

Commodity System Challenges

Moving Sustainability into the Mainstream of Natural Resource Economies

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3 Linden Road • Hartland VT 05048 • (802) 436-1277 • FAX (802) 436-1281
www.sustainer.org

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1. Recreating Commodity Systems — an Essential Part of Sustainability

Why have we written this paper on sustainability and commodity systems, and why should you read it? To answer that question, right up front, we must first ask you, the reader, questions of our own.

How do commodity systems touch your personal or professional life? **When you say the word "commodity" what do you think of?**

Perhaps the word commodity makes you think of a specific crop — lobster, or lumber, or corn, or bananas — because you earn your livelihood producing it. In that case, if you are like the producers we have gotten to know during the course of our research, you don't need a paper to tell you the importance of understanding and managing a commodity system. You feel pressures on your community. You wonder if your children will be able to stay in your community. You wonder if you and your fellow farmers will be able to afford schooling for your children. You wonder if there will be enough fish in the sea to sustain your fishing fleet in five years' time. You wonder how low the price for your commodity will fall before it is done falling. You wonder if it will ever be done falling.

So for you — **producers trying to survive in the main market or diversify into niche markets** — we have written this paper with the hope that stepping back to **see the systemic reasons for the behavior of commodity economies will help you and your fellow producers take concrete action.** We hope examples of what has worked to transform other commodity systems will give you inspiration. And we hope that by being frank about the vulnerabilities of solutions, we will help you refine your strategies.

Perhaps, when you hear the word commodity, you think of a place you love that is threatened by the way a commodity is grown or harvested. Maybe you think of a waterway choked of oxygen by fertilizer run-off or a forest in your view that is destined to be clear-cut. If you see commodities from the point of view of damage done to the environment, we hope this paper helps you understand the causes of fertilizer run-off or massive clear cuts or over-fishing. We hope you will see how good people do bad things for good reasons or because they see no alternative. We hope such an analysis helps you see new options for protecting the forests, oceans, rivers, and soils that you love. We hope this way of looking at commodity systems helps you see opportunities for new partnerships and new actions.

Perhaps the word commodity leads you quickly to concerns for social justice. You are outraged that only a tiny sliver of the consumer dollar makes it back to the majority of the men and women who harvest fish, grain, cocoa beans or tea. You desire a landscape of small farms and prosperous fishing villages and despair at the growth of industrial monocultures. For you, concerned with a commodity economy that can erode social resources as surely as it can erode environmental ones, we offer this paper as a way of understanding the structural forces making commodity systems so potentially destructive of social capital. We hope the examples in this paper convince you that destruction is not inevitable and give you inspiration about the concrete mechanisms that can keep commodity systems and their harvesting communities healthy for the long term.

Maybe you manage a large company dependant on commodity streams for profitability and survival. Perhaps you are searching for the means to do your job and fulfill your company's mission in ways that support social and environmental resources. Quite likely you know that the success of your enterprise depends upon the long-term sustainability of the resource and its harvesters. We hope this paper provides you with fresh insight about the opportunities for commodity buyers to participate in solutions.

Perhaps, when you think of the word commodity, you see yourself at the grocery store or the furniture shop puzzling out your choices, trying to do the right thing. If that is the case, we offer this paper in the hopes that you see specific ways to support sustainable, equitable rules for the commodity systems sustaining you.

We have then, several answers about why we have written this paper. Each answer is sincere, but each is only partial. Take them all together and you have our best answer.

So much that is vital, from the sustenance of our material needs to the beauty of our landscape and equity among people, is influenced by the way our commodity systems behave. If we are going to move toward the world we want, our commodity systems are going to need to change. That can happen most effectively if all those involved, from small producers to large corporations, from social justice advocates to environmental reformers to consumers, believe that these systems can improve and come together to make that happen.

We offer this look at the structure of commodity systems, their traps, and alternative structures, in the hopes that it will facilitate such a coming together.

Where Human Economy Meets the Earth

Commodities that come directly from the earth – grain, meat, cotton, sugar, lumber, fish – are the raw materials at the foundation of every economy. They are the basis of subsistence and material comfort. The natural resource economies that have grown up to harvest, produce, process, refine, transport, and market these commodities exist at the intersection of human systems and the Earth's systems. These commodity economies are where business policies intersect with food webs, where trade rules meet nutrient cycles, where cultural assumptions must mesh with water flows and weather patterns.

The rules and incentives guiding daily decision-making within these dynamic and complex systems determine not only the amount and quality of goods produced but also the condition of ecosystems and human communities. Do the fish, trees, or soils at the heart of a commodity system regenerate faster than they are depleted? Can healthy profit margins exist within a system that is sensitive to regeneration rates? Do the harvesters earn a livable wage? Do the waterways run pure or become filled with sediments or pollutants?

As the scale of commodity production increases, the potential for commodity systems to exceed the capacity of human communities and ecosystems to support them also increases. Commodity systems can overshoot the sustainable harvest of the resources they depend on, as in the collapse of a fishery. They can produce more wastes than ecosystems can absorb, as in pollution from agriculture. They can push so far towards "efficiency" that communities of producers are pushed to the edge of economic survival.

In response to this growing challenge, people around the world are developing policies and practices to manage natural resource economies. People monitor resources and agree on

production limits to avoid over-harvesting. Countries and regions tax pollutants and reward good stewardship. Commodity processors form partnerships with producers to use best practices. Local food system projects are emerging.

Unfortunately, these good news stories tend to end in the phrase, "successful, but..." The solutions are helpful to a point, but they also are vulnerable to other pressures. Sometimes they seem promising at the local level, but cannot be increased to a larger scale. Or they cannot be sustained without constant injections of outside money and energy. Or they are blocked by international trade rules. Or they just cannot compete with other regions that have not adopted similar practices.

While the techniques of careful commodity system management currently seem workable within small, geographically constrained experiments, we know that isolated experiments are not enough. If the Gulf of Mexico is impacted by nutrient runoff from all the thousands of acres of row crops in the Mississippi River watershed, then solutions leading to a few percent of these acres converting to organic practices won't significantly improve the health of the Gulf. Careful management of a single fishery cannot be maintained if similar fish from other waters are sold into the market at a lower price. In a globally traded commodity, the commitment of a single player, no matter how large and powerful, cannot ensure the long-term sustainability of a resource.

What will it take to implement locally effective solutions at a scale that is meaningful for the Gulf of Mexico or for the global market for groundfish? How do we keep the benefits of commodity systems while changing them enough to reduce problems?

In trying to answer such questions, we are guided by a tenet of systems analysis — structure gives rise to behavior. Even though each crop and each raw material has its own path from harvest, through processing, to final use, we focus on the patterns of behavior common to these diverse systems. We look for the rules, incentives, and decision making processes that produce those behaviors. We examine why these systems tend to expand beyond the capacity of society or the environment to support them. Finally, we examined the collection of rules and incentives with an eye towards those places to intervene that can be used to keep the productive capacity of commodity systems in balance with ecological and community resources. The conclusion examines opportunities to learn from attempted solutions and to expand their range and effectiveness.

Do this in preparation for the class discussion!

Homework - read pages 1-3(above) and be prepared to discuss the following questions in class:

1. When you say the word "commodity", what do you think of?
2. Name the "actors" in this complex system who might hold different world views (mental models) that are described on pages 1-2. For each, identify what the authors propose they may learn from a better understanding of the commodity system. For example:
 - a. **Producers** trying to survive in the main market or diversity into niche markets may learn to see the systemic reasons for the behavior of commodity economies that will help them take concrete action, find inspiration and refine their strategies (from page one).
 - b. **People thinking of a "place they love"....** might learn....
 - c.
 - d.
 - e.
2. Why do the "good news" stories identified on page 3 "tend to end in the phrase, '...successful, but'?
3. Why are "isolated experiments" in doing things differently (such as local farmers markets) not enough?
4. What must we do to "implement locally effective solutions at a scale that is meaningful?

NOTE: the answers to all of these questions come directly from the reading above.

2. Behavior of Commodity Systems

Commodity Systems Aim to Produce Standardized Raw Materials for the Lowest Possible Cost

Over the last few hundred years the production of raw materials for human consumption has shifted from local, small-scale, diverse producers to a system of larger-scale, specialized producers selling commodities over long distances through a highly sophisticated distribution and processing infrastructure. Within these commodity systems materials move in one direction — from production to consumption — and money flows back the other direction.

Two basic rules allow commodity systems to accomplish extraction and distribution of raw materials on such a vast scale. First, commodity systems **standardize the characteristics of the raw commodity**. A ton of Number Two Dent corn from Iowa is indistinguishable from a ton of Number Two Dent from Argentina. A pound of shrimp from Louisiana is identical to a pound of shrimp from Ecuador.

This standardization streamlines the flow of the commodity. Only certain characteristics — those that matter to the next buyer in the chain — are recorded and tracked. As the wheat pours out of tractor-trailer trucks and into grain elevators or as the shrimp from many nets co-mingle in frozen blocks on a transport ship, the history of production is lost. The only information tracked for each product grade is the price and the volume, in metric tons, or bushels, or board feet. This allows traders and buyers to move the commodity as an undifferentiated stream of goods rather than as the identified product of a specific producer.

From the outside, a modern grain elevator looks like a simple enough concrete structure, but inside it is a labyrinth of pipes, ducts, ventilators, belts, and shovel lifts, all controlled from a command room complete with console and flashing, colored buttons. From there it is possible to "blend" grain from different silos so that the foreign customer gets no more than the minimum quality ordered — no more, but no less either, of permitted broken kernels, pieces of weeds, insects, bits of straw, wild garlic, and wild onions. Once the grain is blended, it rockets out along the belts that run as far as a quarter of a mile to reach a waiting ship.

— Dan Morgan, *Merchants of Grain*, 1979¹

Standardization and substitutability have allowed commodity systems to be extraordinarily streamlined and productive. But as knowledge of the ecological and social context of the commodity is removed, producers are left with very few grounds upon which to compete. If buyers no longer know where or how a commodity was produced, it is impossible to reward producers for stewardship or good community-citizenship.

This leads to a **second rule of commodity systems: the producer with lowest prices makes the sale.** Producing the most undifferentiated product for the least cost is the secret to survival at the beginning of the commodity chain. Because the production methods, ecological impacts, and contributions to local communities are not associated with a particular truckload of corn or pallet of lumber, competitive advantage for producers in commodity systems comes only from being able to produce a grade of product for the least cost.

NOTE: try to avoid running up the ladder of inference just yet. Lets try to understand the system before we judge it!

FIGURE 2-1 Total U.S. Production Increases Across Many Commodities.

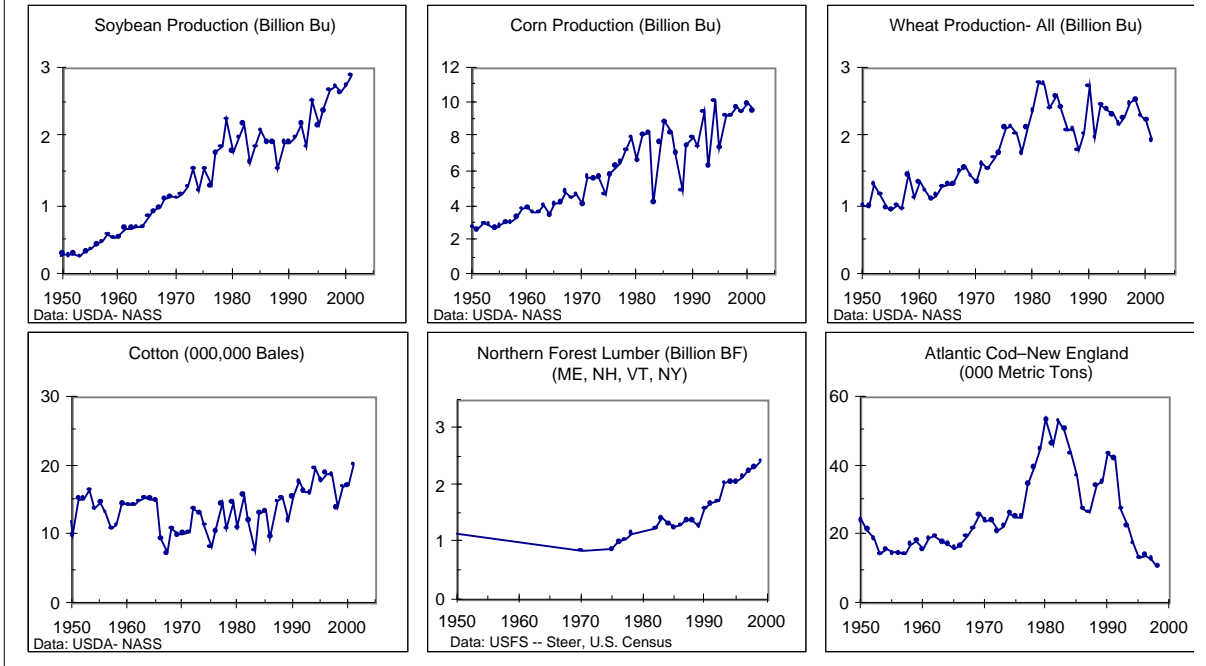
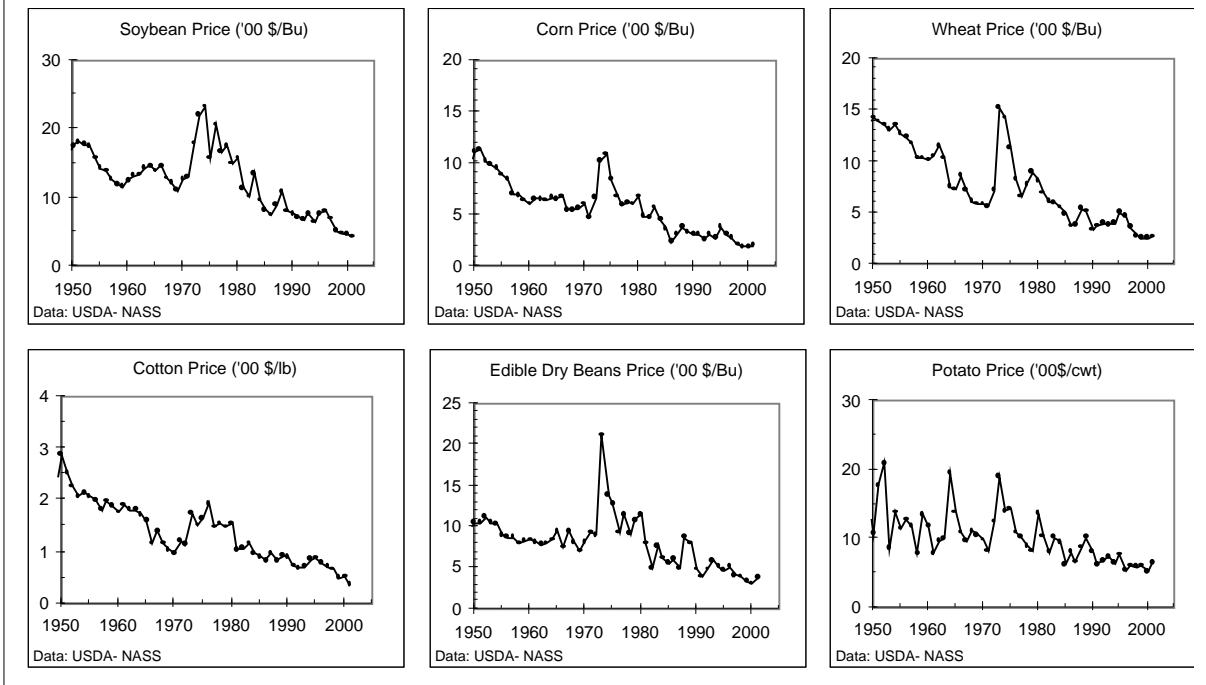
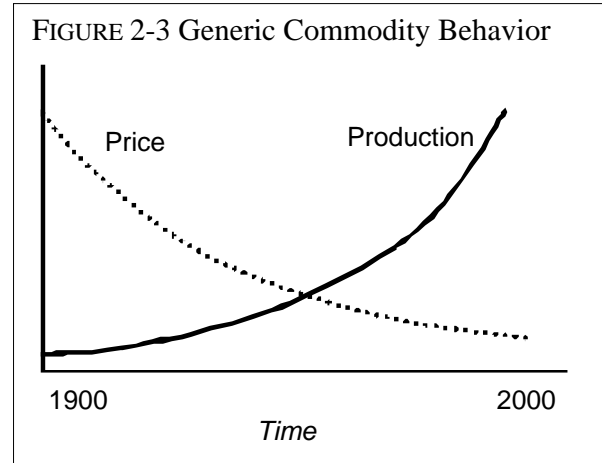


FIGURE 2-2 Falling U.S. Prices Across Many Commodities





Standardization and low price make commodities dependable, accessible and affordable. Processors can depend upon and plan for a specific grade of raw material — from Brazil one month, Iowa the next,

Canada the next. Commodities are produced wherever it can be done for lowest costs, thereby increasing economic efficiency. More products become more available for less money.

All of these useful, desirable features have fueled the success of commodity systems, and commodity systems have grown accordingly. From grains, to lumber, to fish, the amount of commodity harvested or produced has increased over time (Figure 2-1). As commodity production volume increases prices (in constant dollar terms) decline (Figure 2-2). Taken together, these two trends — more and more production and lower and lower prices — are the representative behaviors of commodity systems (Figure 2-3).

Driving Forces

Reinvestment, Efficiency Increases, and Demand Increases Drive the Growth of Production

The trend toward higher and higher production and the trend toward lower and lower prices per unit of commodity are not merely coincidental. These two behaviors of commodity systems are linked together in a network of mutual cause and effect made up of three feedback loops, each of which causes growth in commodity production.

<p>FIGURE 2-4 Capital Growth Loop</p> <div style="text-align: center;"> <div style="border: 1px solid gray; padding: 5px; display: inline-block;">Total production</div> </div> <p>Capacity</p> <p>Reinvestment</p> <p>Total profit</p> <p>Loop R1: As <i>Total production</i> rises, <i>Total profits</i> rise too. <i>Reinvestment</i> in productive <i>Capacity</i> follows, boosting <i>Total production</i> yet again. The "R" stands for a "reinforcing" loop.</p>	<p>Complete the CAUSAL LOOP DIAGRAM</p> <p>The key variables in this CLD are:</p> <ol style="list-style-type: none"> 1. <i>Total Production</i> 2. <i>Total Profit</i> 3. <i>Reinvestment (in infrastructure)</i> 4. <i>Capacity (of production)</i> <p>On the figure to the left, place any arrows, "s" (for moves in the same direction) and/or an "o" (for moves in the opposite direction) required to explain the behavior of the commodity system.</p>
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