Fostering Sustainable Livestock Production: A Tool for Community Economic Development

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Abstract
Livestock production represents an important economic development opportunity in many communities. It is a major economic activity, providing jobs while converting lower value raw materials such as forages and grains into high-value products such as livestock and livestock products. For many rural communities, livestock production is an important ingredient for enhanced economic activity and viability. For others, livestock production may not be a key development focus. Communities will need an aggressive approach in determining their competitive advantages and areas for development of sustainable and expanding economic growth. A commonality for all communities is that sustainability will be needed. Sustainable industries will be built on cornerstones such as economic vitality, impact on quality of life, environmental (waste, odors, etc.) impacts, and animal and worker welfare and health. All will need consideration when identifying strategies for a sustainable and competitive livestock industry, which is integrated into the community environment.

Disciplines
Agribusiness | Agricultural Economics | Animal Studies | Food Security

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A Tool for Community Economic Development

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Introduction

Livestock production represents an important economic development opportunity in many communities. It is a major economic activity, providing jobs while converting lower value raw materials such as forages and grains into higher value products such as livestock and livestock products. For many rural communities livestock production is an important ingredient for enhanced economic activity and viability. For others, livestock production may not be a key development focus. Communities will need an aggressive approach in determining their competitive advantages and areas for development of sustainable and expanding economic growth. A commonality for all communities is that sustainability will be needed. Sustainable industries will be built on cornerstones such as economic vitality, impact on quality of life, environmental (waste, odors, etc.) impacts, and animal and worker welfare and health. All will need consideration when identifying strategies for a sustainable and competitive livestock industry which is integrated into the community environment.

Economic Impact of Livestock and Pork Production

Iowa Impact The livestock sector is a major source of jobs for both rural and urban sectors. Otto has projected that 166,000 jobs in Iowa are directly or indirectly related to livestock production. These jobs represent those involved with supplying inputs to the livestock production sector, direct activities in livestock production, and through to the livestock packing and meat processing industry. This represents about 12 percent of the Iowa labor force and accounts for more than 14 percent of the state's wage and salary income. If livestock production in Iowa was increased by as little as one percent over present levels, employment levels would increase by 20,680 jobs. New jobs in the livestock sector produce, on average, an income of $25,600 annually; a wage and salary income of about $18,000.
Livestock currently accounts for about 55 percent of Iowa's gross receipts from farming in a typical year. Prior to the growth of cash grain production in the 1970s and 1980s, this was as high as 70 percent. Pork production is a major Iowa industry. In a typical year, it represents more than $12 billion, or 5 percent of the state's total economic output (Otto). Of this, $2.7 billion is direct receipts to pork producers from hog sales, $5.5 billion is packing/processing activity, and $3.8 billion is additional production level activity including goods and services sold and wages earned at the local community level. Including the packing/processing industry more than 93,000 jobs are linked to the pork industry. This represents 6.25 percent or one in every 16 jobs in Iowa.

Community Impact Livestock and livestock product production is widely dispersed throughout Iowa representing a primary economic activity in many counties and communities, of which pork production is the largest. For example, with annual state marketings of about 25 million head per year, average annual hog marketings per county would be about 250,000. This generates about $52 million in economic activity per county, $16.4 million in personal income and 488 jobs (Otto). For many communities, other livestock is produced as well. Thus, the livestock impact is far greater.

Pork production represents a "value adding" industry, transforming grain and forages into products of higher value. An example of the "value adding" process is shown in Table 1. In Table 1 a typical trade for a rural community is presumed to be 100 square miles. Over the past few years the average annual hog marketing in Iowa has averaged 23-25 million head; or approximately 400 hogs for every square mile. Given this, there are 40,000 hogs marketed per 100 square mile trade area. Concentrated pork production areas would have more hogs. Table 1 shows that the increased value of pork over the homegrown feed fed is $72.00 per head; or $2.88 million for the 40,000 hogs. With an average marketing weight of 240 pounds and a live weight price of $43.34 per cwt., total revenue from pork production in the trade area would be $4.16
million. Given an output multiplier of 2.0, the $4.16 million generates another $4.16 million of revenue for the local economy. In total, $8.32 million is generated. Selling homegrown crops (cash grain) would have generated an income level of $1.28 million; the value of homegrown feed or $2.56 million of economic activity with a multiplier of 2.0. The veterinarian, feed dealer, building construction personnel, etc., spend their income in the community. Producing pork dramatically increased this value and the income base for the producing area. For example, if feed purchases are $33.00 per hog, expenditures in the rural economy for feed would generate $1.32 million. Most Iowa communities also have other livestock enterprises, so the impact of all livestock production is dramatically higher. Moreover, developing a livestock processing industry around the production base expands revenues still further. Thus, it should be clear that livestock production is a very important economic development avenue and value adding process for rural communities. It clearly offers many opportunities for economic development.

Table 1. Economic Impact of Pork Production in a Community. a

<table>
<thead>
<tr>
<th>Description</th>
<th>Dollars Per Hog</th>
<th>Dollars Per Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hog Value (2.4 cwt x $43.34)</td>
<td>$104</td>
<td>$4,160,000</td>
</tr>
<tr>
<td>Homegrown Feed</td>
<td>$32</td>
<td>$1,280,000</td>
</tr>
<tr>
<td>Value Above Homegrown Feed</td>
<td>$72</td>
<td>$2,880,000</td>
</tr>
</tbody>
</table>

aEstimated at 400 pigs per square mile (approximate Iowa density) or 40,000 pigs per 100 square miles. The typical trade area of a rural community is presumed to be 100 square miles.

Farmer Purchasing Patterns In theory, the economic impact of livestock production on rural communities is not significantly impacted by industry organizational structure. This is the case if producer purchasing patterns are the same by type of organization or farm size. In reality, community economic impact is directly related to factors such as purchasing and marketing patterns and location of profit centers. For example, purchasing and marketing arrangements that bypass local communities does not add economic activity for that portion of the purchase or marketing function. Moreover, profits
earned by outside interests such as contractors are less likely to be retained in the community than profits earned by community residents.

A Minnesota study showed that on average about two-thirds of all farm expenses were made locally (Chism and Levins). This ranged from 98 percent for crop chemicals to 11 percent for livestock. However, there was substantial variation between farms. Of the 30 farms surveyed, one purchased 92 percent of its products locally while one purchased less than one-third locally. In general, smaller farms purchased a higher percentage locally than did larger farms.

Local expenditures declined dramatically for livestock farms as compared to crop farms. Crop farms of all sizes tended to purchase locally. In contrast, for the livestock farm, 11 percent of livestock purchases were made locally. Of the feed purchased, 59 percent was purchased locally. Purchases of feed ingredients, antibiotics, protein, vitamins and minerals lend themselves to discount pricing from distant dealers. Thus, forty-one percent was not purchased from the nearest town.

A recent Iowa hog operations study showed similar results (Lawrence et. al.). For the smaller hog operations (those marketing less than 700 head annually) 69 percent of the feed was purchased within ten miles of the operation. This compared to 42 percent for the large operations. For the Iowa study a large producer was classified as marketing 2,000 or more hogs per year; not large relative to some operations. An important issue is if these trends continue as operation size increases to the 50,000 or more head marketed. About 11 percent of the large operations purchased feed from operations located 50 or more miles from the hog operation; for small operations this was five percent. Only 15 percent of the large operations purchased equipment within ten miles of the operation while 35 percent went 50 miles or more for equipment purchases. In comparison, only 2.8 percent of the small operators went 50 miles or more for equipment purchases. Patterns similar to equipment were shown for building supplies. Distances for banking services were similar for all farm sizes with the majority within ten miles.

These studies raise concerns for rural communities. Larger livestock producers have a greater tendency to bypass local communities and travel longer distances to purchase inputs. As the hog industry moves to larger and fewer operations these pressures on rural communities will continue to grow. Rural communities, too, need to become active in livestock production networks, coalitions, cooperatives, etc. These forms of organizations which help keep the small- and medium-sized producers competitive are also vital to keeping the small- to medium-sized
community competitive. Coordinated efforts may represent the lifeblood for both the livestock producers and the rural community. Economic benefits can flow in both directions: the producer and the community. Efficiently operated industries are key to business and community survival, just as efficiently run pork production units are key to industry survival.

**Livestock Increase Returns** Livestock production has been shown to improve the profit potential for farming systems (Duffy). Livestock can improve the economic viability of the system through diversification, improvement in labor utilization, and provide crop fertilizer through manure availability; all leading to improved profit. Information in Table 2 provides management returns for four production scenarios evaluated under three crop yield levels.

For the analysis, pig production levels were held constant at 7.4 pigs (2.4 cwt.) marketed per litter with two litters produced per sow per year. Given medium crop yields, 400 acres of corn/soybeans provided an annual return of $6,711. This compared to $39,320 for 400 acres of corn/soybeans with 120 sows farrow-to-finish; an increase in annual returns by $32,609 through adding hogs. This can provide a dramatic boost to economic activity for communities. These increased profits are also accompanied by less dollar outflows from the community for purchase of commercial fertilizer. Commercial fertilizer purchases can be reduced through proper manure management and application.

Table 2. Return to management for various crop and livestock scenarios.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Low Yield</th>
<th>Med. Yield</th>
<th>High Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 acres--corn/soybeans</td>
<td>($1,616)</td>
<td>$6,711</td>
<td>$11,844</td>
</tr>
<tr>
<td>1,000 acres--corn/soybeans</td>
<td>(1,410)</td>
<td>16,777</td>
<td>29,609</td>
</tr>
<tr>
<td>400 acres--continuous corn w/120 sows</td>
<td>24,035</td>
<td>31,532</td>
<td>35,885</td>
</tr>
<tr>
<td>400 acres--corn/soybeans w/120 sows</td>
<td>29,283</td>
<td>39,320</td>
<td>44,668</td>
</tr>
</tbody>
</table>

Source: Duffy.

An issue for Iowa is that its share of the feeder pig production industry appears to be rapidly eroding. Over the two year period, June 1992 to June 1994, Iowa’s sow herd decreased by about 12 percent. Over the same time, North Carolina’s sow herd increased by 61 percent. The only Iowa operations which did not show the dramatic declines were the finishing operations.
Iowa has two important ingredients for finishing hogs: cheap corn and high hog prices.

Feeder pig production is a “value-adding” phase of pork production and its decline has implications for Iowa. Farrowing requires higher skilled labor, more labor, and pays a higher return than does finishing. Loss of feeder pig production means communities lose the economic activity and associated jobs. The finishing phase represents the lower wage rate jobs along with high manure output. Thus, there are two fronts for evaluation; the potential for loss of jobs, and increased manure management demands when pig grow-finishing replaces farrowing. While maintaining market hog numbers is a better alternative than also losing market hogs, the state is losing economic activity when farrowing operations are lost.

Production of pork is closely related to two other key Iowa industries; the Iowa corn and soybean industries. Livestock is the number one market for Iowa corn and soybeans. About 50 percent of Iowa’s corn is fed to livestock in Iowa, while about 60 percent of the soybeans are used to feed livestock. This represents a huge “value-added” economic base for the state.

**Ingredients for Livestock Industry Development** The future livestock industry will be impacted by many forces. These can impact rural communities as well and will mean adjustments for rural communities as well as agricultural producers in the quest to grow. Issues facing the livestock industry include: fewer, larger and more specialized farms; increased industry collaborations; cost leadership; access to information, technology; financing; environmental impacts; and sustainable systems. As communities work on identifying their competitive advantages these issues will need to be addressed. An evaluation of the ability to handle these issues and the likely impacts will provide an information base for collaborative decisions and community development.

The challenge for rural communities and pork producers is to meet the future aggressively with the aim of determining where or if livestock production fits into community development plans or if it will be met passively with a likely decline in livestock as an economic production base for the community. The Iowa livestock industry, in particular pork, is on solid footing but needs to remain aggressive if it is to maintain or expand its impact on rural communities.
production represents 30 percent of all agricultural marketing and over half of livestock marketings.

The trend toward fewer and larger farms means rural communities, too, will be dealing with fewer farm operators. Those remaining will be highly business oriented, continually looking for ways to improve their farming operation. The number and structure of farm operations can impact the coordinated and interactive approach rural communities take in the livestock industry.

Development of a livestock industry that represents a competitive growth industry will require much interfacing and integration of the necessary industry components. This will require producers who are highly efficient and operations which are intensively managed. Agri-businesses in the rural community, too, will need to be efficient. The pork production industry infrastructure will need to develop the resource base necessary to meet the challenges of both national and international competition. Effective collaborative efforts between rural communities and livestock production industries will be vital for industry development. This can enhance the industry's input, production and marketing efficiencies. It can improve the competitiveness in pricing and marketing. Larger livestock production operations appear to be able to extract volume discounts for products they buy and volume premiums for livestock they sell. Marketing organizations may be able to pool livestock and sell on a volume basis. Group buying can be used to obtain input cost discounts. Producers will need to increasingly look to these opportunities to improve their competitive position. Collaboration will also lead to more uniform production systems and techniques along with products produced. Within development, it is necessary to realize that production system management determines profitability. Moreover, production and cost efficiency will be necessary for survival. The knowledge base will be crucial. A community focus will be needed to foster adjustments to encourage competitive and sustainable industries.

Many elements are necessary for development and/or enhancement of a livestock production industry. With an industry such as the livestock industry, where there is a large number of producers producing a product of uniform quality, cost leadership is important. Some communities will be able to develop a competitive niche market for a specialized product. However, for most, this will not be feasible and cost leadership will be needed for development. Cost leadership demands a sustained level of capital investment and capital access in agriculture; intense management of production.
systems; effective use of labor; distribution cost which are low, and products which are cost effectively manufactured. Cost leadership will require good records. Records are needed to remain competitive. Producers need to know production levels and establish goals to achieve levels similar to what top producers are now achieving. This includes many factors of production including reproduction, feed usage, labor and facility utilization. Technological advancements, will further increase the need for good records.

Producers positioned to remain competitive have an effective information base for decision making. This can be difficult for the typical Midwest diversified farming operation where many livestock producers have from two to six or more enterprises. It can be quite difficult to stay current on production technologies etc. for all enterprises. Dynamic forces are continually interacting causing price etc. shifts. To remain competitive it will be necessary for independent producers to stay abreast of two or three of the enterprises and obtain guidance and information on the other enterprises through organizations offering this service. An increasing amount of information etc. will be infused into the decision process from off-farm sources. In effect, the producer becomes a specialist in managing some of the enterprises and relies upon someone else (consulting etc.) for the intensive management information for the other enterprises. The producer remains in control but works directly with others to infuse intensive management into their operation. This arrangement presents the opportunity to capture some of the advantages of both diversification and specialization. The synergistic relations of diversification can be more fully incorporated into the farming operation.

Rural communities can be instrumental in developing systems to provide the information base for management decisions. This includes information on new technologies and products, information on the financial and productive performance of the farm, and information on performance of competitors. Near or quick access to good information can directly impact the operations competitive position. This would help with input purchasing, production, as well as marketing decisions. Access to information and the ability to effectively use the information in management decisions will be a necessity to remain competitive in tomorrow's agriculture.

While there is movement toward specialization of function, diversity of resource base will be maintained in many situations, as well. One way of accomplishing this is through establishing the farming operation around multiple families. This has been occurring with increased regularity the past few years
and will continue into the future. Multi-family operations allow for the specialized management focus while capturing the synergistic advantages of diversification. An example may be an operation with livestock production and crop production. This system captures the synergistic effects gained through the combination of enterprises such as hog and crop production. The advantages of specialization, as well as diversification, are encompassed within one operation.

Competitiveness in pricing and marketing can also aid in developing a stronger cost leadership position. Participants in the livestock industry need to avail themselves of these opportunities, enhancing their competitive position and the rural communities as well. Input purchase discounts can come from volume buying. An approach such as group buying may provide some of these advantages. Volume selling can provide similar benefits. A competitive packing and processing pork industry also is needed. During the past few years Iowa has enjoyed the highest hog prices in the country because of the excess packer capacity in the state. Currently, 20 percent of the market hogs processed in packing plants located in Iowa are finished in other states and shipped to Iowa for processing. This trend of relatively high hog prices in Iowa has only occurred over the past ten years and will not likely be maintained into the future. Relative prices will decline as the higher cost plants exit the industry.

The financial community too has an important role in developing and enhancing the livestock production industry. This is through providing the necessary capital as well as encouraging development of financial ratios for use in farm business analysis. Capital is needed for the continual investment in new facilities and remodeling necessary to maintain the cost leadership position. Community efforts may be needed to assure capital access at competitive rates.

Many rural communities have the necessary ingredients for developing a livestock industry which is competitive. There is near access to feed grains and availability of quality labor and management. Economically and environmentally sustainable production systems are needed. In the Midwest many areas produce surplus grain, an ingredient for relatively low grain prices. The main issue is developing the needed institutions and organizations to foster a competitive and sustainable industry. Factors in the community which serve as expanders as well as inhibitors to an economically competitive and environmentally sound livestock production industry need to be identified.

Livestock production offers the potential for a growth industry in many rural communities. For a community looking to livestock production for development, the objective is to position the
industry for infusion of those technologies which improve the competitive position while maintaining or improving the environmental soundness. Much collaboration is needed between the livestock production industry and the communities to establish the services and infrastructure necessary to establish a nationally as well as internationally cost effective industry. This would develop a value added industry which would depend upon lower value resources as raw materials. These raw materials, such as feed grains, would in many cases also be produced in the rural community. However, to foster development will require the proper economic environment. And to be sustainable over time, livestock production will need to be economically as well as environmentally sound. Improved collaboration between industry participants is needed in the future.

It is important to develop plans to address environmental issues. The location of production facilities is one issue facing the livestock industry. Public-policy decisions including land-use planning and zoning must provide the guidance that producers and local governments need. It will be necessary for livestock production operations to react promptly to environmental pollution stemming from run-off or leaks, and to maintain open communication and cooperation with community leaders.

A big issue in many livestock production systems, especially those currently being constructed, is that of odor control. When making a building siting decision, potential odors should be viewed as a key issue. With the movement of some families to rural settings the importance of the odor issue will increase still further in the future. Effective odor control will be needed.

Control and use of animal waste is rapidly becoming an important issue in livestock production. Land application is the primary method of animal-waste management. Proper handling can reduce nutrient loss as well as odors. Incorporation preserves nutrients and reduces the potential for surface water pollution. Odors can also be reduced by incorporating manure into the soil during or immediately after application. Cost effective use of the manure is needed.

Producing healthy animals is a must. This enhances the ability to compete and be a cost effective producer. Additionally, animal health has implications for quality of food products available for consumers. It can reduce problems of transfer of communicable diseases from animals to humans, as well as reduce residues of compounds, such as antibiotics, found in animal
products. Improved animal health also reduces the spread of disease between farms. Thus, providing the opportunity to enhance the competitive position of the livestock industry in the community. Animals will need to be produced under conditions leading to the welfare of the animal. This issue needs consideration whenever constructing and/or remodeling livestock production facilities. Animal welfare issues will demand that animals be produced under conditions leading to their welfare and well being. This is a major item in facility design in some European countries and will increase in importance in the United States in the future.

Sustainability has at least two parts: economic sustainability and environmental sustainability. All too often these are viewed as two independent events. However, they need to be treated as synonymous events. From an environmental perspective production systems need to maintain or improve the environment if there is to be sustainability. Similarly, if a production system is not economic in being cost effective and provide an adequate level of living for the operator the system is not sustainable. For sustainability both conditions, economic and environmental, need to be met. Production technologies and systems which do not fulfill both requirements will have difficulty in surviving over time. There will be pressures for adjustment.

Summary

Pork production can provide an economic base for rural communities. It provides the opportunity for jobs and allows for the conversion of basic products such as grains and forages into higher value products. Collaborative efforts between all industry stakeholders in the community will be necessary for development of a sustainable industry. Issues such as economic vitality, environmental impacts, impact on quality of life, etc., animal and worker health and safety, technology infusion, and industry structure need evaluation.

Community leaders need to pursue a community focus for development. For some the focus will be in livestock or pork production. For others, the advantage will be in other areas. Communities need to identify their competitive advantages and ability to develop cost competitive industries. Further, collaborative efforts to further develop livestock production in rural communities need to be cognizant of industry movements and needs. These will impact on
directions for development and ingredients needed for an economically and environmentally sound and sustainable industry.

Many Iowa communities have the necessary ingredients for developing or further enhancing a livestock industry which is competitive. Near access to grains, a key ingredient to a low cost feed supply, is present for most Iowa communities. Most areas produce surplus grain, and thus have relatively low grain prices. Most communities also have available labor and livestock expertise is available in the state. These are two other important ingredients to establishing a competitive industry. Thus, the main issue is developing the needed institutions, organizations, and interaction to foster a competitive industry. Community collaboration is needed to identify factors in the community which serve as expanders as well as inhibitors to an economically competitive and environmentally sound livestock industry. Many factors impact the economic environment and cost advantage for livestock production. Community inventories for development are needed. For many Iowa communities, livestock production will be a dominant force.

The bottom line for development is identification of advantages. Communities need to identify where their advantages lie, establish goals, develop plans and establish methods to achieve these goals. A system approach is needed for livestock industry development. This system should encompass the rural community, the animal, the consumer, the environment, and the producer. Within this system networks, coordination, cooperatives, etc. will be an essential ingredient of system enhancement and growth. Networking too can assist adjustment of rural communities to the changing livestock industry environment. These coordinated efforts may represent the lifeblood of both the livestock producers and the community. The key ingredient for network development is the personnel or individuals that will direct or foster its development. Rural communities need these resources.
References


