OPINION

Does organic farming require too much livestock?

Jim Bender

A characteristic feature of organic farming and related sustainable agricultural systems (hereafter just called "organic farming" in the interest of simplicity) is the integration of livestock husbandry with feed production. This facilitates recycling of livestock manure and the use of rotations involving legume forages. However, it also raises a potentially serious objection: If every farmer practiced it, the country might have more livestock than we need or want.

The question "what if everybody did it?" is legitimate, provided it is phrased accurately and fairly. One version might be: "What if all farmers attempted to use manure to replace their current use of fertilizer?"

Organic farming apparently fails this test. However, this question is based on three implicit assumptions that distort the nature of organic farming. First, it assumes the same cropping plan as is typical of conventional practice, e.g., from one-half to all the cropland in feed grains. Second, it assumes that manure needs to replace conventional fertilizer at the same rate. Third, it assumes that livestock manure is the only material that the organic farmer will wish to use as an alternative to inorganic fertilizer. All these assumptions are false, for reasons I discuss later.

Instead of focusing entirely on fertilizer requirements, I offer another test that reflects the relationship between livestock, efficiency, and conservation in organic farming: "What if livestock were always raised in a manner that conserves resources by using them efficiently, and that makes livestock and crop production mutually supportive?"

This version of the question has important implications for where livestock are produced. The trend has been towards large-scale confinement, rather than a farm-based system. This trend is not consistent with the second test of agricultural practices, for two reasons. First, because it is difficult to use manure from large-scale confinement lots efficiently, this system violates the requirement that livestock production support crop production. Second, confined livestock cannot use crop residues and grasslands, which violates the requirement that crop production efficiently support the livestock.

It is not fair to evaluate the feasibility of organic farming by grafting individual components of it onto the basic structure of the conventional system, such as the continued prevalence of large-scale confinement feeding. Yet this is what the first question assumes. If livestock for organic production were merely added to livestock currently produced in large-scale confinement, the total would indeed be excessive. But most large-scale confinement is inconsistent with the basic idea of organic farming. The criticism that there would be too much livestock places the responsibility for the surplus on the organic farming component, rather than the confinement facilities.

Suppose, instead, that livestock now raised in large-scale confinement were returned to farms to enhance organic systems. To take the example of beef cattle, in 1981 there were about 17 million head of cattle fed in large-scale confinement (at least 1000 head) in the 23 states comprising the major cattle feeding region. By contrast, cattle fed on farms numbered only 6 million, out of a total of about 23 million. Therefore, if there were no large-scale confinement feeding, the number of cattle fed on farms could be increased almost four-fold without increasing the total number.

How much livestock does organic farming require? The desirable livestock herd on an organic farm is the number required to meet soil conservation requirements, to reduce fertilizer needs and enhance soil structure by recycling nutrients and organic matter, to provide financial diversity and stability, and to permit reduction or elimination of pesticide use. The number needed to achieve these goals is not as large as is commonly believed. The following model of a moderate sized farm provides an estimate. Obviously, it is only an illustrative example.

The farm has 320 acres of land typical of the Corn Belt and Plains, mostly in row crops, but with a few acres of steep or rough land. The livestock herd has 30 cows and one bull, with 27 calves. Also, 26 yearlings are finished per year on the farm, including replacement heifers. Would this meet the requirements of organic farming?

From the viewpoint of soil conservation, a few acres are best suited for pasture, and there should be grassed waterways. The 30 cows provide a financial return for these conservation measures by consuming the grass harvested from the rough ground

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and waterways. The grass from up to 4 percent of the land (13 acres), at a yield of at least 1 ton/acre, would easily be consumed by the cows and their calves. Conservation also implies crop rotations, typically involving wheat, oats, and alfalfa or other legumes, in addition to row crops. Pasturing the cattle on the wheat, and feeding the oats and legumes, makes this rotation plausible. The proposed herd size seems sufficient to sustain an ambitious soil-conserving rotation on 320 acres.

The manure from 30 cows with calves, a bull, and 12 yearlings on feed will not be enough to meet all the fertilizer requirements of 320 acres. However, this is not an insurmountable obstacle. Fertility on a well-managed organic farm involves other factors besides livestock manure: A crop mix that includes crops with reduced fertility requirements; the positive effect of crop rotation on yield from factors unrelated to nutrient supply; nitrogen fixation by legumes; and yield goals chosen because they are most efficient, not necessarily the highest attainable. Also, the farmer can use additional organic sources of nutrients, such as fish meal or kelp, although this may be less profitable than increasing the livestock herd.

Recycling of nutrients and organic matter is not optimized in the model farm because not all the feed grains will be consumed on-farm. Finishing the 26 yearlings might require 50 bushels of feed grain each, or 1300 bushels. Additional grain would be used to creep-feed calves on pasture, but together these uses constitute only a small fraction of the total grain production, which would likely be between 5,000 and 10,000 bushels. (The cattle also recycle nutrients by grazing pastures, waterways, and crop residues, and by consuming legume hay produced in the crop rotation.) Although selling some feed grains reduces nutrient recycling, it is permissable because it diversifies the sources of income, which contributes to financial stability.

The proposed livestock operation also increases the farm's financial stability because almost all the feeds are raised on the farm. This means that this important component of production costs is more under the farmer's control than if feeds were purchased. Also, by foraging, livestock yield some economic return even if hazards like drought or hail leave little harvestable grain crop.

Finally, livestock are important for the goal of reducing pesticide use because they permit the farm to be more diversified, particularly through rotations with legumes. Also, winter grazing of feed grain residue will minimize volunteer corn and milo. The proposed herd will be large enough to be able to clean up the grain residues, taking account of the reduced proportion of feed grains under organic rotations.

The number of livestock proposed as meeting the requirements of organic farming is modest in comparison to current practices. For example, consider my own county, Cass County, Nebraska, which lies along the Missouri River on the western edge of the Corn Belt. It has about 333 thousand acres of farmland, mostly in corn and soybeans. It also has about 158 thousand head of livestock, including cows, cattle on feed, hogs and sheep, or about one head for every 2 acres. The model farm has 84 head of cattle (counting the cows, their calves, the bull, and the cattle on feed) on 320 acres, or about one animal for every 4 acres. Of course, quantitative comparisons of different types of livestock on a per head basis are not valid, but the example shows that the livestock density of the hypothetical farm can legitimately be called "modest."

In summary, this paper is not equipped to provide a precise answer regarding whether livestock production in organic farming would be at appropriate levels. One reason is that appropriateness is partially a function of how much livestock products *should* be consumed. Part of the answer to that lies in nutritional debates which are not yet resolved.

A more modest conclusion, however, is that the too-much-livestock criticism of organic farming is currently without foundation. I argued that that form of attack on organic farming misuses its own device of argument, ignores the highly relevant subject of where current livestock production could be located, and fails to acknowledge that a surprisingly modest quantity of livestock can be organized to create a threshold of viable organic methods.