

A Review of the Proposal and Draft DEQ  
Permit for A Farrow-to-Finish Hog  
Operation By Big Sky Farms, LLC In  
Cassia County, Idaho

By Dr. William J. Weida  
January 18, 2001

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## Executive Summary

1. The Cassia County Zoning Ordinance is, in part, designed: "to encourage the orderly growth of the county...to protect the tax base, and property rights...to stabilize and improve property values...and to protect both urban and non-urban development."<sup>1</sup>

However, as a capital intensive company, Big Sky's proposed hog CAFO has been designed to minimize the number of workers and hence, minimize the economic impact on the Mini-Cassia region. Only about 150-200 direct jobs would be created at the proposed Big Sky CAFO --if management and staff were located in the county. Further, vertical integration requires purchases from and sales to other members of the vertically integrated company, not from local producers and suppliers. A 1994 University of Minnesota study confirmed that large scale hog production facilities are likely to purchase inputs from a great distance away, bypassing local providers.

2. The Cassia County Zoning Ordinance is, in part, designed to protect the tax base.<sup>2</sup> In addition, the conditional use standards require that the use: "not create excessive additional requirements at public cost for public facilities and services and...not be unreasonably detrimental to the economic welfare of the community."<sup>3</sup>

However, a new study of 1,106 rural communities by Gómez and Zhang of Illinois State University found that economic growth rates were 55 percent higher in areas with conventional hog farms as opposed to those with large hog operations, and communities with heavy hog concentration suffered larger population losses than those with conventional hog operations.<sup>4</sup>

Numerous academic studies have all found significant decreases in property values around large hog sites. Tax adjustments by county assessors in at least eight states lowered property taxes by 10 to 35 percent for neighbors of hog CAFOs in Alabama, Illinois, Iowa, Kentucky, Maryland, Michigan, Minnesota and Grundy County, Missouri.

3. Cassia County Zoning Regulations require protection of the tax base, property rights, and both urban and non-urban development.<sup>5</sup> Further, the General Standards for Conditional Use require that the activity not be unreasonably hazardous to existing or future neighboring uses.<sup>6</sup>

However, the closure plan proposed for the Big Sky Farming Group, LLC hog CAFO doing nothing to remediate the damage Big Sky Farming Group, LLC has caused to the site.

The Big Sky Farming Group, LLC closure plan creates a sacrifice zone with 160 abandoned and badly corroded sow barns, 240 abandoned and badly corroded finishing barns, 527 acres of 5 foot deep evaporation pits--all of which are contaminated with heavy metals, 141 acres of 11-12 foot deep settling pits--all of which are contaminated with heavy metals, and 30 badly corroded digesters for methane production.

The clay bottoms of the evaporation and settling pits will dry and crack, providing direct pathways for leaching of contaminants in the pits into the groundwater. No monitoring of groundwater is specified after closure.<sup>7</sup>

The following long term economic effects of this closure plan are likely:

- a. The tax base at the site itself will suffer. There will be no taxes on the abandoned property and it is unlikely anyone will purchase the property and assume the liability for materials abandoned there.
  - b. The tax base of surrounding properties will be depressed by groundwater contamination, blowing dust containing heavy metal residues, and the aesthetic impact of the abandoned site.
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c. The site will be a nuisance, a hazard, and an open invitation for further, unauthorized dumping. Cassia County will be forced to take control of the site and spend county resources to remove those facilities and materials that constitute a hazard to the general public.

4. The Cassia County zoning ordinance requires that conditional use permits "not create excessive additional requirements at public cost for public facilities and services and...not be unreasonably detrimental to the economic welfare of the community."<sup>8</sup>

However, Big Sky Farming Group, LLC is structured to avoid paying local taxes and its CAFO will increase health costs, traffic, accidents, and road repairs. One Iowa community estimated that its gravel costs alone increased by about 40% (about \$20,000 per year) due to truck traffic to hog CAFOs with only 45,000 finishing hogs. Annual estimated costs of a 20,000 head feedlot on local roadways were \$6447 per mile due to truck traffic.<sup>9</sup>

5. The General Standards of Conditional Use require that the proposed hog farm "not involve...activities...that will be detrimental...by reason of excessive production of...pollution or odors... and not...create conditions that could be unreasonably harmful to the general safety, health or welfare of the community."<sup>10</sup>

However, checks for leakage from ponds and basins into groundwater are specified on 5 year intervals in the face of known problems with seepage from the kinds of earthen lined ponds and settlement basins specified by Big Sky Farms, LLC. In addition, there are 25 different pathogens that operations of the Big Sky Farming Group, LLC hog CAFO could transfer to the groundwater. However, DEQ only requires that Big Sky Farming Group, LLC check for fecal coliform.

6. The draft permit issued for the proposed Big Sky Farming Group, LLC hog CAFO by the Department of Environmental Quality (DEQ) on December 29, 2000 requires that "the permittee shall take all necessary actions to prevent or eliminate any adverse impact on the public health or the environment resulting from permit noncompliance."<sup>11</sup>

However, testing and reporting to monitor compliance with zoning and conditional use laws will be done by Big Sky Farming Group, LLC itself. Cassia County has no professional monitors to enforce these rules.

CAFO operations like the one Big Sky Farming Group, LLC proposes are likely to cheat. If monitoring fails, the only option for controlling the behavior of Big Sky Farming Group, LLC is through economic incentives. But Big Sky Farming Group, LLC operates solely to maximize profits, and if this requires shifting the costs of its waste to its neighbors in the region, that is what it will do.

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## **Introduction**

The economic model that became capitalism is based on efficiencies from standardization, specialization and concentration of productive resources. As capitalism developed and this model was applied to production activities, social and environmental problems such as child labor, unhealthy working conditions, unfair labor practices, and polluting activities often occurred. Over time, these issues were dealt with in the industrial sector through a framework of laws and regulations.

Capitalism assumes that investment capital will flow to the most efficient use. This should maximize the return to the investor and increase the living standard of all members of society. However, capitalist philosophy neither forecasts, anticipates, nor desires that this search for efficiency destroy the surrounding society instead of improving or strengthening it. In fact, if this was an

anticipated outcome of reallocating capital to achieve efficiency, the resistance to such reallocation would be so great it would seldom occur.

Recent economic research shows that capital reallocation involved in the transition to Concentrated Animal Feeding Operations (CAFOs) has not worked to the benefit of agricultural communities where CAFOs are located<sup>12</sup>--yet, if the assumptions underlying economic theory are correct, it should. Simply put, conventional farms that can't compete with larger animal-raising operations should transition to other, more efficient uses and this should strengthen the fabric of the community and society in which the farms exist. Instead, the major export of most rural communities is now their youth and the average age of farmers has increased to about 60 years. There are four reasons that these unfavorable outcomes have been realized instead of the benefits that proponents of CAFOs have claimed:

1. The measure of efficiency currently used to guide investment is based on accounting costs (the costs that show up on the books), not true economic costs (the costs to society.)
2. The revenue stream of the "more efficient" operations contains significant subsidies and, in the non-cost category, tax benefits for the CAFOs.
3. Vertically integrated corporate farms drive smaller producers out of the market and suffer no loss by doing this because the price they receive is the price of the final product--which they also manufacture. Thus, there is no true competition in the raw product market place.
4. And finally, when CAFOs attract capital because they are "more efficient" based on (1) through (3) above, they destroy the health, the environment and finally, the economic viability of the surrounding owners of the "less efficient" conventional farms.

Residents of rural regions are usually quick to recognize the problems associated with the reasons listed above. However, agriculture's shift to industrial CAFOs has outpaced laws and regulations governing agricultural activities--laws and regulations that were meant for conventional farms and ranches. To protect their citizens in this environment, counties have enacted zoning laws that are meant to control the potentially damaging activities of large CAFOs. In this respect, the Cassia County Zoning Ordinance is, in part, designed:

- To encourage the orderly growth of the county.
- To protect the tax base, and property rights.
- To stabilize and improve property values.....
- To protect both urban and non-urban development.<sup>13</sup>

Under this ordinance, large CAFOs must obtain a conditional use permit that assures the previously listed objectives are met. In addition, conditional use permits in Cassia County must:

Not be unreasonably hazardous or disturbing to existing or future neighboring uses (General Standard D)

Not create excessive additional requirements at public cost for public facilities and services and...not be unreasonably detrimental to the economic welfare of the community. (General Standard F)

Not involve...activities...that will be detrimental...by reason of excessive production of...pollution or odors. (General Standard G)

Not...create conditions that could be unreasonably harmful to the general safety, health or welfare of the community. (General Standard H)<sup>14</sup>

This paper will discuss the economics-related impacts of the proposed Big Sky Farming Group LLC Hog CAFO on these General Standards and on the objectives of the Cassia County Zoning Ordinance.

## **I. IMPLICATIONS OF LARGE, CORPORATE HOG FARM ORGANIZATION AND CONTRACT ISSUES FOR THE ZONING REQUIREMENTS OF THE COUNTY AND THE PERMIT CONDITIONS OF THE DEPARTMENT OF ENVIRONMENTAL QUALITY**

In the draft permit issued for the proposed Big Sky Farming Group LLC Hog CAFO by the Department of Environmental Quality (DEQ) on December 29, 2000, the DEQ requires that

The permittee shall take all necessary actions to prevent or eliminate any adverse impact on the public health or the environment resulting from permit noncompliance.<sup>15</sup>

Whether or not this occurs depends on the ability of permitting agencies to gain full information about the operating practices of the CAFO. The ability to get this information depends on the "contract" that is established with the CAFO when it applies for its permit. However, there are actually two contracts of interest created when a CAFO enters a region such as Cassia County:

1. the contract within the CAFO's vertical organization where information is equally shared (Big Sky Farming Group, LLC--a vertical organization that intends to control all aspects of meat production from feed and breeding through the actual marketing of the meat.<sup>16</sup>) and where the motives of all players are a consistent and singular search for profit, and
2. the contract between the residents in Cassia County and the Big Sky Farming Group, LLC hog CAFO where asymmetrical information exists.

When a CAFO enters a rural region, it strikes a bargain with the rural communities in that region. This implicit contract is usually formed around stated, but not legally enforceable, promises of jobs. For example Big Sky claimed it "may employ as many as 800 people" at its CAFO.<sup>17</sup> This figure was meaningless because it claimed the number of employees could be as few as zero or as many as 800 and it contained no reference to the total cost of the facility or to the amount of that cost that would be spent in Cassia County. However, it created a vague promise of an economic benefit in return for land, water, access, power and the other factors that are required for the Big Sky CAFO to operate. This implicit contract also implied a certain physical relationship with the region that manifested itself in the presence (or lack) of pollution, traffic, resource consumption, etc., that arise from the operation of the CAFO, and these parts of the contract have never been discussed in detail by Big Sky Farming Group, LLC.

The CAFO is typically well informed about the legal contract with its organization and the implied contract with the region because it signed the legal contract with the vertical organization (Big Sky Farming Group, LLC) and it extended the offers on which the regional contract is based. But the citizens of the region are privy to very little information about the CAFO's explicit contract with its organization. As a result, there is an incentive on the part of the CAFO to shift costs between the contracts based on each party's access to information about those costs. The party with the least information about costs is most likely to have those costs shifted in its direction.

Local, county, state, and national laws and policies on the environment and on zoning are important determinants of the location of CAFO facilities.<sup>18</sup> Further, these laws and policies affect the

ability of CAFOs to control information about their operations and they are major determinants of the role the CAFO will play in the physical, social and economic environment of a region. The issue here is not whether Big Sky Farming Group LLC can make an implied contract with the Mini-Cassia region. Instead, the issue is that this contract will be based on asymmetrical information that heavily favors Big Sky Farming Group, LLC. Such a contract is likely to work in only one direction--it is likely to increase the profits of Big Sky Farming Group, LLC by shifting the operating costs of the CAFO either to the region in which it is situated or, through some mechanism of pollution migration, to another region further removed from the CAFO. The certainty of this outcome follows directly from existence of asymmetrical information about the operation of the CAFO and from the motivation of Big Sky Farming Group LLC.

In theory, the permitting process used to evaluate CAFO applications should insure that the citizens of a region are fully informed about all aspects of the CAFO's proposed operation. If this was indeed the case, there would be no asymmetrical information. However, the nature of the permitting process allows the CAFO operator to acquire an operating permit while withholding significant amounts of information from the residents of the region. This occurs in the following ways:

1. The CAFO's requirements for secure, sterile operating facilities limit public inspection of and knowledge about the CAFO and even limit the overall organizational knowledge of many CAFO employees. For example, at Big Sky Farming Group, LLC's hog CAFO "Part of each sites' (sic) security is an electrically operated site access gate. This gate can only be opened by security or a key card. Each employee will be issued a key card. Each card is coded differently and access to only locations needed by the employee will be opened by his card."<sup>19</sup>
2. The usual position of the CAFO as a contract operator for a larger, out-of-area corporate interest may limit even the CAFO operator's knowledge of the source of inputs (feeds, antibiotics, etc.), the rationale behind the amounts and types of inputs selected, and the actual value of the product to the owner.
3. Out-of-area ownership severely limits the ability of regional residents to determine the motivation, trustworthiness, and credibility of those who own and operate the CAFO and Limited Liability Corporation status (LLC) limits the ability of regional residents to make the operators of the facility financially liable for problems the facility causes.
4. The short life span of CAFOs (normally, ten to twelve years due both to the increasing incidence of hog disease in older facilities and the extreme corrosive atmosphere in the hog barns) and the normal practice of building CAFOs as turn-key operations limits the ability of regions to establish any reliable record of CAFO performance before committing to a fully-constructed operation.
5. And finally, the CAFO permit approval process is often so rushed and so subject to information controlled by the CAFO that residents of the region have insufficient time to learn enough about the proposal to ask intelligent questions or to do relevant research. For example, Big Sky Farming Group LLC has so carefully controlled public information about its proposed CAFO in Cassia County that even the Idaho Department of Environmental Quality has had to make multiple requests to secure the information they required for the permitting process.

A combination of these factors has created an agreement (contract) between Big Sky Farming Group LLC and a the Mini-Cassia region based on non-enforceable promises of jobs and economic development that have been released in newspaper letters and Rotary speeches, but for which the actual information needed to validly assess the impact of the CAFO on the physical, social and economic environment is withheld from the public and available only to the owners/operators of Big Sky Farming Group LLC. The result is that the county and other permitting agencies have inadvertently created what

economists call a moral hazard, a process that occurs when one party is better informed than the other about the characteristics of the transaction. By definition, a moral hazard leads to lower efficiency and to higher costs to the party that is least informed (in this case, a higher cost to the Mini-Cassia region that hosts the proposed Big Sky Farming Group LLC operation.)

If it allows this moral hazard to be created, the Mini-Cassia region will then be faced with a second economic condition called adverse selection. There will be an incentive for additional owners of hog CAFOs who also want to shift their costs to the residents of a region to migrate to Cassia County. As Milgrom and Roberts note, adverse selection is “a kind of precontractual opportunism that arises when one party to a bargain has private information about something that affects the other’s net benefit from the contract and when those whose private information implies that the contract will be especially disadvantageous for the other party agree to a contract.”<sup>20</sup>

Casson has laid out the general outline of the relationship that develops between a region and the owners of a CAFO as a result of these factors by noting that:

the crucial question... is whether the other party to the transaction can be trusted. There are two fundamental approaches to engineering or creating trust. The one most commonly used in much of the Western world is to monitor performance through the institutional and legal system and penalize those parties that do not fulfill their negotiated commitments. The alternative approach to engineering trust is to manipulate the incentive structure so that individuals fulfill their commitments based on rewards they receive rather than penalties they incur.<sup>21</sup>

For the Big Sky Farming Group LLC hog CAFO the issue of trust is directly tied to out-of-area ownership and the asymmetrical information in the agreement between Big Sky Farming Group LLC and the residents of Cassia County. Since the motivation of Big Sky Farming Group LLC is to create profit, not to control pollution or engage in any of the other social benefits the region may desire, Big Sky can only be trusted to act in its own self interest. The interests of the region could initially be protected by disclosure of full information concerning the operations of the proposed CAFO during permitting. However, due to the factors already discussed, Big Sky Farming Group LLC controls the information in this part of the process. The only recourse for the region is monitoring by knowledgeable regulators.

Unfortunately, in this case the testing and reporting necessary to monitor compliance with zoning and conditional use laws will be done by Big Sky Farming Group, LLC. The Idaho DEQ's role is essentially one of receiving reports written by Big Sky Farming Group, LLC, and Cassia County has no group of professional monitors that could help enforce the rules. Add to this the fact that the Idaho Department of Environmental Quality only calls for Big Sky Farming Group LLC to monitor groundwater quarterly and then to only check for one type of pathogen--fecal coliform; to only check for basin and pond leakage once every five years; and to only check at nine points for possible groundwater contamination.<sup>22</sup> Further, Big Sky Farming Group, LLC's application to DEQ only proposed to monitor chemicals in the groundwater and would not even check groundwater for pathogen contamination.<sup>23</sup>

Factors that make it difficult to get information on proposed CAFO operations during the permitting process also complicate attempts to monitor CAFO operation. This leads to a condition called low separability. Separability is “...the feasibility to see who has done the work. With low separability, the principal [in this case, the Mini-Cassia region] will face either high control costs or intense cheating.”<sup>24</sup> So far, the history of CAFO operations shows that cheating is likely. And it is made even more likely by the decision on the part of many regulating agencies like the Idaho

Department of Environmental Quality to rely on citizen complaints instead of more costly professional monitoring. If monitoring fails or is not effectively implemented, the only other option for controlling the behavior of Big Sky Farming Group, LLC is through economic incentives. But, as previously noted, a powerful economic incentive structure is already in place and this incentive structure has been formalized in the explicit contract between the CAFO, Big Sky Farming Group, LLC, and its investors. This contract directs Big Sky Farming Group, LLC to operate in such a way as to maximize profit, and if it can do this by shifting the costs of its waste to its neighbors in the region, that is how it will operate.

#### A. Specific Impacts on Conditional Use Requirements Stemming From DEQ's Permit Process for Big Sky Farming Group, LLC

The General Standards of Conditional Use require that the proposed hog farm "not involve...activities...that will be detrimental...by reason of excessive production of...pollution or odors [General Standard G] and not...create conditions that could be unreasonably harmful to the general safety, health or welfare of the community." [General Standard H<sup>25</sup>

However, relaxed monitoring of seepage from ponds and basins into groundwater (checking every five years) is proposed in the face of known problems with seepage from the kinds of earthen lined ponds and settlement basins specified by Big Sky Farms, LLC. For example, Ruhl studied earthen basins with above-grade, earth-walled embankments and compacted clay liners. The hog basins held a manure-water mixture from a 5000 pig gestation barn. Monitoring systems were installed below the compacted clay liners both in the sides and the bottom of the basin. Seepage from the basin ranged from 400-2200 gallons per day except during one month and three month periods when 3800 to 6200 gallons per day. Seepage flow in areal units ranged from .025 to .43 inches/day. Except during the first three months when the basin was filling, seepage flow was greater through the sidewalls than through the bottom of the basin. The seepage had concentrations of 11 to 100 mg/L of chloride, 2.58 mg/L or less of ammonium-N, 25.7 mg/L or less of nitrate-N, and organic-N concentrations of .92 mg/L or less. Nitrate-N concentrations in the seepage exceeded the US Environmental Protection Agency drinking water standard of 10 mg/L in 17 of 22 samples.<sup>26</sup>

Ham found that after accounting for evaporation, seepage from lagoons could be determined to within +/- .5 mm per day. The lagoons studied ranged in size from .5 to 2.5 ha (1.24 to 6.2 acres) and waste depths between 1.5 and 5.6 m (4.92 to 18.4 feet) and were built with compacted soil/bentonite liners. Average seepage rates were 1.2 mm/day (.05 inch). Calculated nitrogen export losses from seepage were 2000-3000 kg/ha/year (1826 to 2738 pounds/acre/year).<sup>27</sup>

In addition, " conditions that could be unreasonably harmful to the general safety, health or welfare of the community" could easily arise from pathogens that migrated into the ground water supply from the Big Sky Farming Group, LLC hog CAFO. The pathogens that normal leakage could transfer to the groundwater could include some or all of the 25 diseases in Table 1.

Table 1, Diseases and organisms spread by animal manure

<b>Disease</b>	<b>Responsible organism</b>	<b>Disease</b>	<b>Responsible organism</b>
Bacterial		Viral	
Salmonella	Salmonella sp	New Castle	Virus
Leptospirosis	Leptospiral pomona	Hog Cholera	Virus
Anthrax	Bacillus anthracis	Foot and Mouth	Virus
Tuberculosis	Mycobacterium tuberculosis	Psittacosis	Virus
	Mycobacterium avium		
Johnes disease	Mycobacterium paratuberculosis	Fungal	
	Brucella abortus	Coccidioidomycosis	Coccidoides immitus
Brucellosis	Brucella melitensis	Histoplasmosis	Histoplasma capsulatum
	Brucella suis	Ringworm	Various microsporium and trichophyton
Listeriosis	Listeria monocytogenes	Protozoal	
Tetanus	Clostridium tetani	Coccidiosis	Eimeria sp.
Tularemia	Pasturella tularensis	Balantidiasis	Balatidium coli.
Erysipelas	Erysipelothrix rhusiopathiae	Toxoplasmosis	Toxoplasma sp.
Colibacillosis	E.coli (some serotypes)		
Coliform mastitis	E.coli (some serotypes)	Parasitic	
Metritis		Ascariasis	Ascaris lumbricoides
		Sarcocystiasis	Sarcocystis sp.
Rickettsial			
Q fever	Coxiella burneti		

Source: Agricultural Waste Management Field Handbook, United States Department of Agriculture Soil Conservation Service, April, 1992, p. 3-13, 3-14.

However, DEQ requires that Big Sky Farming Group, LLC check for only one of these pathogens, fecal coliform. In addition to these problems, studies released in 1999 found that

(a) Swine herds are a potential animal reservoir for Swine Hepatitis E Virus and this virus is present in fields to which manure has been applied and in water waste. Swine Hepatitis E Virus may persist in the environment for at least 2 weeks and possibly longer.<sup>28</sup>

(b) A broad profile of chemical and microbial constituents are present in both ground and surface water proximal to large-scale swine operations--chemical (pesticides, antibiotics, heavy metals, minerals, and nutrients) and microbial (Escherichia coli, Salmonella sp., Enterococcus sp., Yersinia sp., Campylobacter sp., Cryptosporidium parvum) contaminants were present.<sup>29</sup>

(c) Antibiotics are present in waste generated at confined animal feeding operations and may be available for transport into surface and ground water.<sup>30</sup>

These data and scientific and governmental studies indicate that those Conditional Use standards relating to "conditions that could be unreasonably harmful to the general safety, health or welfare of the

community" are likely to be violated and further, under the relaxed monitoring proposed by the DEQ, these violations are unlikely to be detected.

## **II. ECONOMIC EFFICIENCY AND THE NEED TO SHIFT THE COSTS OF CONCENTRATED ANIMAL FEEDING OPERATIONS TO THE LOCAL REGION**

The Cassia County zoning ordinance requires that conditional use permits not create excessive additional requirements at public cost for public facilities and services and...not be unreasonably detrimental to the economic welfare of the community. (General Standard F)<sup>31</sup>

However, Big Sky Farming Group, LLC's is very likely to do just that because, by definition, a vertically integrated company like Big Sky Farming Group, LLC is structured to avoid paying enough taxes to cover the expenses it is likely to cause in the region. This occurs because Big Sky Farming Group, LLC is driven by the following concept of efficiency:

Big Sky Farming Group, LLC has claimed that "common farming operations [are] deeply entrenched in inefficient farming practices."<sup>32</sup> The economic issue of efficiency of production is the central rationale for the design of Big Sky Farming Group, LLC's proposal. This argument claims that increasing returns to scale occur because of efficiencies that are realized when more capital is brought to a production process--i.e., the larger the operation, the cheaper one can produce hogs. The resulting capital-intensive process has a much higher reliance on machines and technology and is less reliant on labor. In the CAFO process, raw materials (feed, water, etc.) are submitted to hogs in confinement buildings and the output is pork.

If this was all there was to Big Sky Farming Group, LLC's process, one would expect efficiency of operations to continue to increase as more capital in the form of hogs and buildings was added to the process. However, this is not the case. Efficiency quickly peaks as animal concentration rises because the cost of waste disposal for any CAFO increases sharply after one surpasses the ability of the land to absorb the waste and the cost of disease control rises sharply as concentration is increased. The fact that CAFOs try to avoid these costs by shifting the cost of their waste to the surrounding region makes no difference--the confined operation is still less efficient in an economic sense.

### **The Efficient Size of CAFO Operations**

A team of Purdue University economists recently found that pork industry concentration had increased to the point where the top four pork processing firms controlled 56 per cent of the business.<sup>33</sup> However, if all the economic costs of CAFO operation are considered, two economic concepts--diseconomies of scale and diminishing marginal returns--both mandate that the efficient size of most animal feeding operations should be relatively small. To understand why smaller and medium sized hog operations have lost market share to the CAFO giants it is necessary to investigate how the expected effect of these two economic concepts has been altered by the actions of the CAFO industry.

The first economic concept--diseconomy of scale—usually comes into play when problems associated with some element of a production process increase much faster than the size of the process itself increases. With hogs such a situation occurs with attempts to control disease and the stress factors that occur during confinement, movement and transportation. For example a ten percent mortality rate

is common in facilities of the type proposed by Big Sky Farming Group, LLC. For the Big Sky CAFO, that would equate to about 59,500 dead hogs per year or about 160 hogs per day that must be collected, refrigerated, stored, disinfected, and trucked to rendering plants--all of which increases costs. The possibility of disease among hogs is so great that a heavy use of antibiotics, limitations with respect to shed populations, the requirement to maintain a sterile site, and time limits on how long hog operations can stay in one spot all act to create diseconomies of scale. In fact, large hog CAFOs are usually limited to ten to twelve years at a site before health factors become so overwhelming that they can no longer be controlled with certainty and the hog operation must abandon the site.

A second, more powerful economic concept called diminishing returns also ought to act to limit the size of efficient CAFO operations. Under this concept, when units of a variable resource (such as hogs) are added to a fixed resource (such as land) one reaches a point where the marginal product (the revenue gained from the last hog added to the operation less the cost of the last hog added to the operation) of the variable resource begins to decline. Because of the costs of handling animal waste responsibly, the point at which this decline occurs is closely related to the ability of the land on which the CAFO is located, and the land over which the CAFO will apply its waste effluent, to absorb and recycle the manure. If diminishing returns to a CAFO did not exist, all the hogs in the world could be raised on a single, small plot of land.

To overcome these costs, CAFOs have been designed to take full, economic advantage of assumptions about agriculture that allow important costs of CAFO operations to be either omitted or understated in the profit and loss calculations of the CAFO. They also allow the CAFO to take advantage of important tax and investment opportunities that, in effect, subsidize its operation. These factors artificially inflate the amount of profit available from CAFO operations and generate short term gains for developers and investors. This provides an economic incentive for an organizational model that gives rise to the four common attributes of every CAFO:

- (1) The use of capital intensive production methods. CAFOs use less labor and more machinery to achieve production output.
- (2) Employment of a production methodology that maximizes tax benefits and subsidy availability to the corporation.
- (3) The use of vertically integrated operations where separate divisions of the same company produce the different stages of a product and market their output to one another.
- (4) The use of cost shifting to reduce the costs of production. Cost shifting occurs when the costs of health problems, traffic, social problems and pollution (odors, chemical and particulate air pollution; chemical, pathogen, and particulate water pollution) are transferred to the residents of a region and are neither paid by the company responsible for the costs nor included in the price of the products they market.

For example, additional costs associated with hosting Big Sky Farming Group, LLC will include increased health costs, traffic, accidents, and repairs. One Iowa community estimated that its gravel costs increased by about 40% (about \$20,000 per year) due to truck traffic to hog CAFOs with only 45,000 finishing hogs. Annual estimated costs of a 20,000 head feedlot on local roadways were \$6447 per mile due to truck traffic.<sup>34</sup> Colorado counties that have experienced increases in livestock operations have also reported increases in the costs of roads, but specific dollar values are not available.<sup>35</sup> While the costs of wear and tear on the roads can be compared to the taxes paid in Cassia County by Big Sky Farming Group, LLC, the costs of the traffic in terms of safety, congestion and pollution are shifted to the residents of the county without reimbursement.

Because a CAFO like the one proposed by Big Sky Farming Group, LLC is designed to

1. maximize tax benefits in both industrial and agricultural categories, and
2. maximize subsidies for both industrial and agricultural operations, and
3. shift as many costs as possible to the local region while
4. producing an agricultural commodity (raising animals),

it is not clear what weight if any, one should give to efficient sizes for pork production when discussing a CAFO operation. Any comparison of efficiency is further complicated by the fact that the price of CAFO commodities is more likely to be set by the competitive needs of the organization as a whole (in other words, the competitive price of the final, processed products produced by the vertically integrated organization--i.e., Ramsey Pricing) than by the actual need to directly compete with other producers of pork or chicken. As a result of these factors, the Big Sky Farming Group, LLC hog CAFO is likely to violate the Cassia County Zoning Ordinance by creating excessive additional requirements at public cost for public facilities and services and...be unreasonably detrimental to the economic welfare of the community.

### **III. THE ECONOMIC EFFECT OF THE PROPOSED BIG SKY FARMING GROUP, LLC CAFO ON CASSIA COUNTY'S REGIONAL ECONOMY**

NOTE: Big Sky Farming Group, LLC has provided very little hard information about the actual spending and hiring practices at its proposed hog CAFO. The following data about Big Sky Farming Group, LLC's operation were gathered from various sources (as cited) and are presented along side the normal practice in these areas.

The Cassia County Zoning Ordinance is, in part, designed:

- To encourage the orderly growth of the county.
- To protect the tax base, and property rights.
- To stabilize and improve property values.....
- To protect both urban and non-urban development.<sup>36</sup>

All of these conditions and indeed, the Zoning Ordinance itself, are related to the economic development of the county. However, there is a significant difference between economic growth and economic development. Economic growth concentrates on short-term changes in jobs or price while economic development has the objective of creating a diversified economy that is capable of providing jobs, economic stability and economic growth for the citizens of a region over the long term.

The town of Burley and Cassia County have both begun to focus on economic development. In early 1998, 80 members of the Mini-Cassia business community met after the shock caused by Simplot laying off 400 workers “made the community aware that the region was too dependent on food processing and those few crops grown in the area.”<sup>37</sup> In addition, the city of Burley has begun public hearings for ideas for a five-year revitalization plan for its downtown area.<sup>38</sup>

As opposed to these efforts, the Big Sky Farming Group, LLC hog CAFO proposed for Cassia County neither diversifies the regional economy nor improves the long term economic health of the region. Instead, Big Sky has emphasized short term gains to developers and investors. For example, Big Sky’s proposal spoke of providing “handsome incomes for the developers” and “an internal rate of return for invested capital of 73.9%.”<sup>39</sup> Whether or not these are admirable goals, they contribute nothing to the long-term economic development of the Mini-Cassia region.

Regional economic development proceeds on the premise that the wages paid and purchases made by a company are transferred to other individuals or companies in the region. The multiplier effect of these payments further assumes that they are again spent within the confines of the region and

that they do not “leak” into other areas of the state or nation. However the Big Sky Farming Group, LLC hog CAFO is specifically structured to limit these kinds of payments. In fact, the issue is not that the Big Sky Farming Group, LLC hog CAFO is unlikely to aid regional economic development, the issue is that the CAFO is structured so it cannot aid regional economic development for the following reasons:

### (1) Constraints on Regional Economic Development Due To Employment

As a capital intensive company, a CAFO such as Big Sky’s proposed hog operation has been designed to minimize the number of workers involved and hence, minimize the economic impact of Big Sky’s proposed operation on the Mini-Cassia region. Big Sky’s conditional use permit application claims it could employ “as many as 800 people” [author’s emphasis].<sup>40</sup> This figure is at variance with actual employment figures at other hog CAFO operations. A 1998 Colorado State University study found that 3-4 direct jobs (jobs with the hog producer) are created for every 1000 sows in a CAFO sow farrowing operation.<sup>41</sup> This implies that 150-200 direct jobs would be created at the proposed Big Sky CAFO --if management and staff were located in the county. Big Sky also claims that the “collateral employment multiplier [is] estimated at 1.8x for every direct employee.”<sup>42</sup> This agrees with the Department of Commerce RIMS II model for Eastern Idaho--if one chooses to treat Big Sky’s operation as an agriculture operation. However, if one treats this CAFO as what it is, a factory operation, the multiplier should be similar to that for miscellaneous manufacturing, or about 1.35.<sup>43</sup> Thus, instead of the direct and indirect employment implied in Big Sky’s conditional use permit application of

$$800 \times 1.8 = 1440 \text{ employees}^{44}$$

the actual amount of employment in Cassia County, both direct and indirect could be

$$150-200 \times 1.35 = 200-270 \text{ employees.}$$

It is likely that this figure also overstates the economic impact on Cassia County. For the employment multiplier to operate at the levels specified in the RIMS II model, all employees must both live and work in Cassia County. Given the short commute from Twin Falls, and Big Sky’s own observation about the “significant need for housing”<sup>45</sup> in Cassia County, it is likely that most workers will live well outside the region and that the actual employment multiplier will be further depressed. Further, this number of jobs represents a minimal impact on the Mini-Cassia region. 100 direct jobs were created in July, 2000 when Tele-Servicing Innovations, Inc. opened a branch in Burley.<sup>46</sup> These jobs were created without the kinds of adverse impacts that will accompany the Big Sky Farming Group, LLC hog CAFO.

Ikerd calculated that large farrow-to-finish contract hog operations employ about 4.25 people to generate over \$1.3 million in revenue. His figures show that an independently operated hog farm would employ about 12.6 people to generate the same amount of hog sales.<sup>47</sup> Based on this estimate, if the same increase in hog production levels proposed by Big Sky Farming Group, LLC were achieved simply by expanding the herd size on existing conventional hog farms, three times as much employment--or 600-810 jobs--would be created in the region.

The size of the employment multiplier will further depend on amount of purchases that Big Sky itself makes in the Mini-Cassia region. However, large scale hog production facilities are more likely to purchase their inputs from a great distance away, bypassing local providers in the process.<sup>48</sup> A 1994 study by the University of Minnesota Extension Service found that the percentage of local farm

expenditures made by livestock farms fell sharply as size increased. Farms with a gross income of \$100,000 made nearly 95% of their expenditures locally while farms with gross incomes in excess of \$900,000 spent less than 20% locally.<sup>49</sup>

Cassia County also produces a large amount of grain. Hog production can occasionally benefit grain production, but only when it consumes all the grain produced in the county. If the county has to export even one bushel of grain, all the grain in the county will have to be priced at a lower level that will enable the grain to compete in the export market.<sup>50</sup>

#### (2) Constraints on Regional Economic Development Due To Taxes

Federal, state and local taxes are levied on the taxable amounts calculated on federal returns. The numerous tax write-offs that are possible because hog CAFOs are sometimes treated as industries and, at other times, treated as farms, significantly decrease the amounts of taxes paid locally at the same time the operations of the hog CAFO create social, health and traffic costs that the local government must finance. The local government, in turn, must rely on increased taxes to pay these CAFO-induced costs--and this decreases other economic activity in the region.

#### (3) Constraints on Regional Economic Development Due To Vertical Integration

Vertical integration requires purchases from and sales to other members of the vertically integrated company, not from local producers and suppliers. Thus, vertically integrated companies stimulate regional economies only to the extent that all elements of the company are located in the region. Historically, this factor has severely limited the economic impact of CAFOs on the regions in which they are situated. For example, Lawrence found that in Iowa smaller hog operations (less than 700 head annually) purchased 69 percent of their feed within 10 miles of the operation. Large hog operations (2000 or more hogs per year) that are more likely to be vertically integrated only purchased 42 percent of their feed within 10 miles of the operation.<sup>51</sup>

#### (4) Constraints on Regional Economic Development Due To Cost Shifting

The previous three sections have described the reasons inherent in the structure of hog CAFOs that most of the money from a hog CAFO will either be directly spent outside the region or it will quickly migrate there. However, through cost shifting the CAFO will leave the costs of its odor, health risks, surface water pollution, ground water pollution and in the long run, its abandoned basins, pits and facilities, for the region to deal with. This directly effects both long and short run economic development.

Put bluntly, every company has many choices of location and active recruitment is practiced by most regions. Quality of life is a major factor in decisions to locate in a region, and most companies would never consider locating in an area where large hog farms are operating. In addition, as the following section shows, large hog farms adversely impact the value of neighboring property in the region.

#### A. Likely Property Tax And Economic Development Effects Of The Proposed Big Sky Farming Group, LLC hog CAFO

The Cassia County Zoning Ordinance is, in part, designed to protect the tax base.<sup>52</sup> In addition, the conditional use standards require that the use:

not create excessive additional requirements at public cost for public facilities and services and...not be unreasonably detrimental to the economic welfare of the community. (General Standard F)<sup>53</sup>

These requirements are at variance with the conclusions of a large amount of credible research in this area. For example, on the issue of economic development a new study of 1,106 rural communities by Gómez and Zhang of Illinois State University found that large hog farms tend to hinder rural economic growth at the local level.. All models in the study indicated an inverse relationship between hog production concentration and retail spending in local communities. Economic Growth rates were 55% higher in areas with conventional hog farms as opposed to those with larger hog operations in spite of the fact that economic growth rates had been almost identical in all the studied communities before the advent of larger hog operations in the 1990s. Data in the study also showed that communities with heavy hog concentration suffered larger population losses than those with conventional hog operations. According to the authors, the results of this study suggest that without public policy to protect rural communities, the most probable outcome is the continuing decline of rural communities in the future as the size agriculture and livestock production units continue to increase.<sup>54</sup>

With respect to property taxes, Palmquist et al., in a 1995 study in North Carolina, found that neighboring property values were affected by large hog operations based on two factors: the existing hog density in the area and the distance from the facility. The maximum predicted decrease in value of 7.1 percent occurred for houses within one-half mile of a new facility in a low hog farm density area. [Note: this would mirror the situation in Cassia County where hog farm density is currently low.] A 1997 update of this study found that home values decreased by \$.43 for every additional hog in a five mile radius of the house. For example, there was a decrease of 4.75% (about \$3000) of the value of residential property within 1/2 mile of a 2,400 head finishing operation where the mean housing price was \$60,800.<sup>55</sup>

Large hog facilities have also been shown to have a negative impact on rural residences in other studies. Negative impact decreases as distance from the facility increases and in areas that already have a large number of hog operations.<sup>56</sup> A 1996 study by Padgett and Johnson found much larger decreases in home value than those forecast by Palmquist. In Iowa, hog CAFOs decreased the value of homes in a half-mile radius by 40%, within 1 mile by 30%, 1.5 miles by 20% and 2 miles by 10%.<sup>57</sup>

A more recent study by Palmquist, Roka and Vulkina (1998) shows that large hog operations tend to depress the sales value of nearby homes and real estate.<sup>58</sup> An eighteen month study of 75 rural land transactions near Premium Standard's hog operations in Putnam County, Missouri that was conducted by the departments of Agricultural Economics and Rural Sociology at the University of Missouri found an average \$58 per acre loss of value within 3.2 kilometers (1.5 miles) of the facilities. This study primarily evaluated farmland without dwellings. These findings were confirmed by a second study at the University of Missouri-Columbia by Hamed, Johnson, and Miller that found that proximity to a hog ILO does have an impact on property values. Based on the averages of collected data, loss of land values within 3 miles of a hog ILO would be approximately \$2.68 million (US) and the average loss of land value within the 3-mile area was approximately \$112 (US) per acre.<sup>59</sup>

These findings were further substantiated by a study that found that tax adjustments by county assessors in at least eight states lowered property taxes for neighbors of factory farms. As Table 1 shows, local property tax assessments were lowered in Alabama, Illinois, Iowa, Kentucky, Maryland, Michigan, Minnesota and Grundy County, Missouri. Grundy County has lowered some residents' taxes by up to 30% due to their close proximity to the corporate hog operations of Continental Grain.

Table 1--Property Tax Reductions In Areas Around CAFOs

Area	Amount of Reduction	Reduction In Value Of:
Grundy Co, MO	30%	
Mecosta Co, MI	35%	dwellings only
Changed to	20%	total property (land and structures)
Midland Co, MI	20%	
DeWitt Co, IL	30%	rescinded
McLean Co, IL	35%	
DeKalb Co, AL	base reassessment, variable rates	
Renville Co, MN	base reassessment, variable rates	dwellings only
Humbolt Co, IA	20-40%	dwellings only--now rescinded
Frederick Co, MD	10%	now reduced to 5%
Muhlenberg Co, KY	18%	dwellings only

Radius of reduction varied, up to 2 miles. All were for hogs except Muhlenberg, for chickens.

Source: [Property Tax Reductions](#), scott.dye@sfsierra.sierraclub.org, March 13, 2000

All of these studies indicate that conditional use requirements concerning economic development and maintenance of the tax base are likely to be violated by the Big Sky Farming Group, LLC hog CAFO. However, the requirements levied on the county by the DEQ will also further decrease development and reduce the tax base. The DEQ requires a minimum of 1 mile between any animal housing unit and any occupied dwelling, school, church, or community gathering location. While this restriction is meant to protect local property owners, it also results in a set-aside of a huge parcel of land around the CAFO site that can no longer be used for occupied dwellings, schools, churches, or community gathering locations after the CAFO is approved. This has the effect of stopping development of large parcels of private land that would have contributed to the tax base and to the economic development of the county.

#### **IV. THE LIKELY LONG TERM ECONOMIC EFFECTS OF THE BIG SKY FARMING GROUP, LLC'S PROPOSED CLOSURE PLAN**

The Cassia County Zoning Regulations require protection of the tax base, property rights, and both urban and non-urban development.<sup>60</sup> Further, the General Standards for Conditional Use require that the activity not be unreasonably hazardous to existing or future neighboring uses.<sup>61</sup> The closure plan proposed by the Big Sky Farming Group, LLC hog CAFO appears to be in direct conflict with both objectives.

According to the Big Sky Farming Group, LLC, the closure plan is essentially comprised of one action--flushing, drying and removing the animal waste and sludge from buildings and retention pits. At this point, "the buildings will remain intact and will be considered closed" and retention structures will be considered closed upon removal of any accumulated residual solids."<sup>62</sup> Given the limited life span of hog CAFOs due to disease and the corrosive effects of the atmosphere in the barns on the structure of the buildings, this closure plan could be enacted as early as 10 years after the opening date of the facility. The reason that Big Sky Farming Group, LLC is only spending \$845,565 to accomplish this plan is that they are essentially doing nothing to remediate the damage they have caused to the site.

What Big Sky Farming Group, LLC will create with this closure plan is a sacrifice zone with 160 abandoned and badly corroded sow barns, 240 abandoned and badly corroded finishing barns, 527 acres of 5 foot deep evaporation pits--all of which are contaminated with heavy metals, 141 acres of 11-12 foot deep settling pits--all of which are contaminated with heavy metals, and 30 badly corroded digesters

for methane production. The clay bottoms of the evaporation and settling pits will dry and crack, providing direct pathways for leaching of contaminants in the pits into the groundwater. No monitoring of groundwater is specified after closure and if ten years of sludge remains in the pits at the time of closure, 565 acre feet of sludge that is laced with heavy metals will have to be disposed of.<sup>63</sup>

The following economic effects of this closure plan are likely:

1. The tax base at the site itself will suffer because there will be no taxes on the abandoned property and no one willing to purchase the property and thereby assume the liability for the tons of questionable materials abandoned there.
2. The tax base of the surrounding properties will continue to be depressed by groundwater contamination and blowing dust containing heavy metal residues, to say nothing of the visual and aesthetic impact of the abandoned site.
3. Because the site will be both a nuisance and a hazard as well as an open invitation for further, unauthorized dumping, Cassia County will eventually have to take control of the site and spend county resources to clean it up and to remove those facilities that constitute a hazard to the general public.
4. Big Sky Farming Group, LLC, because it is not a local company and because it is specifically structured to avoid financial liability for its actions, will bear none of the financial burden for these outcomes.

None of these outcomes remotely satisfies the Cassia County Zoning Ordinance requirement that the tax base be protected and that the activity not be unreasonably hazardous to future neighboring uses.

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<sup>1</sup> Cassia County Zoning Ordinance, Chapter 1, Section, 1-2, 1993 with amendments through October 18, 1999.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid., Chapter 13, Section, 13-3, 1993 with amendments through October 18, 1999.

<sup>4</sup> Gómez, Miguel I., and Zhang, Liying, Impacts of Concentration in Hog Production on Economic Growth in Rural Illinois: An Econometric Analysis, Presented at the American Agricultural Economics Association Annual Meeting, Tampa, Florida, August, 2000.

<sup>5</sup> Cassia County Zoning Ordinance, op. cit., Chapter 1, Section, 1-2.

<sup>6</sup> Cassia County Zoning Ordinance, op. cit., Chapter 13, Section, 13-3.

<sup>7</sup> Ibid. p. 160.

<sup>8</sup> Ibid.

<sup>9</sup> Duncan, M.R., Taylor, R.D., Saxowsky, D.M., and Koo, W.W., "Economic Feasibility of the Cattle Feeding Industry in the Northern Plains and Western Lakes States," Agricultural Economic Report No. 370, Department of Agricultural Economics, North Dakota State University, 1997.

<sup>10</sup> Cassia County Zoning Ordinance, Chapter 13, Section, 13-3, 1993 with amendments through October 18, 1999.

<sup>11</sup> Swine and Poultry Draft Permit, SP-001-01, Department of Environmental Quality, December 29, 2000, Section H, no. 9.

<sup>12</sup> Gómez, Miguel I., and Zhang, Liying, op. cit.

<sup>13</sup> Cassia County Zoning Ordinance, op. cit., Chapter 1, Section, 1-2.

<sup>14</sup> Cassia County Zoning Ordinance, op. cit., Chapter 13, Section, 13-3.

<sup>15</sup> Swine and Poultry Draft Permit, op. cit.

<sup>16</sup> Application for Conditional Use Permit, Before the Board of County Commissioners, Cassia County, Idaho, CU991002, October 12, 1999, and verbal clarifications of the nature of the Big Sky organization given at that meeting.

<sup>17</sup> "Supporting Documentation and Concluding Remarks," Application for Conditional Use Permit, Before the Board of County Commissioners, Cassia County, Idaho, CU991002, October 12, 1999

<sup>18</sup> Hennessy, David A. and Lawrence, John D., "Contractual Relations, Control, and Quality in the Hog Sector," Review of Agricultural Economics, vol. 21, no. 1, Spring/Summer, 1999, p. 53.

<sup>19</sup> Application for permit under IDAPA 16.01.09, op. cit., section 8.

<sup>20</sup> Milgrom, P. and Roberts, J., Economics, Organization, and Management, Prentice Hall, Englewood Cliffs, NJ, 1992.

- <sup>21</sup> Casson, M., The Economics of Business Culture: Game theory, Transaction Costs and Economic Performance, Clarendon Press, Oxford, England, 1991.
- <sup>22</sup> Swine and Poultry Draft Permit, op. cit., Section E and Appendix 2.
- <sup>23</sup> Application for permit under IDAPA 16.01.09, op. cit., p. 11.
- <sup>24</sup> Sauvee, Loic, "Toward an Institutional Analysis of Vertical Coordination in Agribusiness," in The Industrialization of Agriculture, Jeffrey S. Royer and Richard T. Rogers, eds., Ashgate Press, Brookfield, VT, 1998, p. 55, 56.
- <sup>25</sup> Cassia County Zoning Ordinance, op. cit., Chapter 13, Section, 13-3.
- <sup>26</sup> Ruhl, James F. "Quantity and Quality of Seepage from Two Earthen Basins Used to Store Livestock Waste in Southern Minnesota, 1997-98--Preliminary Results of Long Term Study," US Geological Survey, Mounds View, MN, 1999, a paper presented at the conference on "Animal Feeding Operations--Effects on Hydrological Resources and the Environment," Colorado State University, Fort Collins, CO, August 30-Sept 1, 1999.
- <sup>27</sup> Ham, J.M., "Field Evaluation of Animal Waste Lagoons: Seepage Rates and Subsurface Nitrogen Transport," Department of Agronomy, Kansas State University, Manhattan, KS, 1999, a paper presented at the conference on "Animal Feeding Operations--Effects on Hydrological Resources and the Environment," Colorado State University, Fort Collins, CO, August 30-Sept 1, 1999.
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- <sup>31</sup> Cassia County Zoning Ordinance, op. cit., Chapter 13, Section, 13-3.
- <sup>32</sup> "Supporting Documentation and Concluding Remarks," op. cit.
- <sup>33</sup> Paarlberg, Philip, "Structural Change and Market Performance in Agriculture: Critical Issues and Concerns about Concentration in the Pork Industry, Testimony before the Senate Committee on Agriculture, Nutrition, and Forestry, Washington, DC, February 1, 2000, in Anthan, George, "Hog-industry concentration assessed," Des Moines Register, Washington Bureau, February 27, 2000.
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- <sup>36</sup> Cassia County Zoning Ordinance, op. cit., Chapter 1, Section, 1-2.
- <sup>37</sup> "Magic Valley," Idaho Employment, vol. 11.1, February, 1999, p. 32.
- <sup>38</sup> "Magic Valley," Idaho Employment, vol. 11.10, October, 1999, p. 16.
- <sup>39</sup> Application for Conditional Use Permit, op. cit.
- <sup>40</sup> Application for Conditional Use Permit, op. cit.
- <sup>41</sup> Park, Dooho, Lee, Kyu-Hee, and Seidl, Andrew, op. cit.
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- <sup>43</sup> RIMS II, Department of Commerce, Bureau of Economic Analysis, Washington, DC, October, 1997.
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<sup>57</sup> Park et al., op. cit.

<sup>58</sup> Palmquist, R.B., F.M Roka, and T. Vukina. 1997. “Hog operations, environmental effects, and residential property values,” *Land Economics*, 73, 114-124.

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<sup>60</sup> Cassia County Zoning Ordinance, op. cit., Chapter 1, Section, 1-2.

<sup>61</sup> Cassia County Zoning Ordinance, op. cit., Chapter 13, Section, 13-3.

<sup>62</sup> Application for permit under IDAPA 16.01.09, op. cit., pp. 168-170.

<sup>63</sup> Ibid. p. 160.