

9602 West Shore Drive
Columbus, Indiana 47201-9292
January 24, 2016

Kris Medic
Extension Educator – Agriculture & Natural Resources
Purdue Extension – Bartholomew County
965 Repp Drive
Columbus, IN 47201

Dear Ms. Medic and members of the CAFO Study Committee,

It is our understanding that your committee recently made the decision to exclude lands owned by the Sycamore Land Trust (SLT), namely Touch the Earth and Tangeman Woods, from your designation as “parks”.

These two county properties comprise a total of 125 acres of beautiful woods. We are frequent visitors to Touch of Earth especially. Bartholomew County should be proud of this wonderful resource that is enjoyed by individuals, families and small groups. TTE is filled with wildlife and a variety of trees and wildflowers: there are over 60 species of plants and trees and more than 40 species of birds and mammals have been observed.

We have delighted our *friends, neighbors and grandchildren* by taking advantage of the educational scavenger hunt thoughtfully provided at the entrance of the woods in the Outdoor Lab. We have been fortunate to take part in educational excursions and efforts to support the wildflowers planted for the 17 species of Monarch and other butterflies that frequent the area. When we aren't enjoying the TTE ourselves, we drive by daily and are able to observe the numbers of our community who visit regularly.

We are confused about why this area would not be considered on your list of parks. Sycamore Land Trust is a trusted partner for all who care about our environment and they have stringent requirements for the property they include in the Trust. These areas contain important natural settings with habitats for wildlife and plants.

We are fortunate that the Sycamore Land Trust has provided these resources for our citizens. This is especially impressive given the fact that both of these properties are available to the public free of charge due to the generosity of various individuals and private foundations and they are well maintained at no cost to county taxpayers.

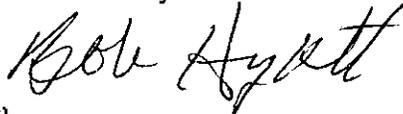
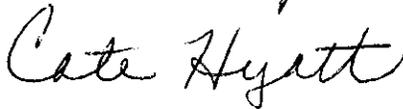
Is there something we are missing in your decision?

We are asking that you reconsider designating these areas as 'parks' for all to enjoy.

Thank you for your consideration of this matter.

Sincerely,

Bob and Cate Hyatt

CC: County Commissioners

Jeff Bergman, Director – Planning Department

Zach Ellison, President – Planning Commission

Bob and Nancy Pulley
8670 W. 450 S.
Columbus, IN 47201

Bartholomew County Planning Commission
Columbus City Hall
123 Washington St. #8
Columbus, IN 47201

Dear Members of the Bartholomew County Planning Commission
and the CAFO Study Committee,

It has come to our attention that the Bartholomew County CAFO
committee is thinking about not considering the Sycamore Land
Trust areas as park land. My online dictionary lists the following
definitions for the noun "Park":

1 *we were playing in the park:* **playground, play area, public
garden, garden(s), green.**

2 *a new national park:* **parkland, wilderness area, protected
area, nature reserve, game reserve.**

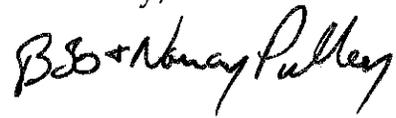
My wife and I visit the "Touch the Earth Natural Area" quite often. I
image we go there at least once per week. We have been walking
there for 15 or 20 years and have seen open fields progress to shaded
groves.

We live in Ogilville and as retirees we try to keep walking in our
exercise regimen. Touch the Earth has two walking loops through
varied terrain totaling about 2 miles. We love going there and
walking both loops. We have seen deer, turkeys, owls and hawks as
well as other walkers.

Look at the second definition of "park" again. Touch the Earth is
open, free of charge, to any who wish to use it. It is a wilderness area
protected from hunting, timbering and development by the Sycamore
Land Trust Board. It is a nature reserve. In fact, a couple years ago
the Trust board provided funds to have many of the invasive species
killed and cut out in hopes of improving habitat for native plant
species. It is a game reserve that provides habitat for many native
animals and birds.

Touch the Earth is not financially supported through taxes, but it is supported through large and small donations by individuals in the public who value setting aside space for nature and its enjoyment. Its' foot bridges and improvements are built by civic minded individuals. It is an important public space. Surely our civic leaders should seek to encourage and honor such examples of private civic generosity and should seek to protect such spaces from encroachment by particularly noxious development.

Sincerely,

A handwritten signature in black ink that reads "Bob + Nancy Pulley". The signature is written in a cursive, flowing style.

Bob and Nancy Pulley

Bergman, Jeffrey

From: Carolyn Otto <carolyn42@comcast.net>
Sent: Monday, February 01, 2016 6:25 AM
To: Bergman, Jeffrey
Subject: CAFO

Categories: Green Category

This letter is to state my opposition to the CAFO proposition. I have read some of the studies about the unfair and untenable losses to small businesses, the probable loss in tax revenues, manufacturing and tourism profits for the county, and the air and water pollution that would impact the area. I am extremely against allowing this to occur in our community. Please consider the needs of the entire county and not just a few special interests.

Carolyn Otto

Bergman, Jeffrey

From: ccaldie@tls.net
Sent: Monday, February 01, 2016 4:46 PM
To: Bergman, Jeffrey

Hi Jeff,

I feel that CAFOs are not good for the health and well being of our community. It is proven that they pollute our air, land and water.

Building one near a park, well, or most of all Anderson Falls is a bad idea. Working at a school, I feel a larger distance should be considered.

The committee minority opinion closest reflects my viewpoint.

I gave the commissioners a letter reflecting my viewpoint. At the least, please consider a compromise to the minority/majority opinions and have greater compromise setbacks which will be safer and better for the general public.

Thank you for listening.

Sincerely,

Cathy Caldie, 6580 South 650 West, Columbus, IN
812 552-9612

synfellette

Bergman, Jeffrey

From: Chuckandsandyhainz <hainz@tls.net>
Sent: Thursday, January 28, 2016 3:32 PM
To: Bergman, Jeffrey
Subject: CFO and CAFO ordinance changes

Good day Mr. Bergman,

I am a home owner in the "2 mile Zone" of Bartholomew County. Over the past year I have followed progress made by a study committee asked to recommend changes to the zoning ordinances that govern siting of what I view as industrial, or factory farming operations.

Recently the Republic had a summary of the progress of the study committee. I also have read the proposed new ordinance and the minority report of the study committee. As are result of these pieces of information I would like to make several concerns known. I hope these concerns can be alleviated in the final ordinance presented by your organization. The proposed new ordinance that I have read does not so do.

1. I would hope that the siting of any large scale, industrial, CAFO type operation would require public notice and review. Notification of the intent should be made to all nearby property owners at least 90 day before allowing the operation to proceed.
2. It Is not clear to me how enforcement of rules governing safe and neighborly operation of the CAFO are to be enforced. A large bond should be required of the operator that would be forfeited if the operation is not in compliance.
3. It is likely that a siting of a CAFO near my home would lower the market value of my home. Who is expected to suffer this loss. I would suggest that the CAFO owner should be required to compensate me for that loss.

I used the word industrial earlier in this message because I do see a clear difference between various types of agricultural practices. A large orchard operation was operated on the land adjoining my home property for many years. The orchard was operated in a way to be an excellent neighbor.

Please help the county continue to be a place where healthy, friendly coexistence of various land uses is continued.

Thank you for your consideration.

Charles E. Hainz

Bergman, Jeffrey

From: Charles Mitch <cmitch01@comcast.net>
Sent: Monday, February 01, 2016 1:34 PM
To: Bergman, Jeffrey
Subject: Written statement for the Feb. 10 County Plan Commission Hearing on proposed CAFO ordinance amendments

Categories: Green Category

Hello Jeff,

Below is my written statement to be submitted to County Plan Commission in consideration of the February 10 Hearing on proposed CAFO ordinance amendments. Please include this with the information provided to them before the Hearing.

Thanks,
Charlie Mitch

* * * * *

Charles Mitch
3210 Grove Parkway
Columbus, IN 47203
February 1, 2016

Bartholomew County Plan Commission
123 Washington St.
Columbus, IN 47201

Dear County Plan Commission Member,

I am submitting written objections to the proposed CFO and CAFO ordinance zoning amendments to be considered by the Bartholomew County Plan Commission. I specifically object to the proposed amendment to make CFOs and CAFOs a Permitted Use instead of as a Conditional Use, as under the current ordinance.

I served as a member of the CAFO Regulation Study Committee, examining CAFO zoning issues in Bartholomew Community. From my service on the Committee, I am aware that CFOs and CAFOs have the potential to be very disruptive to how neighbors use their property. I believe that the community will be best served by leaving in place the requirement for Conditional Use approval, so that site specific issues examined may be examined on case-by-case basis by the Board of Zoning Appeals. For Conditional Use Approval under the current Zoning Ordinance, the BZA is required to make "findings of fact in writing that each of the following is true: 1. General Welfare: The proposal will not be injurious to the public health, safety, and general welfare of the community. 2. Development Standards: The development of the property will be consistent with the intent of the development standard established by this Ordinance for similar uses. 3. Ordinance Intent: Granting the conditional use will not be contrary to the general purposes served by this Ordinance, and will not permanently injure other property or uses in the same zoning district and/or vicinity. 4. Comprehensive Plan: The proposed use will be consistent with the character of the zoning district in which it is located and the recommendations of the Comprehensive Plan.

Unfortunately, if CFOs and CAFOs are changed to be Permitted Uses, none of these criteria would be reviewed by Planning Department Staff as part of their decision process. Planning Department review would be limited to

evaluating whether simple setback distances from residences and certain other uses have been met. Removing the BZA and the four criteria for decisions from the process is contrary to the best interests of the community.

Having CFO/CAFOs classified as a Permitted Use would also be inconsistent with current Zoning Standards that classify animal boarding facilities and animal shelters as Conditional Uses. Recently, a relatively small wildlife rehabilitation facility was required to apply for Conditional Use as an animal shelter. It would be unfair and unjust to allow a CFO or CAFO, housing many more animals and generating considerably more animal waste, to be regulated as a Permitted Use, while the much smaller wildlife rehabilitation center is required to meet stricter decision criteria for Conditional Use.

A basic question for any zoning plan is who makes decisions about zoning and will the public have any opportunity to participate in the process. Because of the ongoing controversy regarding CFOs and CAFOs, it is essential that requirements for public notice and public hearings be retained. Decision makers need to hear the concerns of neighbors and of the community. They need to have this information so that they can properly evaluate how to balance conflicts over how land is to be used. To eliminate public notice and public hearings would build into the counties zoning ordinance, a preference for those wishing to operate CAFOs over neighbors wanting to use their property for other uses. This is inconsistent with the county's comprehensive plan, which calls for both agriculture and residential uses in Agriculture Zoned districts. Residents in Agriculture Zoned districts should not be treated as second class citizens, less favored than those wishing to operate CAFOs. An essential part of trying to maintain some balance between conflicting uses, such as CAFOs versus neighboring residential uses, is the requirements for public notice and public hearings for proposed CFO and CAFO applications.

Doing away with public notice will also disadvantage aggrieved parties who may wish to appeal decisions made behind closed doors by the Planning Department Staff. A neighbor may be prevented from making a timely appeal if they have no way of knowing that a decision was even made. That kind of "catch-22" has no place in our ordinance given the ongoing controversy over CFOs and CAFOs in our community.

I urge the plan commission to retain conditional use permits for CFOs and CAFOs and reject the undemocratic proposal to do away with public notice and public hearings by changing to a permitted use scheme.

I also object to other aspects of the ordinance changes recommended by the so-called "majority" report . I find the proposed setback distances to be grossly inadequate. The "majority" report fails to provide any scientific or technical justification for such short setback distances. I also object to the grandfathering of CFOs and CAFOs wishing to expand, by exempting them from setback distances to more recently constructed neighboring uses. Such an exemption would fail to strike an appropriate balance between conflicting zoning uses.

The impact of CFOs and CAFOs on property values throughout the community needs to be evaluated. Indiana Law sets out requirements for Zoning Ordinances and Amendments, including a mandate that the Plan Commission "pay reasonable regard to the conservation of property values throughout the jurisdiction"(IC 36-7-4-603). The proposed "majority" ordinance changes should be rejected because they fail to meet this statutory requirement to protect property values throughout the community.

In conclusion, our community would best be served by the Plan Commission instructing the Planning Department to draft CFO and CAFO Zoning ordinance amendments that reflect the scientifically justified recommendations of the so-called "minority" report.

Respectfully submitted,
Charles H. Mitch

Criteria for Zoning Ordinances and Amendments - from Indiana Law

IC 36-7-4-603

Zoning ordinance; preparation and consideration of proposals

Sec. 603. In preparing and considering [zoning ordinances] the plan commission and the [county commissioners] shall pay reasonable regard to:

- (1) the comprehensive plan;
- (2) current conditions and the character of current structures and uses in each district;
- (3) the most desirable use for which the land in each district is adapted;
- (4) the conservation of property values throughout the jurisdiction; and
- (5) responsible development and growth.

Zoning ordinance Section 6.3(B)-CFO Requirements:

3. Minimum Separation Distances. All CFOs shall be separated from other properties and/or uses as specified below:

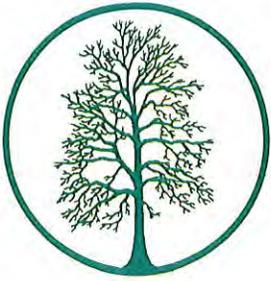
C. Residential Properties in Agricultural Zoning District: No CFO facility shall be located closer than 500 feet to any residential property (any property of 5 acres or less regardless of whether or not it currently contains a residence) located in an Agricultural zoning district. The separation shall be measured from the nearest structure associated with the CFO facility to the residential property line.

Cheryl Mullis
3344 N 1200 E
Hartsville IN 46244

Whether I own 5 acres or 100 acres it should not matter. The 500 ft. should always be measured from the property line to the new structure. However 500 ft. is not enough when you have taken out the amount of animals allowed on a site. 500 ft. might be okay for 600 hundred animals but 4400, or 8800, the distance should be greater. We should have at least 1000 ft. to the property line. Always the Property line.

The State just paid Purdue to conduct a study on CFO-CAFO's out of 81 counties 64 currently have zoning ordinances. The Population Density is something that this county should look at. This planning board should look at the findings. The neighboring county's Johnson, 750 ft. from property line, Jackson county is Proposing 1000 ft. to property line. (Don't sell us short.) We have twice the population density as are neighboring counties.

Consider the rights of the Majority of Bartholomew County residents, and protect our property values by increasing the required set backs from what has been proposed!



Sycamore Land Trust

P.O. Box 7801 • Bloomington, IN 47407-7801 • Phone: 812.336.5382 • Fax: 812.336.6193
info@sycamorelandtrust.org • www.sycamorelandtrust.org

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Don Whitehead
Todd Young

January 12, 2016

Zach Ellison, President
Bartholomew County Planning Commission
5995 W Lowell Road
Columbus, IN 47201

Dear Mr. Ellison,

I understand that Bartholomew County is currently studying potential changes to the county planning regulations as regards Confined Animal Feeding Operations. As part of that assessment, you are looking at areas that may warrant setbacks or buffers, including parklands. I am writing to ensure that you have accurate information about Sycamore Land Trust and the properties it owns in Bartholomew County. I believe you may have received some misinformation about our work previously.

Sycamore Land Trust is a twenty-five year old nonprofit conservation organization working in twenty-six southern Indiana counties. The organization has owned property in Bartholomew County for nearly two decades. Currently, Sycamore owns two properties—93 acres on Country Club Road and 32 acres on SR46—that are open to the public. Additionally, these properties are used as part of our state and national award-winning Environmental Education Program for area schools, including those in Bartholomew County. Sycamore maintains walking trails on both of these properties, and hundreds of people a year use them for recreation and family enjoyment.

I understand that you have declined to consider Sycamore Land Trust properties as parks. I have been told that you may have been advised that calling our properties parks would lead to just anyone and everyone putting their land in to Sycamore Land Trust, thereby making it impossible to ever locate a CAFO. This suggestion represents a wild misunderstanding of what we do and how we do it. I write to you now to make sure you are clear as you consider your revisions. Put simply, I urge you to consider Sycamore Land Trust properties as parks within your definitions, as they meet both technical and common sense understandings of what that term means.

First, Sycamore works with private landowners on voluntary land purchases or donations. Second, those properties acquired by Sycamore are open to the public for



Cedar Crest

passive enjoyment, often including hiking trails and educational field trips, but not hunting, camping, or more intensive uses. Third, Sycamore is selective about which properties it chooses to acquire. Our resources are limited like any private business, and we do not work on properties that have no or limited conservation value. The risk of every landowner wanting to block a CAFO giving his or her real property to Sycamore Land Trust is both nonsensical and impractical. Even if they wanted to, we would not do it. That is not how we operate, and our mission is not to block CAFOS.

When we consider properties for protection, we ask:

Does it include important natural habitat for wildlife and plants, or buffers important habitat?

Is it in a relatively natural, undisturbed condition?

Is it adjacent or close to land already protected by Sycamore?

Is it adjacent or close to public land or other permanently protected private land

Does it include or protect a significant river, stream or wetland?

Is it large enough that its conservation values will likely remain intact despite possible future changes in adjoining land use?

Not all properties fit these considerations, obviously.

By classifying Sycamore lands as parklands, you are not opening up a loophole to be exploited by hundreds of landowners. You are making a common sense declaration that these natural areas protected and enhanced for the enjoyment of the citizens of Bartholomew County should be recognized as what they are: **parks**.

You deserve, as public servants, accurate information in your decisionmaking process. I would be happy to come and meet with your group either in a public forum or private meeting. Please feel free to contact me with any questions. I hope you will take this matter under further consideration.

Sincerely Yours,



Christian Freitag, JD, PhD

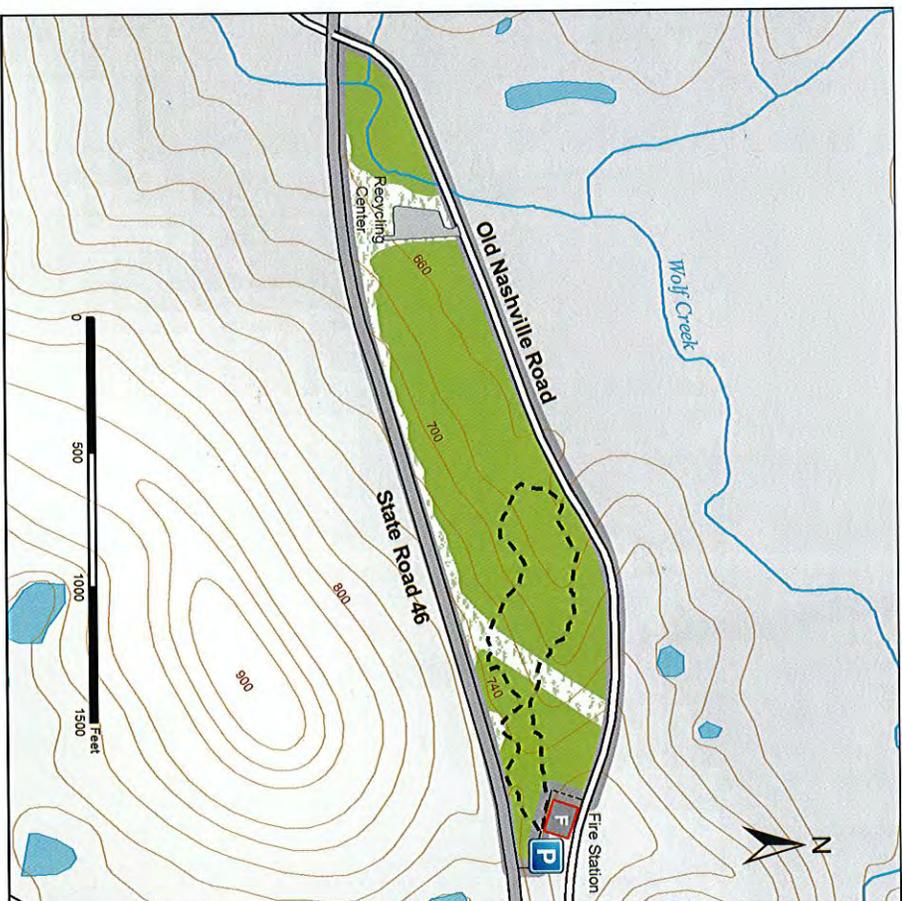
Executive Director

Cc: Kleinhenz, Leinloop, Flohr, Bergman, Medic



Jeff Danielson

Donated in 2007 by the Irwin-Sweeney-Miller Foundation, Tangeman Woods features the Outdoor Lab nature trail created in the 1970s and still used for school field trips, including those conducted by Sycamore's Environmental Education Program. The trail winds through a mixed hardwood forest and has several bridges over intermittent streams.

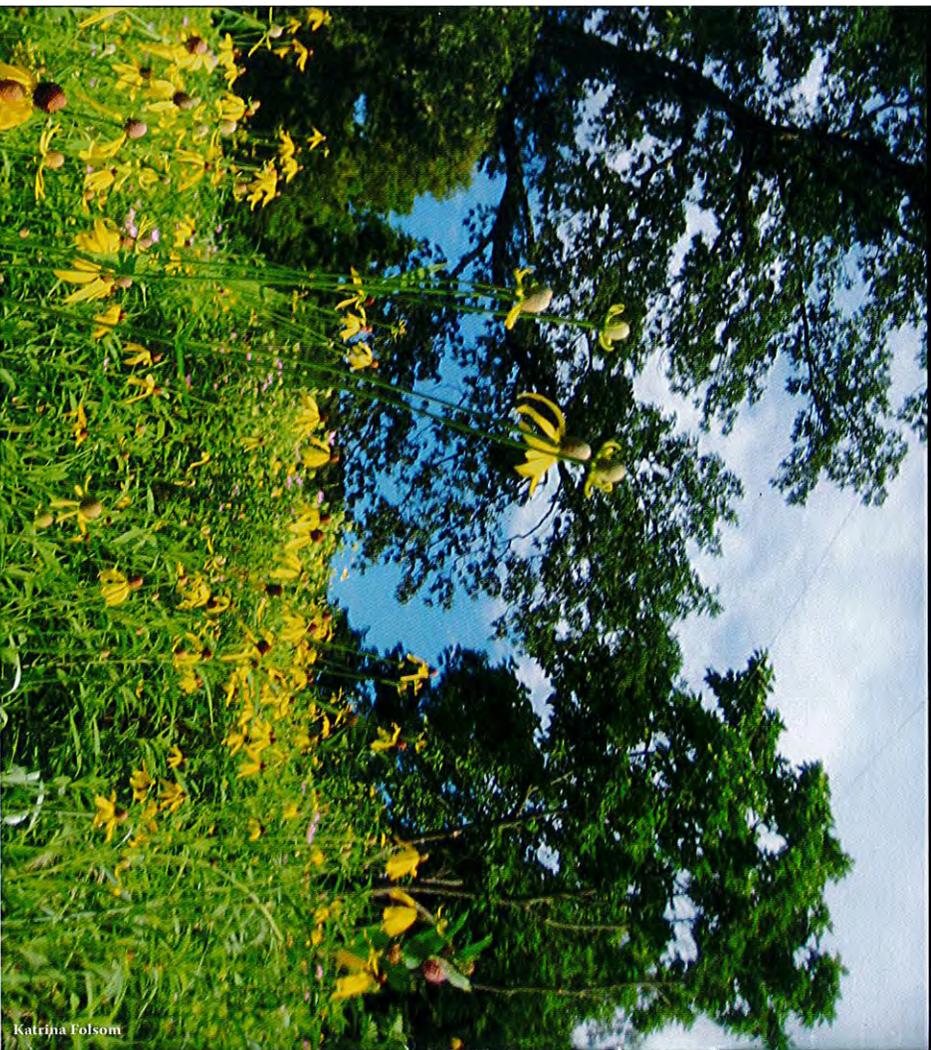


DIRECTIONS: From the intersection of SR 46 and Country Club Rd, go north on Country Club and turn left onto Old Nashville Rd. Parking is available at the fire department; be sure not to block their garage.



TOUCH THE EARTH NATURAL AREA

BARTHOLOMEW



Katrina Folsom

located conveniently near SR 46 just west of Columbus, this preserve is larger than any park in Bartholomew County and is an excellent spot for hiking and bird-watching. A mowed parking area provides access to 2 mi of trails through scenic woods and fields that are old farm fields now reverting to nature. Touch the Earth was purchased by Sycamore in 1995 and 1998 thanks to gifts from a Bartholomew County family foundation.



DIRECTIONS: From Columbus, go west on SR 46 to Country Club Rd and turn left. From Bloomington/Nashville, go east on SR 46. Look for the blue water tower, and 4 mi after crossing the Bartholomew County line, turn right onto Country Club Rd. Entrance on your left after 0.5 mi.



Katrina Folsom



Bergman, Jeffrey

From: Christine Lemley <lemleyc@sbcglobal.net>
Sent: Monday, February 01, 2016 9:13 AM
To: Bergman, Jeffrey
Cc: Christine Lemley; Charles Mitch; Kate & John O'Halloran
Subject: CAFO Bartholomew Co. issues 2/1/16

Jeff and Columbus/Bartholomew Co. Plan Commission,

CAFO operations in Bartholomew County and beyond are objectionable on scientific grounds supported by

Purdue University studies relative to air, water, land use qualities. You and Plan Commission know what all that is about.

Plan Commission must consider not only the present, but the future for our densely populated community.

We must pay attention to the impact of CAFOs on not only human health, but environmental health as well.

Agriculture is in minority position on this issue.

Please consider both present and future residential growth in our county..as well as economic/business growth.

Businesses and corporations will not locate in an area where residential and corporate land values are affected by effects of CAFO operations.

We hope Columbus/Bartholomew Plan Commission and Zoning will consider both short and long term affects of permitting CAFO operations in our county. Thank you.

Sincerely,

Christine and Max Lemley
Lemleyc@sbcglobal.net

812.372.2166

Bergman, Jeffrey

From: DAVID HARPENAU <jjhdah@sbcglobal.net>
Sent: Monday, February 01, 2016 1:44 PM
To: Bergman, Jeffrey
Subject: CAFO reports

Categories: Green Category

Dear Jeff,

Although I hope to be present at the February 10th CAFO meeting, I want to express several thoughts about the issue in an e-mail in the event that I am not able to be present. I attended most of the meetings and wish that there had been more discussion among all members and eventually some compromise to have taken place, but that was not the case.

I was most impressed with the the effort of those members who eventually wrote the minority report, particularly having done their homework and bringing the work of Dr. AL Heber, a Purdue University researcher, to the table. Heber's work and findings seemed most relevant to the discussion at hand. Dr. Heber's work was objective, scientific, and data-based and time tested, having taken place over 20 years.. It seemed that the majority report members only brought their personal opinions to the table. Not once did they bring any objective findings etc. which supported their recommendations or contradicted the findings of Dr. Al Heber.

To me, majority members just dismissed the report out of hand and even refused to discuss Heber's findings. As mentioned, their dismissals and refusals seemed primarily based on personal opinion. Not once did they bring any objective data to the table which refuted the findings and recommendations of Dr. Heber.

Their position seemed very similar to those who refuse to acknowledge the reality of climate change. In spite of mountains of scientific evidence over decades of time, many naysayers', primarily politicians', primary argument is "I don't believe it." No real truths to refute the evidence before them; just "I don't believe it" as if that should be enough.

We as taxpayers need to expect more of our policy makes and decision makers, particularly and most importantly when the health of Bartholomew citizens may be put at risk or when the property values of homeowners may be put reduced.

This is an issue where recommendations based on personal opinions should not be enough to justify recommendations; there is too much at stake.

Thank you for your attention.

David Harpenau
812-379-2642
3207 Overlook Court
Columbus, IN 47203

Dennis Tibbetts—presentation to Barth County Planning Feb 10, 2016

How do the people of Bartholomew County feel about this CAFO issue? Here are 2 studies to help answer.

Farmer Survey This CAFO issue has commonly been termed “Farmers vs Rural Residential”

We set out to find out what farmers actually thought about CAFOs.

Results of 19 farmers sampled in Clifty Township. “What should setback be from residential lot?”

Sample #	Setback suggestion	Survey of farmers		
1	0.25	t Test		
2	0.25	Df=16		
3	0.25	Confidence=.95		
4	0.25	T=	2.12	
5	0.375	E	0.048	255.5 FT
6	0.375			
7	0.375			
8	0.375	Average of Answers	0.382	2019 FT
9	0.375			
10	0.375	Standard Deviation	0.091	482 FT
11	0.375			
12	0.375	Average of Answers	0.382	2019 FT
13	0.5			
14	0.5			
15	0.5			
16	0.5			
17	0.5			
18	No answer			
19	No answer			

If we polled all the farmers then there is a 95% chance that the average would be between

0.333970782 **1763 FT**

and

0.4307351 **2274 FT**

Whole County

Conclusion: This is not a “Farmers vs County Residential” issue. Farmers want a much tougher ordinance

Committee Open House—Colored Dot Exercise

	% of respondents who want tougher ordinance	
Schools	58	x4
HealthCare Facility	57	x4
Worship Facility	56	x2
RecreationFacility	57	x2
State Highway	55	x26
Residential Zoning	63	x1
Residential Lot	58	Calculated
Residential Home	58	Calculated

Overall Conclusion: The people of Bartholomew County want a much tougher ordinance than the one proposed.

Recommendation: Commission should send this ordinance back to staff for the addition of backbone.

Bergman, Jeffrey

From: Jean Terpstra <jterpstra1@comcast.net>
Sent: Friday, January 29, 2016 3:07 PM
To: Bergman, Jeffrey
Subject: Proposed CFO and CAFO Rule Change before the Plan Commission at the hearing February 10th, 2016

Dear Jeff Bergman,

I am a 26 year resident and passionate supporter of Columbus, Indiana, and I have to speak out against the direction I see you taking this community. I am writing in opposition to the proposed changes to the rules relating to CFOs and CAFOs in Bartholomew County. While presented as if they are an increase in protection that will safeguard the community, they are in fact the opposite. Any protection they claim to provide is illusory and deceptive, and they are wholly inadequate to protect this community.

The proposed changes are functionally a significant lessening of the protection the current system of issuing conditional use permits provides. The current system requires a hearing which at least gives everyone a chance to review applications and identify potential problems with proposed operations before they go in. The Conditional Use process allows the BZA to look at the specific operation and make additional conditions if special circumstances warrant it, while the new automatic approval process does not. Removing the hearing requirement is the opposite of government transparency and is designed to blind-side the community and silence those most directly effected by these massive, resource-intensive and polluting, concentrated livestock operations. As a community servant you and the BZA need to do the hard work of reviewing and evaluating each proposal specifically, not leave a rubber stamp out and available for any operation to use.

I am very disappointed the recommendations of the scientifically based members of the CAFO Regulation Study Committee have been completely ignored and discounted by the Plan Commission. Much time and effort was put into determining the science and impact on air, water, health and property values, yet none of that is being used to create rules that work here in Bartholomew County. I strongly recommend that instead of the proposed changes that actually lessen protections for our community, you implement zoning ordinances that require any facility to be located at the safe distances between CFOs/CAFOs and neighbors as described by the Purdue/Heber Model for Odor Control and other independently and scientifically-vetted tools.

Bartholomew County is a heavily populated county, with lots of waterways, flood zones, people and businesses that require special consideration and cannot be located in the vicinity of a CFO or CAFO. The CFOs and CAFOs Study Committee Majority, you, and the BZA all seem to have started with the mind-set and premise that Bartholomew County wants and will have room for these huge concentrated livestock operations, and will host as many of them as anyone could request. From that premise you then come up with rule changes that are designed to make sure there are plenty of places for them to set up. I suggest that premise is misguided and will cost all of us greatly. The better approach and assumption would be that **these operations can only be allowed if they can be located in a way that does not endanger or lessen the quality of life for their neighbors and the other residents of the county.** If you work from this premise, the rules you set up would be VASTLY different from what you now propose.

Tourism in Bartholomew County brings in twice the revenues of all our agriculture operations in our county, yet the costs to that industry have been completely ignored. Tourism will suffer if we allow CFOs and CAFOs to proliferate unfettered. Who wants to come here if their camping trip, marathon, architecture tour, or sporting tournament is disrupted, or they even think it might be disrupted, by reeking fields of pig waste, polluted water, or foul-smelling and unhealthy air? Cummins and other industries here depend on attracting tens of thousands of highly skilled people to come live in our community from across the world. The best and brightest are not easily recruited to a county where property values are at risk, the quality of the air and water is compromised, and recreational facilities (i.e. Anderson Falls and Ceraland) are not protected. The proposal before the county will encourage the installation of CFOs and CAFOs at the cost of the rest of the economic foundation of our county.

The costs of huge concentrated livestock operations are not being fully born by the producers who receive the profits, but are instead being shifted to the rest of our community. The overwhelming numbers of animals involved in the CFO and CAFO industry create gargantuan quantities of air and water pollution, property value declines and untold public health risks. We simply don't have the resources to manage or clean up the mess that will be created by allowing these to freely proliferate in inappropriate sites, so we must carefully manage where they go in, or ultimately pay with tax money, with declining industry, with our health, and with our lives. Please consider the 80,000 of us who live here and our best interest over the tiny handful of people who would benefit from these huge concentrated livestock operations.

Please require that our zoning ordinances call for the safest distance between CFOs and CAFOs and neighbors by using the Purdue/Heber Model for Odor Control and other independently and scientifically-vetted tools. Please act on the premise that current homes, schools, parks, businesses, and non-CAFO farms are as important as a any proposed concentrated livestock operations. Require that this industry be treated like any other industry and not be given a pass to earn profits while the rest of us shoulder their business costs. Please reject the current proposed changes and instead implement the recommendations of the "Minority Report" of the CAFO Regulation Study Committee.

Respectfully Submitted,

Jean Terpstra,
812-350-1204



This email has been sent from a virus-free computer protected by Avast.

www.avast.com

Planning Commission
Columbus City Hall
123 Washington Street
#8
Columbus, IN 47201

January 19, 2016

Dear Members of the Planning Commission:

The CAFO Study Committee failed to reach consensus on any issue and as a result produced two reports - one from the Majority (8 members) and one from the Minority (4 members).

To get a better understanding of the issues involved I read both reports.

I was very impressed by the Minority Report. It was data based, logical and used the best available setback research from Purdue University Agricultural Department. It also struck a sensible compromise between the needs and rights of 80,000 county residents and the needs and rights of a handful of potential CAFO operators.

The Minority Report also researched the important issues of adverse health effects and reduced property values with the introduction of CAFOs. These issues were ignored by the study team but they should be addressed.,

The Majority Report, in contrast, is basically a list of setback numbers with little or no explanation for why these recommendations are reasonable for everyone in our county.

Because of the housing density in our county we don't have the space to have many CAFOs with reasonable setbacks. The Majority Group decided that we have to have CAFOs. Therefore, they propose to squeeze them in by setting extremely low setbacks to houses, schools, medical facilities, churches, etc. This is putting the cart before the horse. These setbacks will have significant negative effect on residential property values, expose residents to potential adverse health effects and generally lower the quality of life in our county.

Sincerely,



Johanna Slone
2301 Fairington Ct.
Columbus, IN 47203
812-350-1035

Public health and safety questions raised by the Bartholomew County CAFO Committee Report – Majority Report

I have read the report noted above and wish to comment on the material presented and its implications for zoning in Bartholomew County.

Since I do not see any quantified evidence or rationale presented for any of the distance setbacks presented I would like to offer a series of questions that any citizen should expect to be answered on these issues by their elected representatives. Answers to these questions may be available; if so I would like them publically presented prior to finalizing a zoning rule.

If quantified answers do not exist, I would expect a risk adverse approach would have to be adopted by our elected representatives for incorporation into zoning laws. This approach would pertain at least until satisfactory quantifiable data and analysis could be used to justify the setbacks suggested in the majority report. A somewhat rational risk adverse approach would involve using the maximum of set back distances adopted for each category across all counties in the State of Indiana. (This approach is based on the wisdom of the crowd concept applied where there is a lack of concrete data.)

I am going to focus my questions on Public Health and Safety issues impacted through water quality considerations.

First let's consider possible water contamination from distribution of the enormous quantities of liquefied manure and urine that are generated from CAFO facilities. The magnitude of this waste should scale with the numbers of animals/hogs in a given operation; this factor

should be considered in any zoning regulation. It would seem that a reasonable set of questions to insure public health would be:

- what are the human health and safety conditions necessary to safely dispose of a quantity of animal waste in the agricultural environment and how were these determined?
- what is the minimum acreage for distribution of animal waste material for a given size CAFO operation? how were these conditions established?
- what controls are in place to insure that the distribution of waste is properly done?
- how do the distribution conditions vary with the soil conditions and soil topography?

Plans for distribution of CAFO waste, distribution of sites and monitoring of those sites should be public knowledge and updated periodically with random checks. It is also clear to me from failure of numerous self monitoring schemes across the country that monitoring by disinterested third parties followed by full public disclosure of results should be mandatory. These mechanisms for tracking the impact of CAFO wastes should be in place and operative before codification of set back conditions to the levels noted in the majority report.

It would appear from all the concerns that are being seen across the country on the impact of various farm and industrial operations on water sheds that it would be prudent to understand the impact of CAFO's in Bartholomew County on water shed issues.

- What evidence do we have that issues of water run off to the water shed from areas treated with liquefied manure and urine have been quantified in ways reflecting the size of the operations, land, soil and topography conditions of areas of dispersal?

- What type of continuing monitoring and analysis of water quality in the immediate, near by and mid range water sheds has been considered and implemented in view of the magnitude of the liquefied manure and urine waste's potential for significant health problems.

Finally, What assurance, backed up by scientific data, do we have that the high levels of antibiotics needed to maintain some semblance of health among the animals and ejected into the waste stream does not overwhelm and degrade the health of citizens? When one considers the issue of increased antibiotic resistance of numerous bacterial infections this area is one of great concern.

In view of the Flint, MI water quality fiasco one should have little confidence in an unmonitored, undocumented, unpublished solutions for a critical human health issues relating to water quality. As the Flint case so aptly demonstrates, when the collective political judgement does not consider the basic elements of science relating to the health of the citizenry there is little reason to believe in solutions posed. The public presentation of plans, data and analysis methods of monitoring CAFO operations as a full system (meaning the CAFO operation and the distribution of its waste products) should be mandatory and be open for all to see before set backs are codified.

We don't need a series of "oops" moments when public officials admit to effecting serious health issues in their communities because of shoddy and incomplete analysis. So I eagerly await substantiation of the questions I have raised through the commissioner's considerations.

To get a greater understanding of the problem read:

**Impacts of Waste from Concentrated Animal Feeding
Operations on Water Quality**

<http://www.ncbi.nlm.nih.gov>

From the National Institutes of Health

Bergman, Jeffrey

From: Julia Lowe <j_lowe66@yahoo.com>
Sent: Monday, January 25, 2016 1:56 PM
To: Bergman, Jeffrey
Cc: kate.ohalloran@sbcglobal.net
Subject: BC Planning Commission FEB 10 meeting

Dear Mr. Bergman,

Please consider the remarks included in this email. Please convey to the board and all of those attending the February 10th meeting that I, Julia Lowe, citizen of Bartholomew County, support the recommendations provided by the minority members of the Study Committee.

The cost of the factory-farmed meat, eggs, and dairy we consume includes far more than the price at the grocery store. The overwhelming numbers of animals involved in the CAFO industry creates gargantuan quantities of air and water pollution, with resultant property value declines and public health risks. We simply don't have the resources to manage the mess created in the long term. One way or the other, we, the people, will pay: with money, with health, with lives. Reject the marketing slogans of those making the profits ('feeding a hungry world' and 'they have to go somewhere'). Let's require that our county officials consider the 80,000 of us who live here. Require that our zoning ordinance call for the safest distance between CAFOs and neighbors by using the Purdue/Heber Model

for Odor Control and other independently and scientifically-vetted tools. Require that current homes, schools, parks, businesses, and non-CAFO farms be as important as a yet-to-be CAFO facility.

Require

that this industry be treated like any other industry and not be given a pass to earn profits while the rest

of us shoulder their business costs.

Best Regards,

Julia Lowe, B.S.,R.T.(R)(MR) FSMRT

Bergman, Jeffrey

From: Lucy O'Neal <lucyoneal@icloud.com>
Sent: Monday, February 01, 2016 12:06 AM
To: Bergman, Jeffrey
Subject: Proposed CAFO ORDINANCE

Categories: Green Category

I own a farm in Bartholomew County. 15245 E 100 N, 47203.

I am shocked at the conclusions of this proposal & believe the majority of residents in our high density population county share my dismay. Why should the profit of a few determine the air, water, and livability standards of the many? Why should the mistreatment of animals by a few set an example of immorality for our children. I believe we need to limit and eventually diminish the number of CAFOs in Bartholomew County. For now the set backs should be at least 1/2 mile, and I believe we need to have a continuous review process with a goal of improving the quality of life for humans and animals in Bartholomew County. It is a short step from treating animals without kindness to treating humans without regard.

Thank you for your regard,
Lucy O'Neal

Sent from my iPhone

Bergman, Jeffrey

From: mariehenning@comcast.net
Sent: Sunday, January 31, 2016 6:11 PM
To: Bergman, Jeffrey
Subject: CAFO

Dear Mr. Bergman:

As a resident of the city of Columbus and the county of Bartholomew, I was disappointed to hear about the Livestock issues that have recently been studied.

I don't believe that allowing places to warehouse animals in cages where they have no real mobility, where waste is allowed to run into the ground and the water supply, and where the neighbors will see their ability to enjoy their property and land is not good for Bartholomew County and therefore should not be passed.

I understand this is a quick summary, but I do plan to attend the meeting and make sure that my objection is heard and noted. You must protect the current citizens, property owners, and families that make up the community we have come to call home.

I look forward to February 10.

Sincerely,

Marie Henning
3521 Washington St.
Columbus, IN 47203

Bergman, Jeffrey

From: KATHY REESE <luvd13too@yahoo.com>
Sent: Tuesday, January 26, 2016 11:48 AM
To: Bergman, Jeffrey
Cc: Mike Percy; Kathy Hershey
Subject: Reduced property values and CAFO's

Jan. 26, 2016

To who it may concern;

My name is Mary K. (Kathleen) Reese

Until just over a year ago, I resided at 3728 N. 1100 E Hartsville, IN.

I had lived there since 1989.

This letter is to make known the financial devastation that the Gelfius CAFO has caused me.

I had my home, a 2400 sq. ft. house, and just under 6 acres for sale. It took almost a year to find a buyer for the property. I had several people who loved the house but refused to purchase it because of the proximity of the "Hog Farm." Indeed, there was an offer pending, for much more than the amount that it finally sold for, but on the very morning that the Realtor was to draw up the contract, the potential buyers called said realtor, and said...."Stop the contract. We've done some research, and the Gelfius hog farm is too close. We are NOT going ahead with the offer."

Months later, I received a very low offer, and after a great deal of thought decided to accept it.

I knew that if I waited until spring, when there would be hogs in the building, I would be lucky to sell it at all.

My estimate is that this CAFO, and Mr. Gelfius, have cost me between \$25 to \$50 thousand dollars.

The property is 9/10ths of a mile from the Gelfius property.

This loss has devastated my finances, and my retirement.

Please feel free to contact me if needed.

Thank you for your time and attention to this matter.

Mary K. Reese

Purdue CAFO Odor Setback Modeling System.

Dr. Al Heber is a Researcher and Professor in the Purdue Agricultural Engineering Department. For the last 20 years he has worked on developing a mathematical simulation for predicting setbacks for CAFOs.

His model is based on the physics of gas mixing and dispersion and an immense amount of data gathered by his research team with mobile labs from CAFO operations all over Indiana.

The model is comprehensive and accounts for all of the following factors,

1. Number and type of livestock.
2. Number and orientation of barns.
3. Barn design.
4. Wind maps for the area
5. Terrain
6. Housing density in the area.
7. Mitigation actions.
8. Manure storage and handling.
9. Tree density.

The model provides a 360 degree setback recommendation that strikes a sensible balance between the needs of residents and potential CAFO operators. I have also evaluated the University of Minnesota setback model (OFFSET) and found it to be more restrictive on CAFO operators than the Heber model. The Heber model has been available

to the public for over 10 years and is continually upgraded and maintained by Dr. Heber and his team.

In my opinion Dr. Heber is the national expert on CAFO setback prediction and his simulation is the best available scientific approach. Dr. Heber has authored over 90 articles in journals on the subject and over 70 invited papers and lectures. He reviewed his research with our Study Team and it was the most informative and useful lecture of the series. The publication "A Guide for Local Land Use Planning for Agricultural Operations", published by the Indiana State Department of Agriculture refers to the Heber model as a useful tool for determining setback guidelines.

The Minority Group used the Heber Model as the basis for our recommendations on setbacks. A summary of the recommendations for setbacks from houses is shown in Appendix B, page 8, of our report. It shows that the setbacks written into the proposed ordinance are 3 to 5 times less than those predicted by the Heber Model.

How did the Majority group arrive at these extremely low setback proposals? They started with the answer as a given i.e. "we have to have the CAFOs we want in the county". They then back-calculated the setbacks needed to accommodate their requirement. This analytical approach is illogical and irrational. It took no account of the needs and rights of the residents of the county.

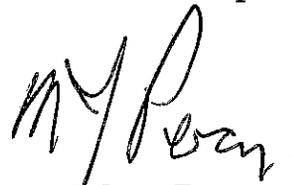
The proposed Ordinance also defines no limit on CAFO size. So a 25000 hog CAFO could be located 500 ft. from a residence. I ran the Heber model for 25000 hogs for various housing densities and the results are listed below.

Setbacks in ft. for 25000 hogs.

	Heber	Proposed
City of Columbus	7000	2640
2 mile Buffer Zone	6200	500
< 50 Houses	4861	500
Single Houses	3472	500
Schools		
Parks and Rec.		
Medical Facilities		
Churches	7000	1320

I have seen no data, logic, science or analysis that explains why the setbacks proposed in this ordinance should be acceptable. I am also very concerned that the best science available from our own highly respected Purdue University was rejected.

I would recommend that Planning Commissioners take a very close look at the proposed setbacks and consider the impact on the 80,000 residents of Bartholomew County.


Mike Percy

Preston and Darlene Byrd
3065 S Pisgah Way
Columbus, Indiana 47203
January 18, 2016

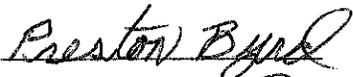
Zack Ellison
Chairman, Bartholomew County Plan Commission

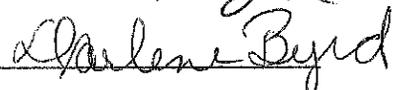
Subject: CFO/CAFO

The purpose of this letter is to state our strong opposition to the proposed requirements contained in the CFO/CAFO Study Committee's Majority Opinion.

We do strongly support the proposed requirements contained in the CFO/CAFO Study Committee's Minority Opinion.

Please give serious consideration to this very important issue,

Preston Byrd 

Darlene Byrd 

(812) 579-5174

pdbyrd@comcast.net

Bergman, Jeffrey

From: Richard Gold <Richard@brainstormprint.com>
Sent: Monday, February 01, 2016 4:35 PM
To: Bergman, Jeffrey
Subject: CAFOs - we need stronger measures and greater setbacks - the risks are great

Jeff,

This is Richard Gold. I am a city and county resident and am very concerned about what I read and understand about CAFOs and in particular what has become to be known at the "majority" proposal from the study team on CAFOs.

I am opposed to the majority position and in fact think we should have more restrictive measures than those proposed by the minority group on the study.

I am concerned on a number of grounds, but predominantly that this will injure our quality of life, reduce property values and make Columbus/Bartholomew County a less attractive place to locate for jobs and residency.

- I believe these lesser setbacks will damage adjoining property and reduce the value of it - in fact not just adjoining but across the county as far as the smell goes and further. So when people talk about property rights, smaller setbacks affect more people than those who benefit from it.
- If property values go down, so does tax revenue for the county and city.
- There is environmental risk to these - smell, airborne disease and potential damage to the surrounding waters.
- This will damage Columbus both as a place to live and as destination location for tourism, architecture, sports. The economic impact will be very negative.
- Why would we have setbacks and restrictions less than our less populated neighbors? Do we want to attract these CAFOs?
- The number of animals are not linked to the setbacks.
- Once in, CAFOs can add additional animals indiscriminately.
- The large food/agricultural organizations who are lobbying for this do not have our best interests in mind; and they are the ones who benefit economically.

I am also concerned about the process. Should those who recommended the majority position be allowed to vote again as members of the Plan Commission?

How do we ensure that the voice of more residents are heard before we take these unprecedented steps to allow such minimal setbacks and encourage location of CAFOs in our community?

Regardless of the setbacks, we should ask all CAFOs to go before the BZA to ensure that the rights of all property holders are protected.

Thank you for your consideration of these concerns.

Sincerely,
Richard Gold
1005 Hawthorne Drive
Columbus, IN
47203

9704 W Raintree Dr.
Columbus, IN 47201
January 28, 2016

Members of the Bartholomew County Plan Commission,

These comments concern the proposed CAFO regulations.

Why has the CAFO Study Commission recommended regulations that are at wild variance from those recommended by the Purdue University experts that they consulted? What led them to conclude after a few months of study that they knew more than people that have studied the issue for years? Why do they not want to use guidelines based on science? Why are they recommending “dumb-downed” regulations? Why are they not recommending “best in class” regulations rather than their proposed “watered- down” regulations? Do the Planning Commission members want Bartholomew County to be Progressive or Regressive?

The proposed regulations give lots of rights to CAFO operators but do not require them to accept any responsibilities. Why?

Why are they not to be held responsible if their CAFO operations causes financial or health loss for their neighbors? Do their neighbors not have any rights?

Why are CAFO operators not to be held responsible if their operation pollutes the water supply of their neighbors, downstream residents, or cities? If their operation pollutes the wells supplying Columbus residents, are city residents the ones who will have to pay the cleanup costs?

Will they pay the cost of damage to county roads caused by their operations, or will county residents be forced to bear the costs?

Why will they be allowed to operate in secrecy? Why can their neighbors not be advised when they plan to build a CAFO facility?

Lastly, would each member of the Commission be willing to live 500 feet from a CAFO facility with 5,000 hogs or cattle? If not, why are you willing to subject your fellow county residents to that possibility?

Thank you for your time.

Sincerely,

Terry Marbach

9704 W Raintree Drive
Columbus, IN 47201
January 11, 2016

Kris Medic
Extension Educator- Agriculture & Natural Resources
Purdue Extension- Bartholomew County
965 Repp Drive
Columbus, IN 47201

Dear Ms. Medic and members of the CAFO Study Committee,

This letter is written by a 50 year resident of Bartholomew County and a member of the Sycamore Land Trust (SLT).

My understanding is that at a recent meeting of the Committee the decision was made to not treat lands owned by SLT as "parks" in terms of the setback required from CAFO operations. Acting on the belief that this decision was made without knowing several facts I write this letter asking the Committee to reconsider their judgment.

SLT is a 25 year old non-profit organization serving 26 counties in south central Indiana. Its mission is "Protecting southern Indiana's beautiful landscapes and connecting people to nature." It has 1,000 members and a staff of 6 professionals.

SLT protects 8,500 acres as it carries out its mission. 4,545 of those acres are owned.

Two of the owned properties are in Bartholomew County-- Touch the Earth Natural Area (TTE) and Tangeman Woods (TW). TTE is 93 acres, primarily wooded, and TW is 32 wooded acres. Both are open to the public to use.

TTE is larger than any of the 17 parks owned by the City of Columbus Parks Department or the 12 parks owned by the Bartholomew County Parks Department. It contains two walking/hiking trails each about 1.5 miles in length. They are used on an almost daily basis by individuals and families seeking recreation, looking for wildlife, viewing the wildflowers in bloom, photographing nature, etc. Over 60 species of plants and trees are on the property and more than 40 species of birds and mammals have been observed. A special emphasis in recent years has been to plant wildflowers that will support the 17 species of Monarch and other butterflies that frequent the property.

Columbus Regional Hospital's Reach Healthy Communities program lists TTE as 1 of 18 recommended places to walk in its "Bartholomew County Walking Route Booklet".

TW also contains a .6 mile trail. It is the location of the "Outdoor Lab" established by the Bartholomew County Soil and Water Conservation District that has hosted thousands of county schoolchildren on field trips.

The two properties have been the beneficiary of four Boy Scout projects including three by Scouts working on their Eagle Scout badge. Indiana University students and local school biology classes have used the properties for field research for scientific studies.

TTE was purchased twenty years ago by SLT using contributions from individuals and private foundations including the Arvin Foundation. TW was donated to SLT in 2007 by the Irwin-Sweeney-Miller Foundation. Both properties are maintained by volunteers and SLT staff. All of this was/is done without cost to county taxpayers.

Two of the Webster's Dictionary definitions of a "park" are "a piece of ground in or near a city or town kept for ornament and recreation" and "an area maintained in its natural state as a public property". TTE and TW meet those definitions. Why therefore is the Committee unwilling to treat them as other parks in the county such as Anderson Falls are being treated in terms of required setbacks?

The enclosed article from the Republic, even though it is several years old, states the case well why TTE is a complement to other county parks.

It is also my understanding that Jeff Bergman, City-County Planning Director argued against treating TTE and TW as parks because in his words, to the affect, "anyone opposed to a CAFO will put their backyards in SLT and claim it is a park". He does not understand that SLT doesn't accept every property that someone offers to donate or sell to them.

In deciding whether to accept a property SLT looks at several factors; a property needs to have one or more of these attributes:

Does it include important natural habitat for wildlife and plants, or buffers important habitat?

Is it in a relatively natural, undisturbed condition?

Is it adjacent or close to land already protected by Sycamore?

Is it adjacent or close to public land or other permanently protected private land

Does it include or protect a significant river, stream or wetland?

Is it large enough that its conservation values will likely remain intact despite possible future changes in adjoining land use?

It is hard to imagine that anyone's "backyard" would meet any of these criteria.

MORE DISTURBING about Mr. Bergman's comment, and the Committee's support of his comments, is that it implies that a property owner has no right to try to mitigate the impact of a potential CAFO. WHAT KIND OF DOUBLE STANDARD IS THAT?! Only a farmer that wants to establish a CAFO has property rights??

I urge the Committee to reconsider their decision. I await its answer.

Thank you for your time.

Sincerely,

Terry Marbach

Terry Marbach

CC: County Commissioners

Jeff Bergman, Director-Planning Department ✓

Zach Ellison, President- Planning Commission

If you would like to view TTE/TW in person, I'd be happy to meet you and show you what they offer.

Editorial

Keeping the land green

IF the well-worn phrase "tall oaks from little acorns grow" has any local application it just could be a seemingly insignificant sale of 70 acres of woodland west of Columbus along Country Club Road.

The actual significance of the recent transfer of land from Robert and Christina Siefker to Sycamore Land Trust will be determined in the years to come by public acceptance of the philosophy behind the transaction.

Sycamore Land Trust is a nonprofit organization based in Monroe County that is dedicated to the preservation of greenspace and natural areas in south-central Indiana.

The acquisition of the Bartholomew County acreage is the group's first venture outside Monroe County in its four-year history. It manages three other preserves in the Bloomington area.

This latest acquisition by the organization will be called Touch the Earth Natural Area and will be open to the public.

It is an important development for the people and future of Bartholomew County because it addresses a subject that has received little attention in the search for improvements in our quality of life.

Certainly, Bartholomew County's history is replete with examples of individuals and organizations that have been dedicated to the reclamation and preservation of the natural environment.

Few could match the zeal of Arvin Industries co-founder Q.G. Noblitt in his involvement with the creation of Youth Camp, the preservation of an area around what is known today as Noblitt Park and the development of Harrison Lake.

Others, such as industrialist Lowell Engelking, were generous in their donations of money, property and energy in preserving patches of county land.

The public sector also has been aggressive in setting aside land. The Columbus Parks and Recreation Department has won national recognition for its development of an outstanding park system.

However, much of this effort through the years has been tied to recreational pursuits, an outgrowth of the desire to meet the needs of young families that were moving into the community.

Most parks in the city and county have recreational elements, be they playgrounds for children or ball diamonds for young adults.

The paucity of public areas devoted simply to greenspace is not the result of any oversight or neglect by local officials. They simply have responded to the needs expressed by the community.

However, public interest in natural environments has been growing. Anderson Falls, managed by the county parks board, and the stretch of the People Trails between Mill Race and Noblitt parks have become magnets for people who just want to savor the outdoors.

Officials of the trust emphasize that their mission is to preserve land in its natural setting, not to fight development.

Nor is this a case of out-of-county control over local resources. The purchase was made through donations made by several Bartholomew County residents.

It will be developed as a place for local residents to enjoy open grassy fields, woods and intermittent streams while observing wildlife such as deer, turkey, quail, hawks, and songbirds.

It hopefully will serve as a pilot project and spur other local landowners wishing to see their property protected into perpetuity to contact trust officials in Bloomington (812-854-3834 or 812-336-5237).

It is interesting to note that part of the property in the Touch the Earth Natural Area was once owned by Q.G. Noblitt.

It's fitting that his legacy be preserved.

Bergman, Jeffrey

From: Annette Bottum <awinterb@iquest.net>
Sent: Monday, February 01, 2016 4:23 PM
To: Bergman, Jeffrey
Subject: Comments re: CFO/CAFO ordinance amendments

Categories: Green Category

Dear Plan Commission:

As a retired environmental scientist who specialized in air pollution and a fifty year resident of Bartholomew County, I believe the Plan Commission would regret adopting the majority opinion's requirements for new CFO/CAFO locations which are less restrictive than the minority opinion.

The minority opinion is better researched, better presented, more logical and closer to being fair to all the stakeholders.

The minority opinion recognizes that CAFO/CFO operations may still exist in appropriate locations. But setbacks to be workable must be related to the original number of animals housed and to later increases in the number of animals housed. It is a matter of fairness that neighbors be notified about a CAFO's intention to locate or increase numbers of animals. Such elements have been common in the air permits for industrial permits.

Potential and existing CAFO/CFO neighbors deserve protection by the Plan Commission from possible loss of property value, well and land contamination, and unpleasant odor particularly when neighbors occupied their land first. (Is it common sense to imagine that many people would willingly move in next to an existing CAFO?)

Lastly, it is alarming that recently an existing CAFO has been allowed to construct a new building closer than the current ordinance requirement sets forth.

Winter Bottum

CAFOs Uncovered

The Untold Costs of Confined
Animal Feeding Operations

Doug Gurian-Sherman

UNION OF CONCERNED SCIENTISTS
APRIL 2008

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Doug Gurian-Sherman is a senior scientist in the Union of Concerned Scientists (UCS) Food and Environment Program.

The Union of Concerned Scientists is the leading science-based nonprofit working for a healthy environment and a safer world.

The goal of the UCS Food and Environment Program is a food system that encourages innovative and environmentally sustainable ways to produce high-quality, safe, and affordable food, while ensuring that citizens have a voice in how their food is grown.

More information about the Union of Concerned Scientists and the Food and Environment Program is available on the UCS website at www.ucsusa.org.

The full text of this report is available online (in PDF format) at www.ucsusa.org or may be obtained from:

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**CAFOs Uncovered:
The Untold Costs of Confined
Animal Feeding Operations**

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EXECUTIVE SUMMARY

The livestock industry (including poultry) is vital to our national economy, supplying meat, milk, eggs, and other animal products and providing meaningful employment in rural communities. Until recently, food animal production was integrated with crop production in a balanced way that was generally beneficial to farmers and society as a whole. But livestock production has undergone a transformation in which a small number of very large CAFOs (confined animal feeding operations) predominate. These CAFOs have imposed significant—but largely unaccounted for—costs on taxpayers and communities throughout the United States.

CAFOs are characterized by large numbers of animals crowded into a confined space—an unnatural and unhealthy condition that concentrates too much manure in too small an area. Many of the costly problems caused by CAFOs can be attributed to the storage and disposal of this manure and the overuse of antibiotics in livestock to stave off disease.

The predominance of CAFOs is not the inevitable result of market forces; it has been fostered by misguided public policy. Alternative production methods can be economically efficient and technologically sophisticated, and can deliver abundant animal products while avoiding most of the problems caused by CAFOs. However, these alternatives are at a competitive disadvantage because CAFOs have reduced their costs through subsidies that come at the public's expense, including (until very recently) low-cost feed. CAFOs have also benefited from taxpayer-supported pollution cleanup programs and technological "fixes" that may be counterproductive, such as the overuse of antibiotics. And by shifting the risks of their production methods onto the public, CAFOs avoid the costs of the harm they cause.

In addition, the fact that the meat processing industry is dominated by a few large and economically powerful companies makes it difficult for alternative producers to slaughter their animals and get their products to market. This excessive market concentration is facilitated by lax enforcement of laws intended to prevent anti-competitive practices.

By describing several of the subsidies and other often hidden costs of CAFOs that are imposed on society (referred to as externalized costs or "externalities"), this report attempts to clarify the real price we pay—and can no longer afford—for this harmful system. These externalities are associated with the damage caused by water and air pollution (along with cleanup and prevention), the costs borne by rural communities (e.g., lower property values), and the costs associated with excessive antibiotic use (e.g., harder-to-treat human diseases). Subsidies have included payments to grain farmers that historically supported unrealistically low animal feed prices, and payments to CAFOs to prevent water pollution.

The United States can do better. In fact, there is a new and growing movement among U.S. farmers to produce food efficiently by working with nature rather than against it. More and more meat and dairy farmers are successfully shifting away from massive, overcrowded CAFOs in favor of modern production practices. We offer a number of policy recommendations that would level the playing field for these smart, sophisticated alternatives by reducing CAFO subsidies and requiring CAFOs to pay a fair share of their costs.

CAFOs—Too Big for Our Own Good

Most of the problems caused by CAFOs result from their excessive size and crowded conditions. CAFOs contain at least 1,000 large animals such as beef cows, or tens of thousands of smaller animals such as chickens, and many are much larger—with tens of thousands of beef cows or hogs, and hundreds of thousands of chickens.

The problems that arise from excessive size and density (e.g., air and water pollution from manure, overuse of antibiotics) are exacerbated by the parallel trend of geographic concentration, whereby CAFOs for particular types of livestock have become concentrated in certain parts of the country. For example, large numbers of swine CAFOs are now located in Iowa and North Carolina, dairy CAFOs in California, and broiler chicken CAFOs in Arkansas and Georgia.

We need to be concerned about these excessively large feeding operations because they have become the predominant means of producing meat and dairy products in this country over the past few decades. Although they comprise only about 5 percent of all U.S. animal operations, CAFOs now produce more than 50 percent of our food animals. They also produce about 65 percent of the manure from U.S. animal operations, or about 300 million tons per year—more than double the amount generated by this country's entire human population. For the purposes of this report, there are approximately 9,900 U.S. CAFOs producing hogs, dairy cows, beef cows, broiler chickens, or laying hens.

Better Options Exist

CAFOs do not represent the only way of ensuring the availability of food at reasonable prices. Recent studies by the U.S. Department of Agriculture (USDA) show that almost 40 percent of medium-sized animal feeding operations are about as cost-effective as the average large hog CAFO, and many other studies have provided similar results. Medium-sized and smaller operations also avoid or

reduce many of the external costs that stem from CAFOs.

If CAFOs are not appreciably more efficient than small and mid-sized operations, why are they supplanting smaller farms? The answers lie largely in farm policies that have favored large operations. CAFOs have relied on cheap inputs (water, energy, and especially feed) to support the high animal densities that offset these operations' high fixed costs (such as buildings). Feed accounts for about 60 percent of the costs of producing hogs and chickens and is also an important cost for dairy and beef cows, and federal policies have encouraged the production of inexpensive grain that benefits CAFOs.

Perhaps even more important has been the concentration of market power in the processing industry upon which animal farmers depend. This concentration allows meat processors to exert considerable economic control over livestock producers, often in the form of production contracts and animal ownership. The resulting "captive supply" can limit market access for independent smaller producers, since the large majority of livestock are either owned by processors or acquired under contract—and processors typically do not contract with smaller producers. Federal government watchdogs have stated that the agency responsible for ensuring that markets function properly for smaller producers is not up to the task.

Hoop barns and smart pasture operations

Although there is evidence that confinement operations smaller than CAFOs can be cost-effective and produce ample animal products, studies also suggest that sophisticated alternative means of producing animal products hold even greater promise. For example, hog hoop barns, which are healthier for the animals and much smaller than CAFOs, can produce comparable or even higher profits per unit at close to the same price.

Research in Iowa (the major hog-producing state) has also found that raising hogs on pasture may produce animals at a lower cost than CAFOs. Other studies have shown that "smart" pasture oper-

ations such as managed intensive rotational grazing (MIRG) can produce milk at a cost similar to confined dairy operations, but with added environmental benefits.

Properly managed pastures, for example, require less maintenance and energy than the feed crops (such as corn and soybeans) on which CAFOs rely. Healthy pastures are also less susceptible to erosion, can capture more heat-trapping carbon dioxide than feed crops, and absorb more of the nutrients applied to them, thereby contributing less to water pollution. Furthermore, the manure deposited by animals onto pasture produces about six to nine times less volatilized ammonia—an important air pollutant—than surface-applied manure from CAFOs.

The Many Hidden Costs of CAFOs

Feed grain subsidies

CAFOs have been indirectly supported by huge taxpayer-funded subsidies that compensated grain farmers for excessively low prices. Because feed makes up such a large part of CAFOs' costs, lower grain prices can have a big impact on the total cost of production.

Over the past few decades, federal farm bills have progressively moved toward policies that let grain prices fall—often below the cost of production—and compensated farmers for much of the difference. Without such subsidies, grain farmers would not have been able to continue selling their product at such low prices, which benefit CAFOs.

This so-called indirect subsidy to hog and broiler CAFOs amounts to hundreds of millions of dollars per year. When extended to include the dairy, beef, and egg sectors, low-cost grain was worth a total of almost \$35 billion to CAFOs from 1996 to 2005, or almost \$4 billion per year.

Farms that raise animals on pasture and those that grow their own grain do not usually receive as much of a subsidy as the CAFO industry. Pastures themselves are not subsidized at all, so the sustenance that livestock derive from pastures receives no government support.

During the past few years, grain prices have approached or even risen above the cost of production. Under these conditions, CAFOs no longer benefit from grain subsidies, but the problem of increasing concentration in the processing industry persists. This may make it difficult for CAFO alternatives to gain substantial market share without changes in U.S. policy.

Pollution prevention subsidies

Another farm bill program, the Environmental Quality Incentives Program (EQIP), provides CAFOs with another important subsidy. Beginning in 2002, CAFOs were no longer explicitly excluded from EQIP funding (which was originally intended to help smaller farming operations reduce their pollution), and the maximum funding level for individual projects has increased dramatically to \$450,000. Several criteria used to prioritize projects such as manure disposal actually favor CAFOs over pasture-based operations. Extrapolation from the available data suggests that U.S. CAFOs may have benefited from about \$125 million in EQIP subsidies in 2007.

State-level EQIP projects can also favor confinement operations. California, the state with the most dairy CAFOs, spends \$10 million of its allocated EQIP subsidies each year to address dairy manure issues. Georgia, the state with the most broiler chicken CAFOs, uses EQIP funds to support the transportation of chicken manure from that part of the state where broiler CAFOs are primarily located to areas with enough cropland to accept this manure. The distance involved would often not be economically feasible without subsidization.

Water pollution from manure

Disposal of CAFO manure on an insufficient amount of land results in the runoff and leaching of waste into surface and groundwater, which has contaminated drinking water in many rural areas, and the volatilization of ammonia (i.e., the transfer of this substance from manure into the atmosphere). Several manure lagoons have also experienced catastrophic failures, sending tens of millions of gallons

of raw manure into streams and estuaries and killing millions of fish. Smaller but more numerous spills cause substantial losses as well.

Remediation of the leaching under dairy and hog CAFOs in Kansas has been projected to cost taxpayers \$56 million—and Kansas is not one of the country's top dairy- or hog-producing states. Based on these data, a rough estimate of the total cost of cleaning up the soil under U.S. hog and dairy CAFOs could approach \$4.1 billion.

The two primary pollutants from manure, nitrogen and phosphorus, can cause eutrophication (the proliferation and subsequent death of aquatic plant life that robs freshwater and marine environments of the oxygen that fish and many other aquatic organisms need to survive). For example, runoff and leaching from animal sources including CAFOs is believed to contribute about 15 percent of the nutrient pollution that reaches the Gulf of Mexico, where a large “dead zone”—devoid of fish and commercially important seafood such as shrimp—has developed. CAFO manure also contributes to similar dead zones in the Chesapeake Bay (another important source of fish and shellfish) and other important estuaries along the East Coast. The Chesapeake Bay's blue crab industry, which had a dockside value of about \$52 million in 2002, has declined drastically in recent years along with other important catches such as striped bass, partly due to the decline in water quality caused in part by CAFOs.

Although it is difficult to account for all of the social benefits (such as fisheries and drinking water) lost due to CAFO pollution, it is reasonable to assume the losses are substantial. One indirect way of estimating such costs is to calculate the cost of preventing some or all of the pollution caused by CAFOs. The USDA, for example, has determined how much it would cost to transport manure to enough crop fields or pastures to comply with new Clean Water Act rules governing the distribution of manure on fields. Based on a nitrogen-limited standard and realistic estimates of the rate at which farms will accept manure, the annual cost

of adequate manure distribution in the Chesapeake Bay region alone would total \$134 million per year. Using a phosphorus-limited standard and an unrealistically high manure acceptance rate, the cost would be \$153 million annually. Considering that net returns for the animal industry in this region amount to \$313 million, compliance with such standards could comprise between 43 and 49 percent of net returns.

Air pollution from manure

Airborne ammonia is a respiratory irritant and can combine with other air pollutants to form fine particulate matter that can cause respiratory disease. And because ammonia is also re-deposited onto the ground, mostly within the region from which it originates, ammonia nitrogen deposited on soils that have evolved under low-nitrogen conditions may reduce biodiversity and find its way into water sources. Ammonium ion deposition also contributes to the acidification of some forest soils.

Animal agriculture is the major contributor of ammonia to the atmosphere, and the substantial majority of this ammonia likely comes from confinement operations, since manure deposited by livestock on pasture contributes proportionately much less ammonia to the atmosphere than manure from CAFOs. Up to 70 percent of the nitrogen in CAFO manure can be lost to the atmosphere depending on manure storage and field application measures. Over the past several decades, the amount of airborne ammonia deposition in many areas of the United States with large numbers of CAFOs has been rising dramatically, and may often exceed the capacity of forests and other environments to utilize it without harm.

The USDA has estimated the total U.S. cost of controlling air and water pollution through manure distribution onto farmland—in quantities that comply with the Clean Water Act—at \$1.16 billion per year under high manure acceptance rates. However, the standard applied in this calculation would only reduce airborne ammonia pollution from CAFOs by about 40 percent. And if lower, more realistic ma-

nure acceptance rates were used, the manure would have to be transported unacceptable distances. Therefore, proper manure disposal from CAFOs at current farmer acceptance rates would in all likelihood exceed these values considerably.

Harm to rural communities

CAFOs are sited in rural communities that bear the brunt of the harm caused by CAFOs. This harm includes the frequent presence of foul odors and water contaminated by nitrogen and pathogens, as well as higher rates of respiratory and other diseases compared with rural areas that are not located near CAFOs.

One study determined that each CAFO in Missouri has lowered property values in its surrounding communities by an average total of \$2.68 million. It is not possible to accurately extrapolate this value nationally due to the many differences between localities, but as a very rough indication of the magnitude of these costs, multiplying by 9,900 (the total number of U.S. CAFOs as defined for this report) would yield a loss of about \$26 billion.

Antibiotic-resistant pathogens

Estimates have suggested that considerably greater amounts of antibiotics are used for livestock production than for the treatment of human disease in the United States. The massive use of antibiotics in CAFOs, especially for non-therapeutic purposes such as growth promotion, contributes to the development of antibiotic-resistant pathogens that are more difficult to treat.

Many of the bacteria found on livestock (such as *Salmonella*, *Escherichia coli*, and *Campylobacter*) can cause food-borne diseases in humans. Furthermore, recent evidence strongly suggests that some methicillin-resistant *Staphylococcus aureus* (MRSA) and uropathogenic *E. coli* infections may also be caused by animal sources. These pathogens collectively cause tens of millions of infections and many thousands of hospitalizations and deaths every year.

The costs associated with *Salmonella* alone have been estimated at about \$2.5 billion per year—about

88 percent of which is related to premature deaths. Because an appreciable degree of antibiotic resistance in animal-associated pathogens is likely due to the overuse of antibiotics in CAFOs, the resulting costs are likely to be high. Eliminating the use of antibiotics for growth promotion (the majority of which occurs on CAFOs) could cost CAFOs between \$1.5 billion and \$3 billion per year.

Conclusions and Recommendations

The costs we pay as a society to support CAFOs—in the form of taxpayer subsidies, pollution, harm to rural communities, and poorer public health—is much too high (Table ES-1, p. 6). For example, conservative estimates of grain subsidies and manure distribution alone suggest that CAFOs would have incurred at least \$5 billion in extra production costs per year if these expenses were not shifted onto the public. The figure would undoubtedly be much higher if truly adequate manure distribution was required. Although we do not have good national data for other costs quantified in Table ES-1, and some that have not been quantified (such as water and energy use and water purification costs), they could amount to billions of dollars more per year.

Technological solutions to specific CAFO problems have been proposed, such as feed formulations that would reduce manure nitrogen, lagoon covers that would reduce atmospheric ammonia, and “biogas” capture and production that would reduce methane emissions from manure, but these are only partial solutions and would generally add to the cost of production. None of these technologies solve antibiotic resistance, loss of rural income, or the ethical treatment of animals. By comparison, sophisticated CAFO alternatives can provide plentiful animal products at similar prices, but with much fewer of the problems caused by CAFOs.

The bottom line is that society is currently propping up an undesirable form of animal agriculture with enormous subsidies and a lack of accountability for its externalized costs. Once we appreciate the role these subsidies—along with government

Table ES-1. CAFO Costs Underwritten by U.S. Taxpayers¹

	Cost of Pollution or Pollution Avoidance	Cost of Subsidy
Cost to Distribute and Apply Manure to Fields	\$1.16 billion/year ²	
Reduction in Property Values	\$26 billion (total loss) ³	
Public Health Costs from Overuse of Antibiotics in Livestock	\$1.5 billion – \$3.0 billion/year ⁴	
Remediation of Leakage from Manure Storage Facilities (Swine and Dairy)	\$4.1 billion (total cost) ⁵	
Grain Subsidies for Livestock Feed		\$3.86 billion/year ⁶
EQIP Subsidy		\$100 million – \$125 million ⁷

¹ Numbers are rough estimates of current or recent costs and are presented only to indicate the magnitude of these costs. See the text for details.

² SOURCE: Aillery et al. 2005.

³ SOURCE: Mubarak, Johnson, and Miller 1999. Extrapolation from Missouri data based on national CAFO numbers.

⁴ SOURCE: NRC 1999. Extrapolation based on U.S. population of 300 million.

⁵ SOURCE: Volland, Zupancic, and Chappelle 2003. Extrapolation from Kansas data based on national swine and dairy CAFO numbers.

⁶ SOURCE: Starmer 2007. Data averaged over the period 1996–2005.

⁷ SOURCE: NRCS 2003. Calculations based on NRCS projections for 2007 (yearly values increase from a low in 2002 to a high in 2007).

policies—play in shaping the way our food animals are raised, we can also see the environmental, health, and economic benefits to be gained from redirecting agriculture toward smart pasture operations and other desirable alternatives.

Public policies that support CAFOs at the expense of such alternatives should be eliminated, and policies that support these alternatives should be implemented. Needed actions include:

- Strict and vigorous enforcement of antitrust and anti-competitive practice laws under the Packers and Stockyards Act (which cover captive supply, transparency of contracts, and access to open markets)
- Strong enforcement of the Clean Water Act as it pertains to CAFOs, including improved oversight at the state level or the takeover of responsibilities currently delegated to the states for approving and monitoring and enforcement of National Pollution Discharge Elimination System (NPDES) permits; improvements could include more inspectors and inspections, better monitoring of manure-handling practices, and measurement of pollution prevention practices
- Development of new regulations under the Clean Air Act that would reduce emissions of ammonia and other air pollutants from CAFOs, and ensure that CAFO operators cannot avoid such regulations by encouraging ammonia volatilization
- Continued monitoring and reporting of ammonia and hydrogen sulfide emissions as required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, commonly referred to as the “Superfund”) and the Emergency Planning and Community Right-to-Know Act (EPCRA)
- Replacement of farm bill commodity crop subsidies with subsidies that strengthen conservation programs and support prices when supplies are high (rather than allowing prices to fall below the cost of production)
- Reduction of the current \$450,000 EQIP project cap to levels appropriate to smaller farms, with a focus on support for sound animal farming practices
- Revision of slaughterhouse regulations to facilitate larger numbers of smaller processors, including the elimination of requirements not

appropriate to smaller facilities, combined with public health measures such as providing adequate numbers of federal inspectors or empowering and training state inspectors

- Substantial funding for research to improve alternative animal production methods (especially pasture-based) that are beneficial to the environment, public health, and rural communities

American Public Health Association
Precautionary Moratorium on New
Concentrated Animal Feed Operations

The report is more easily read on the following website:

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Precautionary Moratorium on New Concentrated Animal Feed Operations



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Precautionary Moratorium on New Concentrated Animal Feed Operations

Date: Nov 18 2003 | Policy Number: 20037

Key Words: Child Health And Development

An estimated 54 percent of U.S. livestock are now concentrated on 5 percent of livestock farms,¹ with the largest of such farms getting larger;² and these industrial-scale, concentrated animal feeding operations (CAFOs) which are, according to Environmental Protection Agency (EPA) criteria, facilities with more than 1,000 beef cattle, 2,500 hogs or 100,000 broiler hens now dominate U.S. livestock and poultry production; and

Increased numbers of CAFOs in an area often are associated with declines in local economic and social indicators (e.g., business purchases, infrastructure, property values, population, social cohesion), which undermine the socioeconomic and social foundations of community health,³ particularly in poor and African American rural communities;^{4,5} and

CAFOs generate an estimated 575 billion pounds of animal manure yearly.⁶ CAFO generated manure has constituents and byproducts of health concern including heavy metals, antibiotics, pathogen bacteria, nitrogen and phosphorus, as well as dust, mold, bacterial endotoxins and volatile gases; CAFO-generated manure being uneconomical to transport for any distance,⁷ it is typically stored in open or covered pits or lagoons and later spread or sprayed untreated on nearby cropland, posing additional risks to public health; and

Manure pathogens capable of causing severe gastrointestinal disease, complications, and sometimes death in humans include *Campylobacter* and *Salmonella* species, as well as *Listeria monocytogenes*, *Helicobacter pylori*, and *E. coli* O157:H7, and the protozoa *Cryptosporidium parvum*.⁸ Runoff from manure-applied fields can carry human pathogens into surface waters, which often serve as drinking water sources. Epidemiology studies have, in fact, linked several outbreaks involving these pathogens to livestock waste;⁹ and

Manure land application in excess of the land's absorptive capacity also can lead to excess nitrogen and phosphorus in soil,¹⁰ eutrophication of surface waters and algae overgrowth—including some algae producing human toxins;¹¹⁻¹³ and

The emerging scientific consensus is that antibiotics given to food animals contribute to antibiotic resistance transmitted to humans.^{14,15} Antibiotics, as well as arsenic and other metal compounds,¹⁶⁻¹⁸ are routinely added to the feeds of concentrated animals absent any diagnosed illness—to promote growth and to compensate for the stress of raising animals under confinement—to increase the risks from antibiotic resistance.^{19,20} These routine, non-therapeutic animal uses account for an estimated 13 million pounds of antibiotics annually, most being identical or very similar to human medicines, as compared to 3 million pounds of antibiotics prescribed for humans.²¹ Current APHA Policy (Nos. 9908 and 00-LB-5) registers appropriate concern about agricultural use of these medically-important antibiotics;^{22,23} and

An estimated 25–75 percent of feed antibiotics pass unchanged into manure waste, posing additional risks to soil, water and air quality and public health following land application.²⁴ Pig house dust, in a recent study, was found to contain total antibiotics at a concentration of up to 12.5 mg/kg dust with up to five separate compounds, including tylosin, tetracyclines, sulfamethazine, and chloramphenicol;²⁵ and

In several states, storage pits or lagoons legally can leak millions of gallons of liquid manure,²⁶⁻²⁸ and often spill or burst.^{29,30} They are frequently sited on floodplains, below the water table or over alluvial aquifers (formations favored as drinking water sources but more easily subject to microbial contamination);³¹ and

CAFO manure wastes also include organic dust, molds, bacterial endotoxins and manure-generated gases of up to 400 separate volatile compounds, such as ammonia and hydrogen sulfide, many of which are known airway irritants, allergens or respiratory hazards;³²⁻³⁴ and

Numerous studies document serious respiratory problems among CAFO workers, including chronic bronchitis and non-allergic asthma in about 25 percent of confinement swine workers.^{35,36} Workers exposed to the potent neurotoxin hydrogen sulfide at levels only slightly higher than those at which its odor becomes detectable (5.0 ppm vs. .025 ppm), have been found to have accelerated deterioration of neurobehavioral function;³⁷ and

Scientists convened first by the Centers for Disease Control and Prevention (CDC), and more recently by the University of Iowa and Iowa State University, agree CAFO air emissions may constitute a hazard to public health, in addition to workers' health.³ The latter report recommends that "precautions should be taken to minimize

both specific chemical exposures (hydrogen sulfide and ammonia) and mixed exposures (including odor) arising from CAFOs. The Environmental Protection Agency and the Agency for Toxic Substances and Disease Registry (ATSDR) have both recommended that ambient exposure limits be set for ammonia and hydrogen sulfide emissions from CAFOs. These recommendations are based on several experimental and epidemiologic studies of non-CAFO populations documenting respiratory symptoms associated with low level exposure to individual chemical components of CAFO air emissions, particularly including ammonia and hydrogen sulfide. Two published, controlled studies of people residing near CAFOs report eye and respiratory symptoms associated with CAFO air emissions exposures "similar to more prevalent and severe symptoms experienced by CAFO workers who are exposed at much higher concentrations of mixed emissions,"³⁸ although it should be acknowledged these studies cannot be construed as certain "proof" that a specific disease(s) among community residents has arisen from a specific chemical, bacteria or aromatic compound in CAFO emissions.

Noting that moratoria on new CAFO construction have been called for by the Michigan State Medical Society, the Canadian Medical Association as well as local boards of health, moratoria generally citing existing scientific evidence for threats to worker health and public health, combined with insufficient data to determine whether in the face of those risks public health is being adequately protected,³⁹⁻⁴¹ and

Considering APHA's recently passed policy (#200011) encouraging as a precautionary principle--"that public health decisions must often be made in the absence of scientific certainty, or in the absence of perfect information"--action to prevent potential harm to reproductive health, infants and children, even if some cause and effect relationships have not been established with scientific certainty;⁴² while noting that children suffer disproportionately from asthma; while fetuses, infants and children are more vulnerable to adverse impacts from bacterial and antimicrobial-resistant infections,⁴³⁻⁴⁵ as well as from exposure to neurotoxins,⁴⁶ all health impacts to which existing science suggests that emissions from CAFOs may contribute; and

Considering the health and economic impacts on CAFO workers, as well as evidence, albeit less certain, indicating impacts on children and CFO neighbors from exposure to large concentrations of manure and their subsequent emissions of dust, toxins, microbes, antibiotics and pollutants into air and water. Therefore, the American Public Health Association hereby:

1. Resolves that APHA urge federal, state and local governments and public health agencies to impose a moratorium on new Concentrated Animal Feed Operations until additional scientific data on the attendant risks to public health have been collected and uncertainties resolved.
2. Resolves that APHA urge federal and state governments to initiate and support research to quantify more precisely the exposures to pollutants in air, water and soil emissions of CAFOs experienced by communities surrounding CAFOs, as well as to investigate the greater vulnerability of infants and children to harm from such pollutants, deriving from either greater exposure or increased toxicity.

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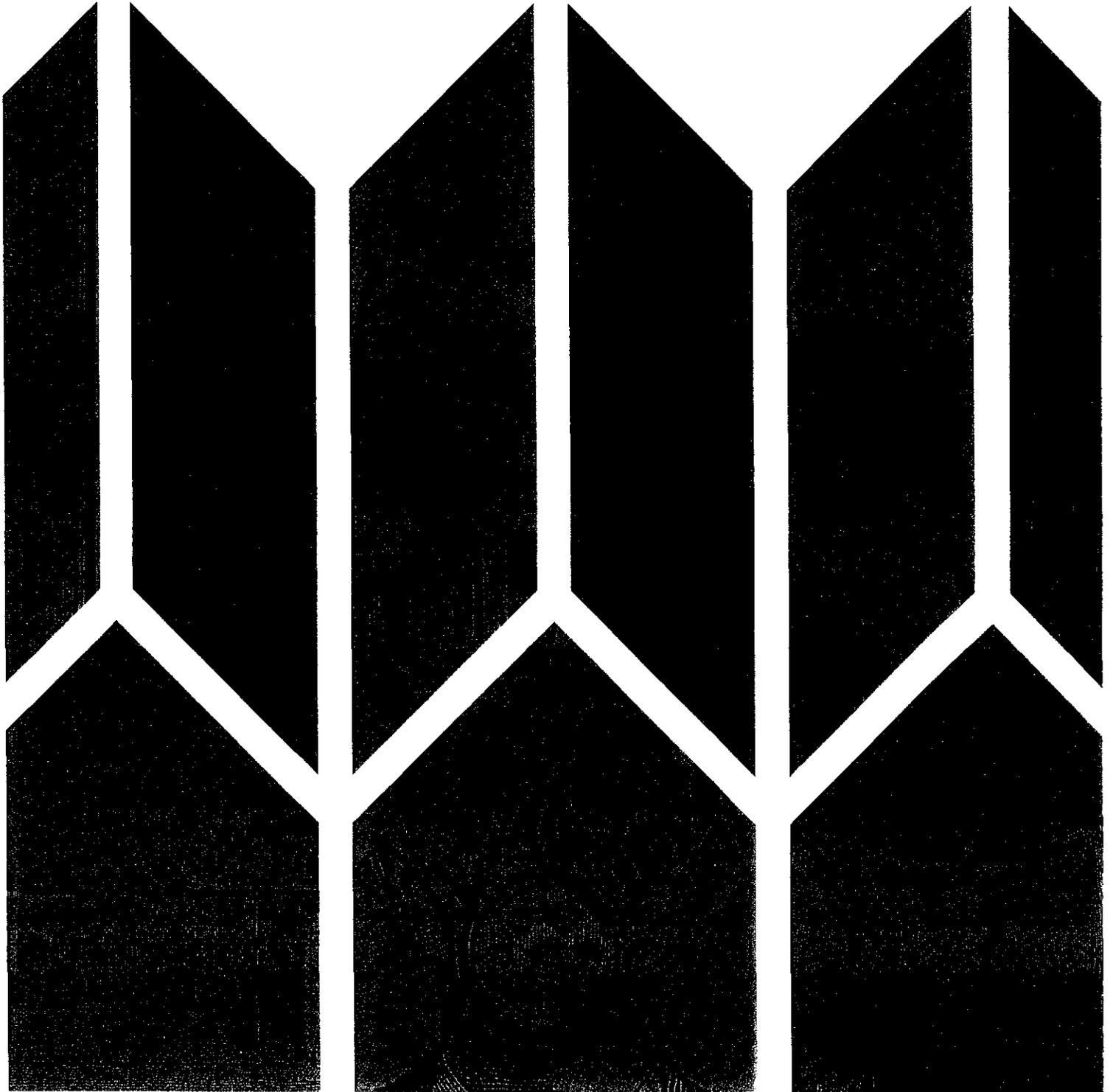
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A Project
of The Pew
Charitable Trusts
and Johns Hopkins
Bloomberg School
of Public Health

Putting Meat on the Table: Industrial Farm Animal Production in America



A Report of the Pew
Commission on Industrial
Farm Animal Production



**Putting Meat on the Table:
Industrial Farm
Animal Production in America**

The entire report can be seen via the following website:

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Foreword by

**John Carlin,
Former Governor
of Kansas**

I have witnessed dramatic changes in animal agriculture over the past several decades. When I was growing up, my family operated a dairy farm, which not only raised cows to produce milk, but crops to feed the cows and wheat as a cash crop. When I took over management of the farm from my father in the mid-sixties, on average we milked about 40 cows and farmed about 800 acres. We were one of some 30 such dairy operations in Saline County, Kansas. Today in Saline County and most Kansas counties, it is nearly impossible to find that kind of diversified farm. Most have given way to large, highly specialized, and highly productive animal producing operations. In Saline County today, there is only one dairy farm, yet it and similar operations across the state produce more milk from fewer cows statewide than I and all of my peets did when I was actively farming.

Industrial farm animal production (IFAP) is a complex subject involving individuals, communities, private enterprises and corporations large and small, consumers, federal and state regulators, and the public at large. All Americans have a stake in the quality of our food, and we all benefit from a safe and affordable food supply. We care about the well-being of rural communities, the integrity of our environment, the public's health, and the health and welfare of animals. Many disciplines contribute to the development and analysis of IFAP—including economics, food science, animal sciences, agronomy, biology, genetics, nutrition, ethics, agricultural engineering, and veterinary medicine. The industrial farm has brought about tremendous increases in short-term farm efficiency and affordable food, but its rapid development has also resulted in serious unintended consequences and

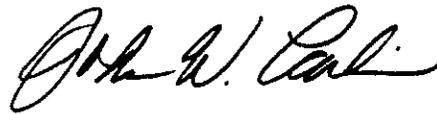


questions about its long-term sustainability.

I initially hesitated to get involved in the work of the Commission, given that the nature of partisan politics today makes the discussion of any issue facing our country extremely challenging. In the end, I accepted the chairmanship because there is so much at stake for both agriculture and the public at large. The Pew Commission on Industrial Farm Animal Production (PCIFAP) sought to develop recommendations that protect what is best about American agriculture and to help to ensure its sustainability for the future. Our work focuses on four areas of concern that we believe are key to that future: public health, environment, animal welfare, and the vitality of rural communities; specifically, we focus on how these areas have been impacted by industrial farm animal production.

The Commission consists of a very diverse group of individuals, remarkably accomplished in their fields, who worked together to achieve consensus on potential solutions to the challenge of assuring a safe and sustainable food supply. We sought broad input from stakeholders and citizens around the country. We were granted the resources needed to do our work, and the independence to ensure that our conclusions were carefully drawn and objective in their assessment of the available information informed by the Commissioners' own expertise and experience. I thank each and every one for their valuable service and all citizens who contributed to the process.

Finally, we were supported by a group of staff who worked tirelessly to ensure that Commissioners had access to the most current information and expertise in the fields of concern to our deliberations. We thank them for their hard work, their patience, and their good humor.



John W. Carlin
Chairman



Preface by

**Robert P. Martin,
Executive Director,
Pew Commission
on Industrial Farm
Animal Production**

Over the last 50 years, the method of producing food animals in the United States has changed from the extensive system of small and medium-sized farms owned by a single family to a system of large, intensive operations where the animals are housed in large numbers in enclosed structures that resemble industrial buildings more than they do a traditional barn. That change has happened primarily out of view of consumers but has come at a cost to the environment and a negative impact on public health, rural communities, and the health and well-being of the animals themselves.

The Pew Commission on Industrial Farm Animal Production (PCIFAP) was funded by a grant from The Pew Charitable Trusts to the Johns Hopkins Bloomberg School of Public Health to investigate the problems associated with industrial farm animal production (IFAP) operations and to make recommendations to solve them. Fifteen Commissioners with diverse backgrounds began meeting in early 2006 to start their evidence-based review of the problems caused by IFAP.

Over the next two years, the Commission conducted 11 meetings and received thousands of pages of material submitted by a wide range of stakeholders and interested parties. Two hearings were held to hear from the general public with an interest in IFAP issues. Eight technical reports were commissioned from leading academics to provide information in the Commission's areas of interest. The Commissioners themselves brought expertise in animal agriculture, public health, animal health, medicine, ethics, public policy, and rural sociology to the table. In addition, they visited broiler, hog, dairy, egg, and swine IFAP operations, as well as a large cattle feedlot.



There have been some serious obstacles to the Commission completing its review and approving consensus recommendations. The agriculture industry is not monolithic, and the formation of this Commission was greeted by industrial agriculture with responses ranging from open hostility to wary cooperation. In fact, while some industrial agriculture representatives were recommending potential authors for the technical reports to Commission staff, other industrial agriculture representatives were discouraging those same authors from assisting us by threatening to withhold research funding for their college or university. We found significant influence by the industry at every turn: in academic research, agriculture policy development, government regulation, and enforcement.

At the end of his second term, President Dwight Eisenhower warned the nation about the dangers of the military-industrial complex—an unhealthy alliance between the defense industry, the Pentagon, and their friends on Capitol Hill. Now, the agro-industrial complex—an alliance of agriculture commodity groups, scientists at academic institutions who are paid by the industry, and their friends on Capitol Hill—is a concern in animal food production in the 21st century.

The present system of producing food animals in the United States is not sustainable and presents an unacceptable level of risk to public health and damage to the environment, as well as unnecessary harm to the animals we raise for food.

The story that follows is the Commission's overview of these critical issues and consensus recommendations on how to improve our system of production.

A handwritten signature in black ink that reads "Robert P. Martin". The signature is written in a cursive, flowing style.

Robert P. Martin
Executive Director



The potential public health effects associated with IFAP must be examined in the context of its potential effects on individuals and the population as a whole. These effects include disease and the transmission of disease, the potential for the spread of pathogens from animals to humans, and mental and social impacts. The World Health Organization (WHO) defines health as “a state of complete physical, mental and social well-being” (WHO, 1992). This definition is widely recognized in the developed world and is increasingly being adopted by American employers.

In IFAP systems, large numbers of animals are raised together, usually in confinement buildings, which may increase the likelihood for health issues with the potential to affect humans, carried either by the animals or the large quantities of animal waste. The IFAP facilities are frequently concentrated in areas where they can affect human population centers. Animal waste, which harbors a number of pathogens and chemical contaminants, is usually left untreated or minimally treated, often sprayed on fields as fertilizer, raising the potential for contamination of air, water, and soils. Occasionally, the impact can be far worse. In one recent example, farm animal waste runoff from IFAP facilities was among the suspected causes of a 2006 *Escherichia coli* outbreak in which three people died and nearly 200 were sickened (CDC, 2006).

Affected Populations

Health risks increase depending on the rate of exposure, which can vary widely. Those engaged directly with livestock production, such as farmers, farm workers, and their families, typically have more frequent and more concentrated exposures to chemical or infectious agents. For others with less continuous exposure to livestock and livestock facilities, the risk levels decline accordingly.

Direct exposure is not the only health risk, however; health impacts often reach far beyond the IFAP facility. Groundwater contamination, for example, can extend throughout the aquifer, affecting drinking water supplies at some distance from the source of contamination. Infectious agents, such as a novel (or new) avian influenza virus, that arise in an IFAP facility may be transmissible from person to person in a community setting and well beyond. An infectious agent that originates at an IFAP facility may persist through meat processing and contaminate consumer food animal products, resulting in a serious disease outbreak far from the IFAP facility.

Monitoring is a basic component of strategies to protect the public from harmful effects of contamination or disease, yet IFAP monitoring systems are inadequate. Current animal identification and meat product labeling practices make it difficult or impossible to trace infections to the source. Likewise, IFAP workers, who may serve as vectors carrying potential disease-causing organisms from the animals they work with to the larger community, do not usually participate in public health monitoring, disease reporting, and surveillance programs because, as an agricultural activity, IFAP is often exempt. Furthermore, migrant and visiting workers, many of whom are undocumented, present a particular challenge to adequate monitoring and surveillance because their legal status often makes them unwilling to participate in health monitoring programs.

In general, public health concerns associated with IFAP include heightened risks of pathogens (disease- and nondisease-causing) passed from animals to humans; the emergence of microbes resistant to antibiotics and antimicrobials, due in large part to widespread use of



antimicrobials for nontherapeutic purposes; food-borne disease; worker health concerns; and dispersed impacts on the adjacent community at large.

Pathogen Transfer

The potential for pathogen transfer from animals to humans is increased in IFAP because so many animals are raised together in confined areas. IFAP feed and animal management methods successfully maximize the efficiency of meat or poultry production and shorten the time it takes to reach market weight, but they also create a number of opportunities for pathogen transmission to humans. Three factors account for the increased risk: prolonged worker contact with animals; increased pathogen transmission in a herd or flock; and increased opportunities for the generation of antibiotic-resistant bacteria or new strains of pathogens. Stresses induced by confinement may also increase the likelihood of infection and illness in animal populations.

Fifty years ago, a US farmer who raised pigs or chickens might be exposed to several dozen animals for less than an hour a day. Today's confinement facility worker is often exposed to thousands of pigs or tens of thousands of chickens for eight or more hours each day. And whereas sick or dying pigs might have been a relatively rare exposure event 50 years ago, today's agricultural workers care for sick or dying animals daily in their routine care of much larger herds and flocks. This prolonged contact with livestock, both healthy and ill, increases agricultural workers' risks of infection with zoonotic pathogens.

Infectious Disease

Numerous known infectious diseases can be transmitted between humans and animals; in fact, of the more than 1,400 documented human pathogens, about 64% are zoonotic (Woolhouse and Gowtage-Sequeria, 2005; Woolhouse et al., 2001). In addition, new strains and types of infectious and transmissible agents are found every year. Among the many ways that infectious agents can evolve to become more virulent or to infect people are numerous transmission events and co-infection with several strains of pathogens. For this reason, industrial farm animal production facilities that house large numbers of animals in very close quarters can be a source of new or more infectious agents. Healthy or asymptomatic animals may carry microbial agents that can infect and sicken humans, who may then spread the infection to the community before it is discovered in the animal population.

Generation of Novel Viruses

While transmission of new or novel viruses from animals to humans, such as avian or swine influenza, seems a

rather infrequent event today (Gray et al., 2007; Myers, Olsen et al., 2007), the continual cycling of viruses and other animal pathogens in large herds or flocks increases opportunities for the generation of novel viruses through mutation or recombinant events that could result in more efficient human-to-human transmission. In addition, as noted earlier, agricultural workers serve as a bridging population between their communities and the animals in large confinement facilities (Myers et al., 2006; Saenz et al., 2006). Such novel viruses not only put the workers and animals at risk of infection but also may increase the risk of disease transmission to the communities where the workers live.

Food-Borne Infection

Food production has always involved the risk of microbial contamination that can spread disease to humans, and that risk is certainly not unique to IFAP. However, the scale and methods common to IFAP can significantly affect pathogen contamination of consumer food products. All areas of meat, poultry, egg, and dairy production (e.g., manure handling practices, meat processing, transportation, and animal rendering) can contribute to zoonotic disease and food contamination (Gilchrist et al., 2007). Several recent and high-profile recalls involving *E. Coli* O157:H7 and *Salmonella enterica* serve as dramatic reminders of the risk.

Food-borne pathogens can have dire consequences when they do reach human hosts. A 1999 report estimated that *E. Coli* O157:H7 infections caused approximately 73,000 illnesses each year, leading to over 2,000 hospitalizations and 60 deaths each year in the United States (Mead et al., 1999). Costs associated with *E. Coli* O157:H7-related illnesses in the United States were estimated at \$405 million annually: \$370 million for deaths, \$30 million for medical care, and \$5 million for lost productivity (Frenzen et al., 2005). Animal manure, especially from cattle, is the primary source of these bacteria, and consumption of food and water contaminated with animal wastes is a major route of human infection.

Because of the large numbers of animals in a typical IFAP facility, pathogens can infect hundreds or thousands of animals even though the infection rate may be fairly low as a share of the total population. In some cases, it may be very difficult to detect the pathogen; *Salmonella enterica* (SE), for example, is known to colonize the intestinal tract of birds without causing obvious disease (Suzuki, 1994), although the infected hen ovaries then transfer the organism to the egg contents. Although the frequency of SE contamination in eggs is low (fewer than 1 in 20,000 eggs), the large numbers of eggs—65 billion—produced in the United States each year means that contaminated eggs represent a significant source for human exposure. Underscoring this point, the Centers for Disease Control and Prevention (CDC) estimated that SE-contaminated eggs accounted for approximately 180,000 illnesses in the United States in 2000 (Schroeder

Zoonotic disease:

A disease caused by a microbial agent that normally exists in animals but that can infect humans.



et al., 2005). The potential advantage of IFAP in this circumstance is that concentrated production and processing in fewer, larger facilities can result in improved product safety if regulations are properly instituted and vigilantly enforced.

Feed and Pathogen Risk

Feed formulation further influences pathogen risk because the feeds for confined animals are significantly different from the forage traditionally available to poultry, swine, or cattle. These feeds have been modified to:

- Reduce the time needed to reach market weight;
- Increase the efficiency of feed conversion—the amount of food converted to animal protein (rather than manure); and
- Ensure the survivability and uniformity of animals.

Other changes in modern animal feeds are the extensive recycling of animal fats and proteins through rendering and the addition of industrial and animal wastes as well as antimicrobials (AMs), including arsenic-derived compounds (arsenicals). In some cases, these additives can be dangerous to human health, as illustrated by the bovine spongiform encephalopathy (BSE) crisis in Britain in the early 1990s—scientists discovered that it resulted from the inclusion of brain and brainstem parts in the renderings that went into animal feeds. Since that discovery, great care has been taken to eliminate brain and spinal cord material from animal renderings. However, the ongoing addition of antimicrobial agents to IFAP livestock foodstuffs to promote growth also promotes the emergence of resistant strains of pathogens, presenting a significant risk to human health.

Nontherapeutic Antimicrobial Use and Resistance

The use of antibiotics for growth promotion began in the 1940s when the poultry industry discovered that the use of tetracycline fermentation byproducts resulted in improved growth (Stokstad and Jukes, 1958–1959). Though the mechanism of this action was never fully understood, the practice of adding low levels of antibiotics and, more recently, growth hormones to stimulate growth and improve production and performance has continued over the ensuing 50 years.

In the 1990s, the public became aware of the threat of antimicrobial resistance as the number of drug-resistant infections increased in humans. However, antimicrobial resistance has been observed almost since the discovery of penicillin. In 2000, a WHO report on infectious diseases expressed alarm at the spread of multidrug-resistant infectious disease agents and noted that a major source of antimicrobial-resistant bacteria was food:

Since the discovery of the growth-promoting and disease-fighting capabilities of antibiotics, farmers, fish-farmers and livestock producers have

used antimicrobials in everything from apples to aquaculture. Currently, only half of all antibiotics are slated for human consumption. The other 50% are used to treat sick animals, as growth promoters in livestock, and to rid cultivated foodstuffs of various destructive organisms. This ongoing and often low-level dosing for growth and prophylaxis inevitably results in the development of resistance in bacteria in or near livestock, and also heightens fears of new resistant strains “jumping” between species... (WHO, 2000)

Despite increased recognition of the problem, the Infectious Disease Society of America (ISDA) recently declared antibiotic-resistant infections to be an epidemic in the United States (Spellberg et al., 2008). The CDC estimated that 2 million people contract resistant infections annually and, of those, 90,000 die. A decade ago, the Institute of Medicine estimated that antimicrobial resistance costs the United States between \$4 and \$5 billion annually, and these costs are certainly higher now as the problem of resistance has grown and intensified worldwide (Harrison et al., 1998).

Because bacteria reproduce rapidly, resistance can develop relatively quickly in the presence of antimicrobial agents, and once resistance genes appear in the bacterial gene pool, they can be transferred to related and unrelated bacteria. Therefore, increased exposure to antimicrobials (particularly at low levels) increases the pool of resistant organisms and the risk of antimicrobial-resistant infections. Consider the following:

- Antimicrobials are readily available online or through direct purchase from the manufacturer or distributor, allowing unrestricted access by farmers to pharmaceuticals and chemicals without a prescription or veterinarian's oversight; and
- Some classes of antibiotics that are used to treat life-threatening infections in humans, such as penicillins and tetracyclines, are allowed in animal feeds to promote animal growth.

Groups attempting to estimate the amount of antimicrobials used in food animal production are often thwarted by varying definitions of “therapeutic,” “nontherapeutic,” and “growth-promoting.” For example, the Union of Concerned Scientists estimated that 70% of antimicrobials in the United States are used in food animal production, whereas the Animal Health Institute estimated closer to 30% (AHI, 2002; Mellon et al., 2001). Others have not bothered with an estimate because of the lack of both clear definitions and data (Mellon et al., 2001; WHO, 2000). A universally accepted definition of the various types of use is necessary to estimate antimicrobial use and to formulate policy governing the use of antimicrobials in food animals. The lack of publicly available validated information on the volume of antimicrobial use as a feed additive leaves policymakers uninformed about the true state of antimicrobial use in food animal production and its relationship to the growing problem of antimicrobial resistance.

Supporters of the use of antibiotics as growth

Antimicrobial resistance:
The result of microbial changes that reduce or eliminate the effectiveness of drugs.



promoters maintain that their use, along with other technologies, results in more affordable meat products for consumers, decreased production costs, and less impact on the environment as fewer animals are required to produce a unit of meat product. However, it is not clear that the use of antimicrobials in food is cost-effective, either in terms of increased health care costs as a result of resistant infections, or for the facility itself (Graham et al., 2007). Antimicrobial-resistant bacteria have been found both in and downwind of IFAP facilities (e.g., swine) but not upwind (Gibbs et al., 2004). Several groups have reviewed the association between the use of low-level antimicrobials in food animal production and the development of antimicrobial resistance in humans (Teuber, 2001; Smith, Harris et al., 2002).

Whatever the direct evidence, it is certain that the exposure of bacteria to antimicrobial agents selects resistant bacteria that can replicate and persist. Such bacteria from IFAP facilities can reach humans through many routes, both direct (through food, water, air, or contact) and indirect (via transmission of resistance in the environmental pool of bacteria).

Occupational Health Impacts of Industrial Farm Animal Production

IFAP facilities generate toxic dust and gases that may cause temporary or chronic respiratory irritation among workers and operators. IFAP workers experience symptoms similar to those experienced by grain handlers: acute and chronic bronchitis, nonallergic asthma-like syndrome, mucous membrane irritation, and noninfectious sinusitis. An individual's specific response depends on characteristics of the inhaled irritants and on the individual's susceptibility. In general, the symptoms are more frequent and severe among smokers (Donham and Gustafson, 1982; Markowitz et al., 1985; Marmion et al., 1990) and among workers in large swine operations (who work longer hours inside IFAP buildings) or in buildings with high levels of dusts and gases (Donham et al., 2000; Donham et al., 1995; Reynolds et al., 1996). Evidence also suggests that increasing exposure to IFAP irritants leads to increased airway sensitivity (Donham and Gustafson, 1982; Donham et al., 1989).

Another, more episodic, bioaerosol-related problem experienced by about 30% of IFAP facility workers is

organic dust toxic syndrome (ODTS) (Do Pico, 1986; Donham et al., 1990), which is thought to be caused mainly by inhaled endotoxin and usually occurs in workers exposed to high levels of dust for four or more hours (Rylander, 1987). Although its onset may be delayed, the symptoms are more severe than those described above: fever, malaise, muscle aches, headache, cough, and tightness of the chest.

In addition to dust, irritants such as gases are generated inside farm buildings from the decomposition of animal urine and feces (ammonia, hydrogen sulfide, and methane, among others) (Donham and Gustafson, 1982; Donham and Popendorf, 1985; Donham et al., 1995). The combination of dusts and gases in IFAP facilities can rise to concentrations that may be acutely hazardous to both human and animal health (Donham and Gustafson, 1982).

Decomposing manure produces at least 160 different gases, of which hydrogen sulfide (H_2S), ammonia, carbon dioxide, methane, and carbon monoxide are the most pervasive (Donham et al., 1982a; Donham and Gustafson, 1982; Donham et al., 1982b; Donham and Popendorf, 1985; Donham et al., 1988). These gases may seep from pits under the building or they may be released by bacterial action in the urine and feces on the confinement house floor (one study showed that the latter accounted for 40% of the ammonia measured in-building [Donham and Gustafson, 1982]).

Possibly the most dangerous gas common to IFAP facilities is hydrogen sulfide. It can be released rapidly when liquid manure slurry is agitated, an operation commonly performed to suspend solids so that pits can be emptied by pumping (Donham et al., 1982b; Osborn and Crapo, 1981). During agitation, H_2S levels can soar within seconds from the usual ambient levels of less than 5 ppm to lethal levels of over 500 ppm (Donham et al., 1982b; Donham et al., 1988). Generally, the greater the agitation, the more rapid and larger amount of H_2S released. Animals and workers have died or become seriously ill in swine IFAP facilities when H_2S has risen from agitated manure in pits under the building. Hydrogen sulfide exposure is most hazardous when the manure pits are located beneath the houses, but an acutely toxic environment can result if gases from outside storage facilities backflow into a building (due to inadequate gas traps or other design faults) or if a worker enters a confined storage structure where gases have accumulated.

Endotoxin:

A toxin that is present in a bacteria cell and is released when the cell disintegrates. It is sometimes responsible for the characteristic symptoms of a disease, such as botulism.

Antimicrobial Resistance
Life-threatening bacteria are becoming more dangerous and drug resistant because of imprudent antibiotic use in humans as well as animals, yet the federal government response to protect the efficacy of these drugs has been limited. For instance, the Food and Drug Administration (FDA) is moving ahead with approval of cefquinome,

a highly potent antibiotic, for use in cattle despite strong opposition from the Centers for Disease Control and Prevention (CDC), the American Medical Association, and FDA's own advisory board. Health experts are concerned about the approval of drugs from this class of medicines for animal use because they are one of the last defenses against many grave human infections. Moreover, in this

instance, the drug proposed is to combat a form of cow pneumonia for which several other treatment agents are available.

Community Health Effects and Vulnerable Populations

Communities near IFAP facilities are subject to air emissions that, although lower in concentration, may significantly affect certain segments of the population. Those most vulnerable—children, the elderly, individuals with chronic or acute pulmonary or heart disorders—are at particular risk.

The impact on the health of those living near IFAP facilities has increasingly been the subject of epidemiological research. Adverse community health effects from exposure to IFAP air emissions fall into two categories: (1) respiratory symptoms, disease, and impaired function, and (2) neurobehavioral symptoms and impaired function.

Respiratory Health

Four large epidemiological studies have demonstrated strong and consistent associations between IFAP air pollution and asthma. Merchant and colleagues, in a countywide prospective study of 1,000 Iowa families, reported a high prevalence of asthma among farm children living on farms that raise swine (44.1%) and, of those, on the farms that add antibiotics to feed (55.8%) (Merchant et al., 2005). Most of the children lived on family-owned IFAP facilities, and many either did chores or were exposed as bystanders to occupational levels of IFAP air pollution.

Mirabelli and colleagues published two papers describing a study of 226 North Carolina schools ranging from 0.2 to 4.2 miles from the nearest IFAP facility (Mirabelli et al., 2006a; Mirabelli et al., 2006b). Children living within three miles of an IFAP facility had significantly higher rates of doctor-diagnosed asthma, used more asthma medication, and had more asthma-related emergency room visits and/or hospitalizations than children who lived more than three miles from an IFAP facility. Their research also showed that exposure to livestock odor varied by racial and economic characteristics, indicating an environmental justice issue among the state's swine farms (Mirabelli et al., 2006a).

Sigurdarson and Kline studied children from kindergarten through fifth grade in two rural Iowa schools, one located half a mile from an IFAP facility and the other distant from any large-scale agricultural operation (Sigurdarson and Kline, 2006). Children in the school near the facility had a significantly increased prevalence of doctor-diagnosed asthma, but there was no difference between the two populations in the severity of asthma. Potential biases among children living close to the IFAP included children who were more likely to live on a farm (direct IFAP exposure was not assessed) and who more often lived in houses where parents smoked, but neither of these confounders explained the increase in asthma prevalence. The authors noted that physicians responsible for the medical care of these two groups of children differed and, therefore, did not rule out physician bias in asthma diagnosis.

Radon and colleagues conducted a 2002–2004 survey among all adults (18 to 45) living in four rural German towns with a high density of IFAP (Radon et al., 2007). Questionnaire data were available for 6,937 (68%) eligible adults. Exposure was estimated by collecting data on odor annoyance and by geocoding data on the number of IFAP facilities within 1,530 feet of each home. To control for occupational health effects, the researchers limited their analyses to adults without private or professional contact with farming environments. The prevalence of self-reported asthma symptoms and nasal allergies increased with self-reported odor annoyance, and the number of IFAP facilities was a predictor of self-reported wheeze and decreased FEV1 (forced expiratory volume in the first second; see definition). Although odor varied from day to day, the study reported reasonable test-retest reliability of the question on odor annoyance in the home environment. Sources of bias in this study include a somewhat dated (2000) registry of IFAP facilities and possible exposure misclassification.

These recent, well-controlled studies are consistent in finding associations between proximity to IFAP facilities and both asthma symptoms and doctor-diagnosed asthma, although they all use proxies for environmental exposure to IFAP emissions. Taken together, however, they provide reason to increase awareness of asthma risks in communities near IFAP facilities, to better inform rural doctors of standards for asthma diagnosis and of the reported association with IFAP facilities, and to pursue local and state environmental measures to minimize risks to children and adults living near IFAP facilities.

Neurobehavioral Outcomes

Volatile organic compounds are important components of the thousands of gases, vapors, and aerosols present in IFAP facilities. More than 24 odorous chemicals (often referred to as odorants) have been identified in IFAP emissions (Cole et al., 2000). Valeric acids, mercaptans, and amines are particularly odorous, even in minuscule concentrations; ammonia and hydrogen sulfide are also pungently aromatic. Many of these compounds are known to be toxic to the nervous system in sufficient concentration. It is thus not surprising that the few studies that have examined neurobehavioral issues among residents living near IFAP facilities have documented increased rates of neurobehavioral symptoms such as depression.

Schiffman and colleagues studied North Carolina residents who lived in the vicinity of intensive swine operations and then compared findings from this group to matched control subjects who did not live near IFAP facilities (Schiffman et al., 1995). They found more negative mood states (e.g., tension, depression, anger, reduced vigor, fatigue, and confusion) among those living close to IFAP facilities. In a study of chronic (non-IFAP or IFAP) occupational exposures to hydrogen sulfide, Kilburn found that such exposures might lead to neuropsychiatric abnormalities, including impaired balance, hearing,

FEV1 (forced expiratory volume in the first second):

The volume of air that can be forced out in one second after taking a deep breath, an important measure of pulmonary function.





memory, mood, intellectual function, and visual field performance (Kilburn, 1997).

Reports have documented that there is great variability among odors from IFAP facilities, that odorous gases may be transformed through interactions with other gases and particulates between the source and the receptor (Peters and Blackwood, 1977), and that there is variability in odor persistence (the "persistence factor"), defined as the relative time that odorous gases remain perceptible (Summer, 1971). There remains a need to combine quantitative measures of odors with environmental measures of a suite of odorants in well-designed, controlled studies of neurobehavioral symptoms and signs in community-based studies.

Conclusions

The Commissioners note that the same techniques that have increased the productivity of animal agriculture have also contributed to public health concerns associated with IFAP. These concerns—antimicrobial resistance, zoonotic disease transfer to humans, and occupational and community health impacts that stem from the dusts and gases produced by IFAP facilities—are not unique to industrial farm animal production or even agriculture. The industrial economy causes significant ecological disruption, and that disruption is a major cause of disease. Microbes have always existed, will continue to exist, and will learn to adapt faster. It is the size and concentration of IFAP facilities and their juxtaposition with human populations that make IFAP a particular concern.

The Commission recommends that the federal government and animal agriculture industry address the causes of these public health concerns, particularly in the area of antimicrobial resistance, in order to reduce risks to the general public. The headlines from the fall of 2006 when *E. Coli* contaminated spinach made its way to the consumer market are fresh in the public's mind (CDC, 2006). The Commission's recommendations in this area are intended to bring about greater public protection without imposing an undue burden on the animal agriculture industry.



Methicillin (Antibiotic)-Resistant Staphylococcus aureus (MRSA)

Staphylococcus aureus is a common bacterium that causes superficial infections and occasionally invasive infections that can be fatal. Strains of *S. aureus* that are resistant to the antibiotic methicillin and related antibiotics commonly used to treat it are referred to as methicillin-resistant *Staphylococcus aureus* (MRSA). MRSA and other staphylococci may be found on human skin, in the nose (where it can reside without causing symptoms), and on objects in the environment, and can be passed from person to person through close contact. MRSA is usually subcategorized as either hospital-acquired or community-acquired, not only because of where the infection was acquired, but also because different strains of the bacteria appear to be responsible for the different types of infections.

MRSA has become the most frequent cause of skin and soft tissue infections in patients seeking care in US emergency rooms (Moran et al., 2006). It can also cause severe and sometimes fatal invasive disease (Zetola et al., 2005). A recent study from the Centers for Disease Control and Prevention (CDC), reported in the *Journal of the American Medical*

Association (JAMA), showed a rise in invasive MRSA infections both within and outside of health care settings in the United States in 2005. In particular, the authors noted a rise in community-acquired invasive MRSA, although it is still less prevalent than the hospital-acquired strain (Klevens et al., 2007). They cite MRSA as a major emerging public health problem.

Pigs and some other animals can also carry staphylococci (including MRSA) on their bodies (known as "colonization"). MRSA colonization in pigs was first studied in the Netherlands, where it was found that pig farmers were 760 times more likely to be colonized with MRSA than people in the general population (Voss et al., 2005). In addition, the study documented transmission of MRSA between pigs, pig farmers, and their families (Huijsdens et al., 2006; Voss et al., 2005). A separate study in the journal *Veterinary Microbiology* looked at the prevalence of MRSA in pigs and pig farmers in Ontario, Canada (Khanna et al., 2007). This study found that MRSA is common in pigs on farms in Ontario: it was present in 24.9% of all pigs sampled and in 20% of the farmers (the prevalence in the study was 45%). In addition, there was a significant correlation

between the presence of MRSA in pigs and humans on farms (Khanna et al., 2007). The strains found in both pigs and farmers in Ontario were mainly of a type that has been found in pigs in Europe, as well as a strain commonly found in US health care facilities.

S. aureus has also been isolated, at varying levels, from meat in Egypt (Bakr et al., 2004), Switzerland (Schraft et al., 1992), and Japan (Kitai et al., 2005). Analysis of the strains of bacteria isolated from these meat products suggested that they were of human origin, probably due to contamination during processing. A recent study from the Netherlands, however, found low levels of MRSA strains in meat that were probably of animal (farm) origin (van Loo et al., 2007). Proper cooking of the meat kills the bacteria, but there is a risk of transmission to workers in processing plants and to consumers before the meat is cooked.

The growing importance of MRSA as a public health problem in the United States and elsewhere, as well as the growing body of evidence suggesting transmission between farm animals and humans and among humans, makes it particularly relevant to the discussion of antimicrobial use in food animals (Witte et al., 2007).

