

# Western Economics Forum

Volume II, Number 2

December, 2003

Last summer the executive committee voted to make the Western Economic Forum a permanent part of our Association. We were asked to present a proposal next summer about how the editorship will be handled in the future. Since the Forum is a new concept, we asked you in our last newsletter about your thoughts on the journal. We received input from 27 people. The input we received encouraged us to continue along our current path. All but one person thought the length was about right at 4-6 articles and that the technical level is appropriate. Fifteen thought the WEF is important, seven that it is somewhat important and two that it is not important. Two goals that people thought were the most important were being able to be timely on issues and to be diverse across topics. People were evenly split (uniform distribution) on the issue of diversity across western states, but felt somewhat strongly that the content should be about western topics. Most of the respondents had less strongly developed opinions on the issue of including non-academic authors.

We need authors for our March issue. As you write your meetings papers for this summer, please consider whether they would be suitable. You will find publication guidelines on the next page. We would need any papers that are to be considered for the April issue by the end of January 2004.

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# The Western Economics Forum

A peer-reviewed publication from the Western Agricultural Economics Association

## Purpose

One of the consequences of regional associations nationalizing their journals is that professional agricultural economists in each region have lost one of their best forums for exchanging ideas unique to their area of the country. The purpose of this publication is to provide a forum for western issues.

## Audience

The target audience is professional agricultural economists with a Masters degree, Ph.D. or equivalent understanding of the field that are working on agricultural and resource economic, business or policy issues in the West.

## Subject

This publication is specifically targeted at informing professionals in the West about issues, methods, data, or other content addressing the following objectives:

- Summarize knowledge about issues of interest to Western professionals
- To convey ideas and analysis techniques to non-academic, professional economists working on agricultural or resource issues
- To demonstrate methods and applications that can be adapted across fields in economics (e.g. adapting conjoint analysis from marketing to environmental economics)
- To facilitate open debate on Western issues

## Structure and Distribution

This will be a peer reviewed publication. It will contain approximately 3 or 4 articles per issue, with approximately 2,000 words each (maximum 2,500), and as much diversity as possible across the following areas:

- Farm/ranch management and production
- Marketing and agribusiness
- Natural resources and the environment
- Institutions and policy
- Regional and community development

There will be two issues per year, which will be mailed out with the WAEA newsletter in the spring and fall.

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## **Cattle and the Environment: What's the Beef?**

by

J. Richard Conner, Gary W. Williams, and Raymond A. Dietrich<sup>1</sup>

Worldwide debate on the environmental impact of the livestock industry is intensifying (see Rifkin; Steinfield, de Haan, and Blackburn). In most of the world, beef cattle are produced primarily with forage-based feeds. Consequently, the chief global environmental concern related to cattle is the direct impact of production and processing systems on air and water quality, soil structure and erosion, plant composition, wildlife interactions, and biodiversity. In the U.S., however, most beef cattle are grain-fed prior to slaughter, adding an important indirect linkage between the cattle industry and the environment through the production and use of grains and oilseeds for animal feed.

Given U.S. cattle-beef industry production systems, questions arise whether the industry is becoming more environmental friendly and whether further progress is possible in the future? This article provides an overview of the environmental impacts of the U.S. cattle and beef industry and assesses trends toward abatement and/or intensification. Some of the obstacles impeding needed changes are then considered and the potential effectiveness of some of the proposed alternative approaches to dealing with the major environmental challenges posed by the industry are assessed.

### **How Does the U.S. Cattle and Beef Industry Impact the Environment?**

The potential environmental impacts of the cattle and beef industry have been of particular concern only since about the beginning of the 20<sup>th</sup> century. Technological advances and related structural changes in the production, feeding, processing, and retailing of cattle and beef have created growing pressure over the last century on U.S. soil, water, air, energy, and other resources. A more detailed discussion of the U. S. cattle-beef industry's interactions with the environment is provided in Conner, Dietrich and Williams. Some of the more important cattle-beef industry environmental impacts are summarized in the following paragraphs.

#### *Methane Emissions*

In the cow-calf and stocker segments of the industry, the production and release of methane into the environment is a primary concern. Because cattle are ruminants and utilize forage, they generate relatively large amounts of methane. Over the past 200 years, however, livestock methane emissions have not increased net emissions, but instead, replaced wild animal emissions (Khalil et al.). Given the current USDA outlook for a continuing slow decline in U.S. cattle numbers over at least the next decade (USDA 2003-1), the beef industry is not likely to become any more important as a source of methane emissions in the future.

#### *Plant Composition and Biodiversity*

U.S. cattle production has also altered the native plant community composition and impacted biodiversity and wildlife through habitat disruption. Plant communities have been altered over much of the U.S. from direct interventions like plowing up native vegetation and establishing monocultural swards of derived pasture forages or by continuous overstocking of native rangelands and eliminating periodic burning from the ecosystems (Conner et al.).

Many plant communities in the U.S. have been so severely altered by cultivation or cattle grazing that, even if grazing were eliminated completely, they will never recover their original ecological state without extensive, costly restoration practices. In recent decades, cattle ranchers and public land management

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agencies have recognized the error of earlier overstocking. Through reduced grazing pressure and other management practices, they have succeeded in improving the ecological condition of much of the nation's rangelands (USDA Forest Service and US General Accounting Office). This success is due largely to the intense educational and technical assistance effort of the Natural Resource Conservation Service (NRCS) of the U.S. Department of Agriculture over the last 50 years. Many ranchers and land managers are now managing for improved wildlife habitat along with or instead of enhanced livestock grazing. Given the opportunity to use wildlife profitably, most U.S. livestock ranchers may actively preserve wildlife habitat. The success of such USDA programs as The Conservation Reserve Program (CRP) and The Environmental Quality Incentive Program (EQIP), as indicated by high landowner participation rates, indicate that the trend toward more landowner emphasis on wildlife and biodiversity will continue.

#### *Air and Ground Water Pollution*

The cattle and beef industry's potential for negatively impacting the environment both directly and indirectly is perhaps greatest in the feedlot segment. Important direct impacts include contributions both to air pollution through odors and dust and to surface and ground water pollution through nutrient loading from improper handling of manure given the concentrations of large numbers of animals in relatively small areas. Government regulation has forced reductions in the direct environmental impact of cattle feeding. The Environmental Protection Agency (EPA) and its state agency counterparts have increasingly focused on feedlots as point sources of pollution and have become increasingly vigilant in their regulation of potential pollutants from feedlots (Johnson, Wheeler, and Christensen). Thus, as with the cattle raising segment, the additional direct damage to the environment by the cattle feeding segment of the industry is likely to be small.

#### *Production of Feed Grains*

The major environmental impact of the U.S. cattle and beef industry may be indirect through the demand for animal feeds which drives the production of feed grains. In turn, feed grain production generates potentially serious pressure on water quality and quantity from erosion and fertilizer runoff and deposition in groundwater. Feed grain production also generates concerns about the potentially adverse effects of the excessive use of pesticides such as atrazine on wildlife habitat and genetic diversity. Researchers are identifying and quantifying the extent and impact of environmental degradation related to U.S. agricultural crop production (see, for example, Faeth).

Of course, not all crop production is for animal feed and not all animal feed is for beef cattle. According to the USDA (1998), feed production accounts for only a little more than half (56%) of total U.S. crop production. Thus, because cattle on feed represent only about 23% of all U.S. grain-consuming animal units, only about 12%-13% of all crops produced in the U.S. are utilized as cattle feed. The remainder is utilized either as feed for non-ruminant livestock, primarily hogs and chicken, or as food for human consumption. Moreover, because they are ruminants and can utilize roughage as feed, beef cattle are generally not placed on feed until they reach 700 to 750 pounds. Beef cattle slaughter weights average about 1,100 to 1,200 pounds so no more than 40% of the average cattle slaughter weight is put on in the feedlot. Because grains comprise about 70% of fed cattle rations, only about 28% of the average cattle slaughter weight can be attributed to grain feeding. In contrast, virtually 100% of all pork and poultry produced are from concentrates comprised of grains and oilseed meals.

#### **What Are the Obstacles to Change?**

Despite current and past efforts to improve the cattle-environment interface, a number of obstacles will likely make further improvements difficult. The unique biological ability of cattle to utilize grazed forages has led to a cow-calf and stocker industry characterized by many small, widely dispersed producers. In addition, many of the small operators, and some of the larger ones, are motivated to produce cattle by goals other than financial gain and efficiency; e.g., lifestyle. The more concentrated

and financially motivated segments of the industry (feedlot, slaughter, processing and retail) must utilize the highly variable quantity (seasonally) and quality of animals provided by cow-calf and stocker producers. This atomistic, dispersed, and often economically insensitive portion of the industry limits the ability of the entire beef industry to make adjustments of any kind, whether market or socio-culturally induced.

Another obstacle to reducing the dependence on feed grains is that in most areas of the U.S., maintaining grazeable forage of the quality required to fatten cattle year-round is impossible. As a result, forage-based fattening systems are seasonal and subject to a high degree of variation in the volume and quality of the resulting beef product.

An entrenched institutional obstacle to changes in the cattle-environment interface is the highly competitive, consumer-driven market within which the industry operates and which provides strong economic incentives to grain feed cattle. In recent decades, beef has lost significant market share to poultry, primarily because consumers have increasingly viewed poultry as a less expensive, more convenient, and healthier source of protein that is consistently tasty and tender. To meet this competition, the U.S. beef industry has moved away from finishing cattle on the highly variable forage-based systems. The U.S. beef industry now relies almost entirely on grain finishing of cattle to achieve the consistency in the taste, tenderness, and availability of product that is increasingly demanded by consumers. Moreover, feedlot finishing produces the beef products desired by consumers at a lower cost than forage-based programs (Brokken et al.).

Taken together, these factors - competition from pork and poultry, the particular biological characteristics of cattle production, consumer preferences for grain-fed beef, the cost advantage of feedlot finishing, and more - all strongly suggest that grain finishing of cattle will remain the standard for U.S. beef production for the foreseeable future.

### **What Can Be Done?**

Despite the obstacles, progress has been made in ameliorating the environmental impact of the cattle industry. Public information efforts in recent decades have increasingly focused on the potential environmental dangers of technology and the rates of resource use. While much has been done to maintain clean air and water and preserve biodiversity through protection of endangered species, notably less has been done to reduce the rate of fossil energy consumption and the resulting build-up of atmospheric CO<sub>2</sub>.

Given our current culture and fossil energy-based economy, the challenge of achieving further progress in both reducing the rate of consumption of natural resources and improving the assimilative capacity of our environment is formidable. Our representative form of government and the consumer-minded electorate make the political task of implementing environmentally friendly regulations with the presumed negative economic impacts extremely difficult. Some of the major environmental problems are truly global in scale, such as the levels of atmospheric CO<sub>2</sub> and methane, the solutions to which require multi-national concessions, agreements, and programs. The difficulty in achieving progress on this scale is evident in the slow rate of progress to date resulting from the 1992 U.N. Conference on Environment and Development in Rio de Janeiro, the so-called "Earth Summit."

Most approaches proposed for improving the cattle-environment interface focus primarily on the direct, rather than the indirect, impact of cattle on the environment. In general, these approaches either are already in place in this country or are most appropriate for developing countries. One such set of proposals was offered by a recent major study sponsored by the U.N. Food and Agriculture Organization, the World Bank, and the U.S. Agency for International Development (Steinfeld, de Haan, and Blackburn).

The study offers three groups of solutions to internalize the externalities created by the livestock sector. The *policy solutions* offered include measures to reduce grazing pressures (such as implementing/

increasing grazing fees), input subsidy elimination, a variety of incentives/penalties to control excessive application of animal waste in mixed farming systems, and continued education of cattle producers and land managers on the potential benefits of enhanced wildlife habitat and biodiversity. *Production technology solutions* suggested include those that enhance and/or conserve resources such as “deferred grazing” of rangelands and the use of derived pastures of perennial grasses and legumes in more humid areas. *Production system strategies* proposed include measures to reduce negative environmental impacts during the transitions between different production system phases (grazing, mixed, industrial, etc) in developing countries.

The Steinfeld, de Haan, and Blackburn study also discusses the indirect impact of livestock feeding on the environment primarily in developed countries but fails to provide effective alternative solutions. According to conventional wisdom, policies and educational programs to encourage increased forage over grain finishing of cattle could feasibly reduce the indirect environmental impacts of cattle feeding. A growing demand for lean beef is generating interest in forage feeding of cattle. At the same time, an increasing number of up-scale restaurants featuring “specialty” meats and grocery meat markets specializing in “organic” or “natural” foods are educating consumers that forage-finished beef is both a healthier (reduced fat) and an environmentally friendlier product.

Of course, a wholesale move of the U.S. cattle industry to forage feeding would alleviate much of the indirect environmental impact of cattle feeding but would exacerbate the direct impacts. Such a move would also create a host of other concerns. For example, much of the forage grazed by cattle is fertilized with non-organic chemicals and frequently subjected to chemical pesticides. Furthermore, many forage-finished cattle are treated with anabolic steroids, other pharmaceuticals, and/or pesticides. Moreover, a large-scale conversion to forage feeding could have important consequences for Midwest agriculture and rural communities whose economic viability depend heavily on grain and feed production.

An often mentioned general solution to environmental pollution is to force consumers to pay the full cost of fossil-based energy use, including waste disposal costs, through a carbon tax (Nordhaus; Woodward and Bishop). Success in reducing fossil fuel use could make grain and other foods directly derived from plant products less expensive relative to animal-based food products derived from the feeding of grain to cattle. The net result would be a reduction in meat consumption and, hence, cattle and beef production. Measures like a carbon tax, however, would be difficult to implement through a process that would likely be slow and incremental.

### **Summing Up**

While the cattle and beef industry has and will continue to have direct negative impacts on the environment, improved grazing and land management practices have considerably reduced the threat of additional direct environmental degradation by the U.S. cattle industry. The most pressing concern is the indirect effects of the cattle feeding industry on the natural resource base. Many forces have combined to minimize the possibility of any significant decline in the U.S. rate of grain-finishing of cattle in the foreseeable future. The best hope for reducing the indirect environmental pressure of the U.S. cattle feeding sector may well be the market-led trend of consumer preferences away from beef toward poultry, pork, and other protein sources. The net effect of that trend could well be negative for the environment, however, because the beef cattle industry is a minor force in the U.S. demand for feed grain production. Non-ruminant livestock (pork and poultry) production drives the demand for feed grains and, thus, is indirectly responsible for the majority of the adverse effects of feed grain production on the environment. In this light, a successful “eat more beef” campaign by the cattle and beef industry might be considered to be pro-environment to the extent that poultry and pork consumption are reduced.

## References

- Brokken, R.F., C.W. O'Connor and T.L. Nordblom. *Cost of Reducing Grain Feeding of Beef Cattle*. Agricultural Economic Report No. 459, USDA, Washington, D.C. 1980.
- Conner, J.R., W.T. Hamilton, D.P. Sheehy, J.W. Stuth and U.P. Kreuter. "Grassland-based Livestock Production in Temperate Zones," *World Animal Review* 90 (1998-1): 6-13.
- Conner, J.R., R.A. Dietrich and G.W. Williams. *The U. S. Cattle and Beef Industry and the Environment*. Texas Agricultural Market Research Center, Commodity Market Research Report No. CM 1-00. Texas A&M University, College Station. March 2000.
- Faeth, P. *Growing Green: Enhancing the Economic and Environmental Performance of U.S. Agriculture*. World Resources Institute, Washington, D.C. 1996.
- Johnson, R.S., W.J. Wheeler, and L.A. Christensen. "EPA's Approach to Controlling Pollution from Animal Feeding Operations: An Economic Analysis," *Amer. J. Agr. Econ.* 81 (5) (December 1999):1216-1221.
- Khalil, M.A.K., R.M. MacKay, M.J. Shearer and R.A. Rasmussen. "Methane and the Greenhouse Effect: the Role of Cattle Over the Last Century. pp. 35-55. In: F.M. Byers (ed.). *Cattle on the Land*. Byers Communications, College Station, Tex. 263 p. 1994.
- Nordhaus, W.D. Optimal greenhouse-gas reductions and tax policy in the "DICE" model. *Am. Econ. Rev.* 83(2) (1993):314-317.
- Rifkin, J. *Beyond Beef: The Rise and Fall of the Cattle Culture*. New York: Dutton, 1992.
- Steinfeld, H., C.H. de Haan and H. Blackburn. *Livestock - Environment Interactions: Issues and Options*. FAO/World Bank/USAID, Rome. 1997. (See companion volume *Livestock and the Environment: Finding a Balance* by the same authors).
- U.S. General Accounting Office. *Rangeland Management: More Emphasis Needed on Declining and Overstocked Grazing Allotments*. GAO, Washington, D.C. p.10 and 25. 1988.
- U.S. Dept. of Agriculture, Economic Research Service. *Feed: Situation and Outlook Yearbook*, FDS-1998. April 1998.
- U.S. Dept. of Agriculture, Economic Research Service. *Agriculture Baseline Projections to 2012*. WAOB Staff Report # WAOB-2003-1. February, 2003.
- U.S. Dept. of Agriculture, Forest Service. *An Analysis of the Forage Situation in the U.S. 1989-2040*. 1989.
- Woodward, R.T. and R.C. Bishop. Efficiency, sustainability, and global warming. *Ecol. Econ.*, 14 (1995):101-111.
- This work is based in part on Conner, Dietrich, and Williams, a report conceived and commissioned by the World Wildlife Fund (WWF) as part of its Conservation and Commodities Initiative. The views expressed herein, however, are those of the authors and not necessarily those of WWF.*
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## LABOR MANAGEMENT IN AGRICULTURE: A CRITICAL MANAGEMENT FUNCTION

By

Jeffrey E. Tranel, John P. Hewlett, Howard R. Rosenberg and Randy R. Weigel <sup>1</sup>

Human resources are critical in production agriculture, especially to the extensive operations found in the western United States. Farm and ranch owners, their family members and cooperating neighbors provide substantial labor to agricultural operations. However, hired employees provide most agricultural labor. While agricultural managers and operators readily acknowledge the importance of laborers in day-to-day operations, few have any formal training in the management of these critical resources. Furthermore, the ever-changing landscape of regulation and oversight by Federal and state agencies makes it critical that the resources be managed to comply with relevant standards.

### Agricultural Labor Force

The agricultural labor force in the United States consists of more than one million workers. The vast majority of workers were hired directly by farm and ranch operators. The number of total farm workers has been on a steady decline since 1999. Similarly, the number of service workers on farms decreased from 1999 to 2003 with the exception of 2001 (Table 1).

Almost 44 percent (43.86%) of farm workers in July 2003 were hired by western farm and ranch operators (Table 2). California, alone, accounted for one-quarter of all hired farm workers. Western states include Arizona, California, Colorado, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming.

Table 1. Total U.S. Farm and Service Workers for Second Week in July. <sup>1</sup>

<u>Year</u>	Total Farm Workers	Hired Workers <sup>2</sup>	Service Workers on Farms
	B thousands B		
2003	1,273	953	240
2002	1,262	966	256
2001	1,374	1,039	335
2000	1,377	1,084	293
1999	1,462	1,143	319

<sup>1</sup> USDA/NASS, August "Farm Labor" Reports

<sup>2</sup> Sum of workers hired 150 days or more and 149 days or less.

Most farm and ranch managers know the importance of labor costs in their operations. Labor is the third largest expense category for farmers and ranchers, exceeded only by purchases of feed and farm services (Table 3). Furthermore, labor costs as a percent of total farm expenditures steadily increased each year of the period 1997 to 2002. Over the same period feed costs decreased and expenditures for farm services increased as percentages of total farm expenditures.

There is a direct correlation between farm size and percent of total farm expenditures dedicated to hired labor. As farm size increases, labor expenses also increase, both in terms of total expenditures and percentage of the total (Table 4). The larger, more labor intensive operations common to California, Oregon and Washington expend a greater percentage of their total costs for hired labor. Work on smaller farms and ranches are typically performed by the operator, family members and non-paid helpers. Additionally, the more extensive type livestock operations found in the mountain states routinely pay a lower percentage of total expenditures for hired labor.

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Table 2. Number of Hired Workers by Selected Region and U.S., July 6 - 12, 2003. <sup>1</sup>

	<u>Hired Farm Workers</u>	
	<u>Number (1,000)</u>	<u>Percent</u>
U.S.	953	
Western States	418	43.86
Mountain I (Idaho, Montana, Wyoming)	31	3.25
Mountain II (Colorado, Nevada, Utah)	24	2.52
Mountain III (Arizona, New Mexico)	18	1.89
Pacific (Oregon, Washington)	110	11.54
California (California)	235	24.33

<sup>1</sup> USDA/NASS, August "Farm Labor" Reports

Table 3. Top Four Expenditures for Inputs as Percentages of Total Farm Expenditures for all U.S. Farms, 1997 - 2002.<sup>1</sup>

	1997	1998	1999	2000	2001	2002
	----- Percent -----					
Farm Services	13.5	13.7	14.0	13.4	13.8	14.0
Feed	14.4	13.7	13.3	12.9	12.7	12.8
Labor	10.0	10.4	10.7	10.9	11.1	11.2
Rent	10.1	9.4	8.6	8.5	8.4	8.4

<sup>1</sup> USDA/NASS, July 2002.

## Pay and Performance

The importance of labor to western farms and ranches and competitive pressures from non-farm employers have magnified the need for agricultural employers to operate efficiently, make good use of valuable human resources, and minimize avoidable expenses. The decisions by which people are managed in agriculture affect business results, worker quality of life, commodity prices and quality, and even the social fabric of rural communities. Farmers and ranchers need to understand what motivates their employees in order to get the desired performance from the workers. The relationship between amount of wages paid and operational results on a farm or ranch are not necessarily a given. It is strongly shaped by how compensation is structured and administered.

Many options for employee compensation are available to help motivate desired employee performance. However, compensation should not be thought of solely as a cost, but also as a management tool for influencing the performance of employees on the job. Options are neither equal in their ability to motivate employee performance, nor in their consequences for the people involved. Tax consequences, consequences for employee social security benefits, additional record keeping requirements for the employer and other considerations must be taken into account when designing an

Table 4. Percentage of Farm Expenditures Spent for Hired Labor by Farm Size and Region, 2000 and 2001. <sup>1</sup>

Farm Size (Gross Sales)	2001	2002	Region	2001	2002
	----- Percent -----			----- Percent -----	
\$1,000,000 +	17.77	18.78	Northeastern	13.4	13.8
\$500,000 - \$999,999	10.85	10.95	Lake States	9.0	9.0
\$250,000 - \$499,999	9.44	9.59	Corn Belt	4.1	4.1
\$100,000 - \$249,999	7.72	7.73	Northern Plains	4.2	4.2
\$ 50,000 - \$ 99,999	7.59	6.75	Appalachian	9.1	9.4
\$ 10,000 - \$ 49,999	6.22	5.99	Southeastern	16.0	16.4
\$<10,000	4.23	4.59	Delta	6.9	6.9
			Southern Plains	7.6	7.5
			Mountain	11.2	12.0
			Pacific	26.3	26.6

<sup>1</sup> USDA/NASS, July 2002.

<sup>2</sup> Northeast: CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT

Corn Belt: IL, IN, IA, MO, OH

Northern Plains: KS, NE, ND, SD

Appalachian: KY, NC, TN, VA, WV

Mountain: AZ, CO, ID, MT, NV, NM, UT, WY

Lake States: MI, MN, WI

Southeastern: AL, FL, GA, SC

Delta: AR, LA, MS

S. Plains: OK, TX

Pacific: CA, OR, WA

employee compensation program. Managers should design a compensation system that results in the desired employee performance.

Cash wages usually make up the majority of an employee's compensation. They represent taxable income to the employee and are a tax-deductible expense to the employer. Cash wages are subject to social security taxes for the employer and the employee alike and are subject to income taxes for the employee. Agricultural producers frequently compensate their employees with benefits in addition to regular wages. Commodities, housing, personal use of business assets, clothing, etc. are all noncash, fringe benefits. Compensating employees with fringe benefits has potential tax advantages for the employer and the employee. Neither the employer nor the employee is obligated to pay social security taxes (FICA) on noncash wages.

#### Piecework

One way to directly tap employee motivation and to reward performance is "incentive pay." Incentive pay makes an employee's current pay somewhat contingent on production. Paying an employee according to the number of units (cartons, boxes, tons, bags) produced is clearly related to individual performance. As long as employees perform at least well enough to earn the statutory minimum wage, employers paying piece rates have the advantage of reasonable certainty about their unit costs for direct labor.

However, piecework is not without its disadvantages. The rush for quantity, which pays off for employees, can lead to neglect of quality. Piecework may also threaten the status hierarchy within the worker group. Older, more senior-level workers may not be able to work as fast as younger employees. In that case, there may be social pressure on the younger workers to produce below their capacity.

Please see Box 1 for an example of a case study, presented in a new labor resource available to Western agribusiness professionals. While defining the economics of the issue, the case also illustrates the complexities of labor management issues.

Employees may be induced to help achieve production goals by receiving some share of total production. Farm/ranch commodities, when paid as wages, are considered tax-deductible expenses for the employer and income for the employee. Income taxes are paid on the value of the commodities. Neither the employer nor the employee are responsible for paying social security taxes on wages paid in the form of commodities as long as certain conditions are met. Employees should understand that being paid with commodities may help to avoid paying social security taxes, but such compensation may jeopardize disability and retirement benefits to the employee.

Employee use of farm and ranch assets, such as housing, pasture, buildings and vehicles, can be a valuable part of a compensation package. If there is no cost to the employer, the use of business assets is not considered taxable income to the employee. Housing and utilities, given to an employee, must meet specific conditions to be considered a deductible business expense to the employer and not be considered taxable income to the employee. Liability aspects of the personal use of business assets should be discussed and formalized with employees.

Other noncash benefits include medical and life insurance, protective clothing and employee education. Protective clothing may increase employee productivity by reducing work-related accidents. Knowledgeable employees may have greater productivity and fewer work related injuries. Some education may be required under current labor laws, for example, working with pesticides. The cost of these benefits is usually tax deductible to the employer and is not taxable income to employees.

As this case study shows, employers need to carefully analyze the benefits and costs of introducing and/or modifying an incentive pay system. Piecework, output bonus, and sharing plans are better suited to specific work situations. Employers should recognize the problems with changing or not changing employee compensation. Some forms of compensation may benefit the employees but increase costs to management and vice versa. Also, it is important to look at both direct costs, such as increased payroll or reduced product quality, and indirect costs such as employee safety or greater discourse.

### **A New Resource For Labor Management in Agriculture**

A recently written book may be of some help to managers of agricultural labor by providing examples and case studies of how managers have addressed various employment issues. The resource, titled *Ag Help Wanted: Guidelines for Managing Agricultural Labor*, was written by a group of Cooperative Extension specialists from across the west--Arizona, California, Colorado, Washington, Wyoming and British Columbia Canada--and published by the Western Farm Management Extension Committee. The full-color, 242-page handbook is divided into six chapters covering the gamut of labor management issues: Roles and Responsibilities of an Agricultural Employer, Organizational Planning, Staffing the Farm Business, Supervising Agricultural Work, Managing Employee Performance, Communication and Problem Solving.

The book introduction acknowledges just how essential labor is to agricultural production.

“Amidst concerns of competition from domestic and offshore producers, scrutiny of cautious lenders, services for sale from various vendors, tastes and preferences of discriminating consumers, and requirements of voluminous laws, farmers and ranchers are running businesses. Virtually all of them need to procure and manage labor. Of course, other resources--land, plants, animals, water, machinery, tools, and chemicals--are also important, but without the abilities and efforts of people in the industry, agriculture would not yield food or fiber.”

### **Box 1. “Pruning Pay For Piece Rate or Hours?”**

Ray Thompson runs the 1,100-acre farm that accounts for all of Multi Farms' wine grape production. He has a year-round staff of about 70, who have been joined in recent years by up to 20 seasonal employees during pruning and harvest times. The need for seasonal employees during harvest has declined in recent years with increased use of harvesting machines. In late fall, shortly before pruning was scheduled to get underway, Ray was approached by several of the regular employees who asked to be put on a piece rate system for the pruning season. They had learned that workers at two nearby vineyards, one of which operates under a union contract, had averaged more than \$10 per hour on a piece rate system the previous year, and they wanted the opportunity to make as much.

While the employees who approached him were good workers and did not represent any fringe element of the work force, a few of the older employees had usually be the ones to bring such matters of general concern to him. Ray wanted to see how strong the sentiment for piece rate pruning really was. Over the next couple of days he spoke with a large majority of the employees in various parts of the vineyard. He learned that most (at least 75 percent) of the men indeed preferred a piece rate system to the straight \$7.80 per hour (up from \$7.50 the previous year) that they were scheduled to receive. The others, mostly older employees with many years of service on the farm, seemed to prefer an hourly rate but said that they would go along with what the majority wanted.

Ray had long taken pride in the harmonious employee relations in his operation. His employees had never sought representation by a union, and he had no fundamental objection to piece rate pay. In fact, the vineyard normally put employees on a piece rate for hand harvesting some of the grape varieties. Ray wanted to be fair to all employees while not over-running his pruning budget or making any changes that he would later regret.

The word “guidelines” in the title refers to the many practical illustrations, descriptions of managers' experience, research-based principles and analytical concepts included. Examples throughout the book illustrate management concepts, suggest ways for avoiding or dealing with common problems and provide points of comparison for readers reviewing their own operations and practices. A separate section of “Ideas in Practice” tells the stories of several farm and ranch employers that have improved operational results, reduced risks, or both through better labor management.

In addition, the text includes innumerable references to various agencies and resources available on the World Wide Web to assist the agricultural manager. These references and accompanying links are housed in the companion web site <http://www.AgHelpWanted.org>. These web pages go beyond simply supporting the text. They provide links for direct access to various Federal agencies, western state departments of labor and associated regulations and a host of other links to commodity organizations, educational resources and professional associations. This site is organized to make the one-stop resource for agricultural labor management information a quick reference and easy to use.

The book is also available on a CD ROM for portability. The CD-version allows the user to search for key phrases or words within each chapter, using this native feature of the free reader program Adobe Acrobat. A second CD supplements material discussed in Chapter 6 with nine sets of brief vignettes that illustrate approaches to one-on-one communication in problem situations. Each set includes one scene showing an apparent personnel problem and three scenes showing different supervisory responses to it. These videos help the manager to consider which management response may be best in a given situation.

## Summary

In spite of strides to improve and increase technologies in agricultural and horticultural production, the success of individual producers still relies heavily on the productivity of their human resources. Effective management of employees translates directly into dollar returns. The management of human resources in agriculture is complex and offers some unique aspects when compared to human resource management in other industries. Furthermore, this responsibility is often assumed by people with little formal training.

*Ag Help Wanted: Guidelines for Managing Agricultural Labor* is a recently published book for the proactive agricultural manager addressing the waterfront of agricultural labor management issues. The companion website at [AgHelpWanted.org](http://AgHelpWanted.org) provides references to many online resources, as well as access to book content, problem work situation videos and industry links. While *Ag Help Wanted* may not make the task of managing agricultural laborers easier, it can boost the reader's confidence in understanding the issues and options available.

## References

Rosenberg, H.R., R. Carkner, J.P. Hewlett, L. Owen, T. Teegerstrom, J.E. Tranel, and R.R. Weigel. *Ag Help Wanted: Guidelines for Managing Agricultural Labor*. Western Farm Management Extension Committee, 2002.

United States Department of Labor. "Minimum Length of Meal Period Required Under State Law For Adult Employees in Private Sector - January 1, 2003," Employment Standards Administration Wage and Hour Division, available online at <http://www.dol.gov/esa/programs/whd/state/meal.htm>.

United States Department of Labor. "Minimum Paid Rest Period Requirements Under State Law for Adult Employees in Private Sector - January 1, 2003," Employment Standards Administration Wage and Hour Division, available online at <http://www.dol.gov/esa/programs/whd/state/rest.htm>.

United States Department of Agriculture, National Agricultural Statistics Service. "Farm Labor," August 2002. Available on line at <http://www.usda.gov/nass>.

United States Department of Agriculture, National Agricultural Statistics Service. "Farm Production Expenditures, 2001 Summary," July 2002. Available on line at <http://www.usda.gov/nass>.

United States Environmental Protection Agency. "Pesticides: Health and Safety, Worker Protection Standard," available online at <http://www.epa.gov/pesticides/safety/workers/workers.htm>.

# Surviving and Thriving Through Direct Farm Marketing

by

Russell Tronstad, Larry Lev, and Wendy Umberger<sup>1</sup>

## Introduction

In recent years, traditional commodity marketing channels have not provided sufficient returns for many small and medium sized farmers to maintain a viable livelihood through only farm activities (Hoppe et al.). While direct marketing allows farmers to retain a much higher share of consumer food expenditures, the elements needed to make this production-marketing strategy a success are not well understood. In part, this is because of their increased complexity as compared to commodity production-marketing systems. Albert Einstein's famous quote that "Everything that can be counted doesn't necessarily count; everything that counts cannot necessarily be counted," may seem all too appropriate when looking at what it takes to thrive at direct farm marketing and agri-tourism. Traditionally, producers have set goals for high yields and low costs of production in order to be a "low cost" commodity producer. This paper presents an alternative route. From a set of 17 case studies, it distills and deciphers the more subtle key elements that have allowed some small and medium sized farmers to achieve success through direct marketing.

Farmers selling direct to consumers has been a growing trend. As an example, the number of farmers' markets in the U.S. increased from 1,755 in 1994, when USDA first began tracking them, to over 3,100 in 2002 (USDA, AMS). What are the reasons behind this growth? This upward trend reflects both consumer and producer factors. Consumers have expressed a desire to purchase products directly from farms where they can obtain fresher products, make a personal connection with how their food was produced, support "locally-grown" agriculture, and purchase organic foods (USDA, APHIS). From 1990 to 1996, direct farm marketing was estimated to account for only 1.6 percent of U.S. fresh produce sales, yet it accounted for 17 to 22 percent of organic sales (USDA, ERS). The organic food industry has grown from a \$1 billion to an \$8.5 billion industry from 1990 to 2002. Conventional supermarkets have experienced the most significant growth in organic product sales, increasing from less than 10 percent of all organic products in 1995 to 49 percent of all sales by 2000 (Dimitri and Greene). Will small farms involved in direct marketing be able to compete with larger commercial farms supplying organic produce to conventional supermarkets? Govindasamy, Pingali, and Hossain found that farmers engaged in producing and retailing value added products such as jams, jellies, and breads, and in providing farm tours, festivals, picnic areas, and petting zoos were more profitable than farmers without these activities in New Jersey.

While several state and federal programs exist to promote direct marketing (e.g., Farmers' Market Nutrition Program, Senior Farmers' Market Nutrition Program, State logos that promote locally grown food, California's Certified Farmers' Market Program, etc.), developing and sustaining a successful direct marketing enterprise requires a different business model than a traditional commodity production-marketing system. Treacy and Wiersema in *The Discipline of Market Leaders* describe three alternative approaches (similar to Porter's generic strategies) a business can follow for success: 1) operational efficiency – producing at the lowest possible cost (Wal-Mart, McDonalds), 2) product leadership – being first with new products (Intel, Nike), and 3) customer intimacy – meeting the specific needs of select customers (Nordstrom, Airborne Express). Commodity-oriented agriculture almost exclusively follows the "operational efficiency" strategy while a "customer intimacy" approach appears essential for direct farm marketing enterprises.

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“Customer intimacy” was an overriding theme for the 17 different and successful direct farm marketing and agri-tourism enterprises that were recently examined by the Western Extension Marketing Committee (WEMC) and other contributors. A primary objective of the WEMC in examining these enterprises was to provide a publication that describes how these operations evolved from traditional, commodity farms that tended to be focused on an operational efficiency approach, towards a “customer intimacy” and market-driven business within the last 10 to 15. Declining profit margins that would not sustain the families’ livelihood on the farm was the main reason that prompted these operations to consider direct marketing. A set of articles surrounding the transition and development of these operations has been put together in a publication by the WEMC entitled, “Western Profiles of Innovative Agricultural Marketing: Examples from Direct Farm Marketing and Agri-Tourism Enterprises.” The publication is intended to identify the unique factors behind the failures and successes of these enterprises and make known their strategies for meeting future challenges and risks. This overview article distills the most significant themes that emerged from the 17 case farms (see also a similar study by Born).

### **Four Key Strengths**

Although the featured case farms are extraordinarily varied, we distilled four key strengths that distinguish these successful direct-marketing farms from most others. These strengths represent challenges that the case study farms have accepted. Each of the strengths provides a significant competitive advantage and a means for escaping from the difficult economic environment of commodity agriculture.

#### *Personality Type and Interpersonal Skills*

In looking back over the 17 farms, we were struck by the similarities in the personality type and interpersonal skills of the operations’ management. Because direct marketing involves selling a product directly to the consumer, producers must be willing to listen to their customers and be willing to adapt their product offerings as the market (consumer) changes. For example, the new farm businesses:

- Represented an increase in the complexity of the farm business. Often times direct marketing involves developing several markets, more involvement with the end consumer, and keeping more “balls in the air.”
- Required a willingness to experiment. All of the managers of the case farms had failures as well as successes. They were able to overcome their failures and keep trying in order to become successful. Well-thought out ideas and perseverance were critical for success.
- Resulted in an increase in the quantity and intensity of interactions with customers. Not all producers have the flexibility needed for dealing with change and the personality and patience necessary for dealing with the public. In production agriculture, producers are often used to being their own boss, in direct-marketing, the consumer also should play a role in decision-making.
- Generally required the management of an increased labor force. Family labor was typically the main labor source prior to developing the direct marketing enterprise. Direct farm marketing is difficult for a single individual or family to accomplish since labor efforts are generally torn between full-time production and marketing duties. Learning how to manage the people that assist in developing, producing and delivering products becomes very important for successful direct-marketing enterprises.

All of the farm families began with recognition that their traditional business focus was not sustainable. The search for new, profitable alternatives led them to more complicated production and marketing plans.

- Marshall Farms (Nevada) transformed a geographically isolated hay farm into an internet-driven production/processing unit that is selling a wide range of companion animal products in both the U.S. and overseas.

- Sunfresh Farms (Arizona) branched out from large-scale vegetable production enterprise to also become a major agricultural entertainment/education provider.
- Thompson Farms (Oregon) changed from producing four crops for a cannery to producing more than 40 crops for sale through diverse direct marketing outlets.
- English Farms and Mebane Farms (both in Colorado) developed a corn maze and pastured poultry enterprises to complement existing farm enterprises.

All of the farms recognize that they will need to continue to change as markets and competitors warrant. The farm manager's willingness to accept complexity and change are necessary, but not sufficient conditions for the transformation these farms achieved. The owners of these operations must also enjoy and be excellent at dealing with both their customers and employees. The customer intimacy approach defined in the next section requires that the farms provide excellent customer service and gather valuable feedback from customers. To a great extent, the excellence in service and products that these farms have achieved results from the efforts of their employees.

### *Target Marketing/Customer Intimacy*

The farms all share the recognition that their escape from commodity agriculture can only be accomplished if they continue to better satisfy the needs of their specific customers. By building relationships with their customers (and by offering superior quality products as discussed below) the producers gain customer loyalty and greatly reduce their concerns with price competition. By continuing to seek and to act on customer feedback they stay ahead of their potential competitors.

- Coffee producer Ken Love studied the Japanese language and culture so that he knows what to provide his high-end Japanese coffee customer.
- Aaron Silverman (Creative Growers) and Dean Okimoto (Nalo Farms) cultivated their restaurant customers by developing a close relationship with each restaurant's chef as well as the entire kitchen staff. They produce in greater quantity and of greater quality than they promise so that they can always exceed the chef's expectations.
- Seabreeze Organic Farm constantly tweaks the boxes of produce that they provide to their Community Supported Agriculture subscribers in order to maintain a satisfied customer base.

### *Superb Product and Service Quality*

In stepping out of the commodity world, these successful producers recognize that they must offer a product that far surpasses the quality of the standard product on the market. Product quality may be differentiated through both unique product attributes and customer service.

- Some of the featured enterprises offer upgraded versions of traditional farm commodities (locally-grown sweet corn, pastured poultry, natural beef, antibiotic-free lamb, or Kona coffee) that earn a much higher price.
- Others have developed new, innovative fresh and processed products through experimentation.
- A third category is farms that are providing one-of-a-kind farm-related experiences that compete successfully with other leisure time activities.

All of the case farms are competing based on providing the best value rather than the least expensive option. Producers who sell their product directly to the consumer must remember that the quality of their product establishes their firm's reputation. Successful direct marketers build strong customer loyalty by providing a quality product that is consistent and is served with excellent customer service.

### *Efficient Resource Allocation*

The personality description provided above should make it clear that these farms do a good job with the "soft" side of the business. The superb product and service quality that the farms achieve demonstrates a good grasp of the production side. One more element that plays an essential role in their success is a

profound and detailed understanding and control of their business so that they are cost efficient and allocate their scarce resources to their highest valued activity.

- Honeyacre Produce (CO) and Cattail Creek (OR) are two of many with superior budgeting and accounting skills. Because they keep track of returns and costs at the enterprise level they are able to make well-informed business decisions before going forward with production or marketing decisions.
- The case study farms also understand how their diverse enterprises complement other farm enterprises in terms of labor demands, customer overlaps and synergies.
- Because the farm operators thoroughly understand the dollars and cents they are better able to integrate these quantitative economic factors with other qualitative factors before making final enterprise decisions. They can then choose the most satisfying enterprise not just the most profitable ones.
- Even the most diverse of these firms have very explicit strategies for eliminating things that do not contribute to the overall goal of the firm. Customer intimacy *does not* mean being all things to all people. It means being able to satisfy targeted customers, focusing on producing and marketing the most profitable products and services well, and letting other parts of the business go.

### *Putting It All Together for a Successful Customer-Intimate Business*

To be successful in the transition from commodity agriculture to this new demand-driven model, a farm must be able to integrate all four of these skills or strengths. All the enterprises profiled have met these challenges and are now more confident about their future. Confident enough, in fact, that they were willing to share some of their secrets. Yes, successful customer-intimate farms do have an excellent understanding of their customers, but they also have the people skills, dedication to product quality, and business savvy that are needed to make the new enterprise thrive. All four strengths appear to be necessary for an enterprise to thrive at direct farm marketing, but they are probably not sufficient conditions for success. Proximity to a large urban or tourist population also came through as an important factor for most enterprises that revolve around agri-tourism.

### **Food versus Agri-Tourism Focus**

While all of the enterprises have roots in producing a commodity or food-oriented product, some farms have shifted their focus to agri-tourism or selling the farm experience. What are the factors that distinguish between a product versus agri-tourism choice? First, it should be noted that all enterprises integrate both a consumptive food product and the farm experience as part of their product mix. Schnepf Farms near eastern Phoenix focuses on providing family entertainment and agricultural education. Yet they also include the agricultural experience of picking fruit and getting one's hands dirty. On the west side of Phoenix, Sunfresh Farms provides a produce item to children that do school bus tours from the commercial vegetable side of their operation. The Seabreeze Organic Farm near San Diego markets organic produce through a Community Supported Agriculture program yet they provide education to consumers and the public that connects them to their farm. Harward Farms sells sweet corn at roadside stands throughout Utah County in a manner that identifies and connects consumers to their farm.

### *Product and Service Attributes*

Providing a very differentiated food product and high-end service is a common theme for enterprises with a food product focus. Cattail Creek Farm in Oregon provides lamb that has never received any GMO feed, hormones, steroids, or antibiotics to 26 restaurants and 7 retail outlets. They guarantee their product for consistent quality and on-time delivery. Honeyacre Produce Company in the front range of Colorado produces (year-round) vine-ripened and pesticide-free tomatoes and peppers. All of their produce is picked and packed by hand and delivered within 200 miles of their operation so that it will have better flavor and condition and taste better than competing produce. Nalo Farms in Hawaii

competes with mainland lettuce and greens by providing top quality, consistency, and customer service. Daily service and personal contact is provided for building and maintaining their resort restaurant accounts.

Enterprises that have migrated to an agri-tourism focus, that include festival events and on-farm tours, are usually located near large metropolitan areas. Fixed costs associated with bringing in entertainers and housing festival events are substantial, and a large crowd is needed to just break-even. Combining school tours throughout the year with seasonal festival events was found to be complementary to the product mix of several farms. While most enterprises just break-even from their school tours, they support a core infrastructure of personnel and facilities that allows them to gear-up for large festival event crowds where they can actually make money. School tours are also used as a promotional vehicle for drawing audiences to festival events. The English Farm in rural western Colorado has moved from a focus of selling produce at a roadside stand to a "Krazy Korn Maze." The fixed and sunk costs associated with developing a maze are not nearly as large as that needed for large festival events.

Other agri-tourism activities are rather targeted in their audience and activities. Love Family Farms in Hawaii rents coffee trees to Japanese customers, mainly to individuals that have visited their farm. Tree renters are allowed to make production decisions on how to maintain their tree and they can go to the farm's website to view the tree they have rented. Customers also receive a physical product of 50 seven-ounce bags of coffee with a custom designed label for special events like weddings or distinctive gifts for business clients. The Holualoa Kona Coffee Company uses farm tours as a way to build their customer base and consumer loyalty. Most of their sales are repeat mail order sales to individuals that have visited their farm before.

#### *Threats to Enterprises*

Most of the farms examined are small enough and specialized enough that they do not fear major agricultural firms invading their market and out-competing them by reducing prices. There are, however numerous other threats to the sustainability of their success.

Many of the threats that they face are from factors that are beyond their control. As with all agricultural firms, weather is a major concern. Weather may cause an agri-tourism event to be canceled or greatly reduce the attendance of the event. Since many of the festival-oriented farms make most of their profit for the year during October, a rained out October equates to a "hailed out crop year." Event insurance is available, but fairly expensive. Unforeseen weather conditions may also reduce the contracted quantity or quality of their product. In addition, whether they sell high-end products or farm experiences, these farms are dealing with much more income elastic markets than are typical for commodity agriculture. Consequently economic downturns and /or reductions in tourism will greatly decrease the demand for their products. As they put together their farm plans, they seek to incorporate some less volatile enterprises as well.

Many of these farms are located on the urban fringe and profit from the close proximity of their consumers. But creeping urbanization (and the increase in land prices and restrictions in land uses) also represents a significant threat to many of these businesses. As they expand into value-added and agri-tourism products, many farms are finding that their businesses are more influenced by regulatory, liability, and food safety concerns. While information was not specifically asked on gross sales and the percentage of household income they obtain from farming, most obtain the majority of their income from their farming enterprise. This also fits Agricultural Census and Agricultural Resource Management Study data where farms with sales greater than \$250,000 obtain most of their household income from the farm.

## University and USDA Resources Related to Direct Marketing

Currently, both human and capital resources are offered through land grant universities and the USDA to help producers develop and expand their direct marketing enterprises. The 2002 Farm Bill amended the Agriculture Risk Protection Act of 2000 and established a pool of funds worth \$40 million annually to assist producers with direct marketing and the development of value-added enterprises. The four programs include: (1) USDA's Value-Added Producer Grant Program (VAPG), (2) the Agricultural Marketing Resource Center (AgMRC), (3) Agricultural Innovation Centers (AIC's), and (4) the Value-Added University Research Grant program (<http://www.rurdev.usda.gov/rbs/coops/vadg.htm>).

The VAPG program provides the opportunity for independent agricultural producers to apply for competitive grant funds for planning and operating innovative value-added marketing enterprises (Parcell). AgMRC ([www.AgMRC.org](http://www.AgMRC.org)) is a partnership between Iowa State University, Kansas State University and the University of California. The AgMRC has developed a web-based library of economic, marketing and business development resources. Additionally, members of the AgMRC team provide their expertise to interested producers and conduct research and economic analyses on issues facing agricultural producers involved in value-added enterprises. The AIC program is designed to fund (up to ten grants funded at no more than \$1 million dollars for one year) centers to provide producers who are interesting in marketing or producing value-added products with technical and business development assistance (<http://www.rurdev.usda.gov/rbs/coops/aic.htm>). The first AIC grant funds were awarded in September 2003 to ten universities, state departments of agriculture commerce, and a state rural electric cooperative association (<http://www.usda.gov/news/releases/2003/09/0331.htm>).

## Obtaining the WEMC Case Studies

Direct marketing has proven a successful and sustainable alternative to traditional commodity markets for many agricultural producers in the western United States. As these 17 case farms have shown, direct marketing requires knowledge of long-term goals, substantial planning, flexibility, and adaptation.

A 120 page color publication with photos of the 17 enterprises studied is available at the Western Extension Marketing Committee's web site of <http://ag.arizona.edu/arec/wemc/wemc.html> and it can also be ordered online from <http://ag.arizona.edu/pubs/> or from CALSmart, College of Agriculture and Life Sciences, The University of Arizona, 4042 N. Campbell Avenue, Tucson, Arizona 85719. Phone: (520) 318-7275, Fax: (520) 795-8508, Toll-free: 877-763-5315 (\$10 for a single full-color copy). While the publication is targeted for producer audiences, it may also be a useful addition for undergraduate agricultural economic marketing, managerial economics, business strategy, and related courses.

## References

- Agricultural Marketing Service. "Farmers' Market Facts!" Agricultural Marketing Service, United States Department of Agriculture. Accessible online at <http://www.ams.usda.gov/farmersmarkets/facts.htm>
- Animal Plant Health and Inspection Service. "Direct Marketing from Farmers to Consumers – A Growing Trend." Animal Plant Health and Inspection Services, United States Department of Agriculture. October 1998. Accessible online at <http://www.aphis.usda.gov/vs/ceah/cei/market.htm>
- Born, Holly. "Keys to Success in Value-Added Agriculture. A Publication of Southern Sustainable Agriculture Working Group and the National Center for Appropriate Technology's ATTRA Project. January 2001. Accessible online at <http://attra.ncat.org/attra-pub/PDF/keystosuccess.pdf>
- Dimitri, Carolyn and Catherine Greene, "Recent Growth Patterns in the U.S. Organic Foods Market." U.S. Department of Agriculture, Economic Research Service, Market and Trade Economics Division and Resource Economics Division. Agriculture Information Bulletin Number 777, September 2002: 1-39.

Economic Research Service. "What is the Size of the U.S. Market for Organic Foods?" Economic Research Service, United States Department of Agriculture. Accessible online at <http://www.ers.usda.gov/Briefing/organic/Questions/orgqa5.htm>

Govindasamy, Ramu, Aruna Pingali, and Ferdaus Hossain. "Income Distribution Comparison of Farms with Innovative Activities: A Probabilistic Approach." Rutgers Cooperative Extension Report 300-9801, January 1998: 1-28. Available online at [http://aesop.rutgers.edu/~agecon/pub/inc\\_dist.pdf](http://aesop.rutgers.edu/~agecon/pub/inc_dist.pdf)

Hoppe, Robert A., James Johnson, Janet E. Perry, Penni Korb, Judith E. Sommer, James T. Ryan, Robert C. Green, Ron Durst, and James Monke. "Structural and Financial Characteristics of U.S. Farms: 2001 Family Farm Report." Robert A Hoppe (ed.), Res. Econ. Div., Economic Research Service, USDA. Agricultural Information Bulletin No. 768. May 2001. Accessible online at <http://www.ers.usda.gov/publications/aib768/>

Parcell, Joseph L. "USDA Producer Value Added Grant Program: A Reviewer's Perspective." University of Missouri Outreach and Extension Development Fund Grant Publication. Accessible online at <http://www.agmrc.org/business/pdf/usdaproducergrantreviewer.pdf>

Porter, Michael. Competitive Advantage: Creating and Sustaining Superior Performance. The Free Press, New York. 1985. Republished with new introduction, 1998.

Treacy, Michael and Fred Wiersema. The Discipline of Market Leaders. Cambridge Massachusetts: Perseus Books. 1995. [Now available from DIANE Publishing Company, Collingdale, PA. Sept. 2001.]

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## **Apocalypse Cow: The Effect of BSE on Canada's Beef Industry**

By  
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### **Introduction**

On May 20, 2003, brain tissue from a cow that was sold in northern Alberta tested positive for bovine spongiform encephalopathy (BSE). Reacting to this information, governments in 34 countries<sup>2</sup> prohibited the import of Canadian ruminant animals and products derived from ruminants.<sup>3</sup> The import ban created turmoil in the Canadian beef industry as exports normally generate approximately 40 percent of the industry's revenues. The real or potential risks associated with BSE have become a major economic and political issue and have been a rude and stunning wake-up call to stakeholders in the Canadian beef industry.

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<sup>2</sup> Imports of Canadian bovine and ovine products were prohibited or restricted in Kenya, South Africa, China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, Vietnam, Turkey, Croatia, Romania, Russia, Ukraine, Kuwait, Saudi Arabia, United Arab Emirates, Australia, New Zealand, Antigua, Argentina, Barbados, Brazil, Chile, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Peru, Trinidad and Tobago, Uruguay, Mexico and the United States.

<sup>3</sup> Ruminant animals include, among others, cattle, bison, goats and sheep.

The purpose of this paper is to detail the short-term impact of the single case of BSE in Canada and to identify possible long-term implications for an export oriented industry. The long-term consequences of the BSE crisis may prove to be more important than its immediate costly and disruptive effects. To alleviate the concerns of foreign governments regarding Canadian beef, industry stakeholders will have to scrutinize and enhance the beef supply chain. This may involve applying the same level of attention and exactitude to upstream (supplier) activities as to the demands of final consumers, redefining livestock protocols for animal diseases, and re-aligning relationships with trading partners.

## **Background**

The beef industry is an important part of the Canadian agri-food economy and the second largest (after wheat) earner of foreign exchange in the agricultural sector. As of January 1, 2003, there were 13.8 million head of cattle and calves in Canada compared to 96.1 million head in the United States (USDA, 2003). Seventy two percent of fed cattle in Canada are located in Alberta, 17 percent in Ontario and remainder are located within the other eight provinces. Table 1 shows that beef and live cattle exports added about C\$4 billion to the beef industry's revenues in 2002; not shown are about \$1 billion in imports – almost all from the United States. Net exports have been increasing in recent years. Canada is the third largest beef exporter in the world<sup>4</sup>, with 76 per cent of exports going to the United States (Table 2).

Canada and the United States have spent the last 15 years seeking ways to harmonize their respective red meat industries. Though periodic border hassles remain, the increased two-way movement of live animals and meat products has been well documented and indicates the nearly complete North American integration of these important agricultural industries. Beef and live animals have moved across the border almost without hindrance.<sup>5</sup> This has resulted in greater production and marketing efficiencies in both countries.

## **BSE in Canada**

Only two cases of BSE have ever been diagnosed in Canada. The first was found in December 1993 in a beef cow that had been imported from Britain in 1987. The animal carcass and all animals in the herd it came from were destroyed. Stricter rules to test cattle were implemented in 1994 and in 1997 the feeding of animal material to ruminants was banned. On May 20, 2003, a second case was reported in one beef cow from Wanham, Alberta. The animal was condemned at slaughter and the carcass did not enter the food or feed chain. Although more than 2,700 animals eventually were destroyed and tested as part of the investigation, no other cases were found.

The response to the single occurrence of BSE in Canada was swift, decisive and aggressive (Figure 1). When news broke on May 20<sup>th</sup> that the United States government had banned Canadian imports, cattle futures prices on the Chicago Mercantile Exchange dropped the daily 1.5-cent limit. Cattle prices at one Alberta auction dropped from \$1.20 a pound to 32 cents before most cattle were taken home again. Slaughter plants in Canada stopped accepting new cattle. The Canadian government stopped all beef shipments not already in transit. Some live animals already in the United States were returned to Canada.

## **Government Assistance**

On June 18, 2003 federal, provincial and territorial Ministers of Agriculture announced a national BSE Recovery Program to provide temporary assistance for the Canadian cattle and beef industry. The package contained two key elements. First, producers were eligible to receive taxpayer transfers for

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<sup>4</sup> In 2001, Australia accounted for 23% of world beef exports, the United States 16%, Canada 15% and Brazil 11%.

<sup>5</sup> The Canadian government prohibits imports of live animals during certain periods of the year on the basis of four diseases: anaplasmosis, tuberculosis, blue tongue and brucellosis.

Table 1: Canadian Live Cattle Exports to the United States

		Quantity (# of head)			Value (millions of C\$)		
		2000	2001	2002	2000	2001	2002
<b>Slaughter</b>	Steers	358,961	424,335	346,237	\$464.60	\$621.86	\$478.92
	Heifers	195,182	285,805	248,399	\$244.40	\$393.54	\$329.33
	Cows	171,488	257,584	372,294	\$138.00	\$230.59	\$299.01
	Bulls	44,286	53,575	57,448	\$59.50	\$79.45	\$77.83
<b>Feeder</b>		115,524	190,538	574,992	\$110.60	\$186.37	\$487.56
<b>Other</b>		78,864	94,318	87,082	\$110.10	\$143.41	\$149.31
Total Cattle Exports		<b>964,265</b>	<b>1,306,155</b>	<b>1,686,452</b>	<b>\$1,127.20</b>	<b>\$1,655.20</b>	<b>\$1,821.96</b>

Source: Canfax Annual Report, 2002.

Table 2: Canadian Beef and Beef Product Exports

	Quantity (tonnes)			Value (millions of C\$)		
	2000	2001	2002	2000	2001	2002
<b>Destination</b>						
U.S.A	318,464	355,942	373,432	\$1,382.21	\$1,688.70	\$1673.22
Mexico	53,189	69,674	75,809	\$180.25	\$271.69	\$282.52
Japan	28,390	29,245	23,982	\$162.02	\$171.37	\$95.84
S. Korea	20,593	9,420	17,254	\$98.56	\$28.64	\$59.51
Taiwan	2,655	2,991	4,026	\$16.07	\$15.62	\$20.97
Hong Kong	2,112	1,664	570	\$8.97	\$7.22	\$2.78
China	1,203	1,405	2,494	\$3.14	\$4.11	\$6.69
SE Asia	1,434	754	2,204	\$1.56	\$1.34	\$2.48
C&S America	7,099	7,524	7,526	\$7.06	\$9.03	\$7.55
Caribbean	3,607	5,519	3,398	\$5.55	\$11.41	\$6.76
EU	422	220	67	\$2.00	\$0.78	\$0.23
Russia	2,623	2,437	4,638	\$2.43	\$2.97	\$4.32
Other	4,125	2,934	4,742	\$6.43	\$13.75	\$17.79
Total Beef Exports	<b>445,916</b>	<b>489,729</b>	<b>520,142</b>	<b>\$1,876.07</b>	<b>\$2,226.61</b>	<b>\$2,180.65</b>

Source: Canfax Annual Report, 2002.

cattle owned as of May 20, 2003 that had subsequently been sold for slaughter in Canada. Beef producers received transfers when the price of cattle fell below a reference price, based on market value in the United States. The amount was calculated as a percentage of the difference between the reference and market prices, where producers received a lower percentage of the difference as the average price declined. Second, processors were provided with incentives to sell or otherwise move surplus meat out of inventory after May 20. The idea was to free up storage space, thus allowing processors to operate at increased capacity to serve the domestic market. These two measures were to be in place until the United States border was reopened to beef products, or until the approximately 900,000 cattle on feed as of May 20 had been slaughtered (except for cull cows, veal and other ruminants for which the program would operate no later than August 31). The maximum cost to taxpayers was \$460 million (C\$276 million from the federal government, C\$184 million from provincial and territorial governments).

Figure 1: Canadian BSE timeline

- **1997** - A black angus cow is believed to be born at Baldwinton, Saskatchewan or another unnamed farm. Cow spent time on at least two other farms.
- **January 31, 2003:** Cow shows signs of illness and is sent for slaughter at provincial abattoir. Believed to have pneumonia and declared unfit for human consumption by Alberta Agriculture inspector. Head kept in freezer at provincial laboratory pending routine testing. Remains sent to rendering plant and made into feed.
- **May 16:** Alberta Agriculture laboratory tests cow's brain for BSE as part of routine surveillance. Notifies CFIA of preliminary test results indicating possible BSE infection. Tissue sent to Winnipeg for further testing May 17.
- **May 18:** Winnipeg laboratory detects BSE in tissue and sends it to World Reference Laboratory in Weybridge, England for final confirmation.
- **May 20:** WRL confirms positive BSE in tissue sample. Farm that sold the animal is placed under quarantine by the CFIA. By 1:30 a.m. CST, the U.S. issues notice to block all imports of Canadian cattle & beef products. Other countries follow suit.
- **May 26:** Seventeen herds quarantined or culled for testing.
- **June 9:** CFIA completes investigation and presents report to review panel of international experts.
- **August 8:** US Secretary of Agriculture announces that firms can apply for permits to export low risk product including boneless cuts from animals less than 30 months and boneless veal from animals less than 9 months. No live animal exports are allowed. Mexico quickly follows suit.
- **September 10:** First truckloads of boneless beef enter the US from Canada.

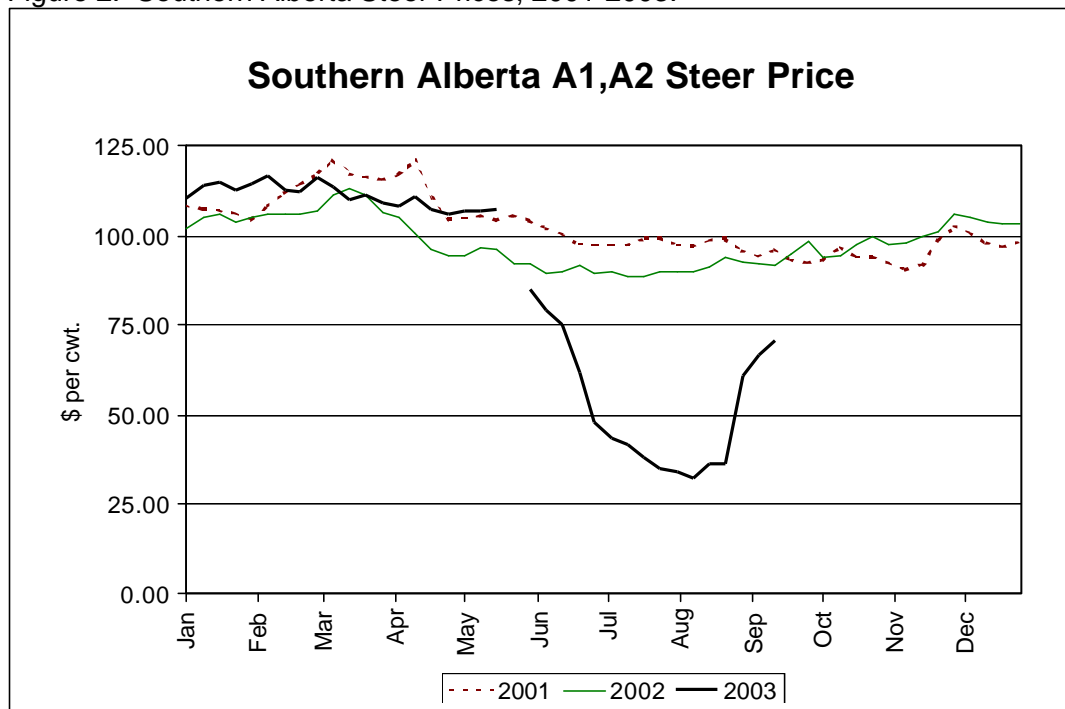
Source: *The Western Producer*, May 28, 2003.

By early August, slaughter activity had doubled from late May and about 725,000 cattle were moved into the domestic market. Figure 2 illustrates that steer prices in Alberta decreased from C\$105/cwt prior to May 20<sup>th</sup> to as low as C\$30/cwt. Since taxpayer transfers compensated producers for some of their loss, the maximum taxpayer transfer quickly reached C\$460 million. As a result, the federal minister of Agriculture and Agri-food announced two additional measures to further assist the Canadian livestock sector. The first was a C\$36 million extension to the Government of Canada's commitment to the national BSE Recovery Program. The second initiative provided advance payments to producers as a transition measure until a new business risk management program is implemented nationally. With provincial participation, program extension funding could cost taxpayers more than C\$60 million.

In August, the Alberta government announced a third financial aid program aimed at further helping feedlot owners. Unlike previous aid programs, the Alberta Fed Cattle Competitive Market Adjustment Program initially had no end date and no limit on the financial obligation of taxpayers. Under this program, fat cattle could be purchased and either slaughtered or held in a feedlot. The Alberta Fed Cattle Competitive Market Adjustment Program ran from August 25 to September 13.

On October 9 the Alberta government announced a final support package for the cattle industry. It included two programs, one that covered the remaining steers and heifers that were on full feed as of May 20, 2003; the other provided assistance to livestock producers who had market-ready cull cows and bulls as of September 1, 2003. The cull program assisted cow/calf producers with expenses associated with maintaining cattle that would normally be sent to slaughter.

Figure 2: Southern Alberta Steer Prices, 2001-2003.



Source: Ken Perlich, *Cattle on Feed Report*, August 18, 2003.

## Re-opening the Border

An intensive three-week investigation on the origins, movements, progeny, and rendered parts of the infected cow (involving the slaughter and testing of 2,700 animals) culminated in a major report by the Canadian Food Inspection Agency (CFIA). An international committee of experts<sup>6</sup> reviewed the report and offered high praise. All scientific evidence pointed to the safety of the rest of the Canadian beef herd.

Following presentation and discussion of the report, it was hoped the United States government would quickly re-open its border to Canadian beef and live animals. These hopes were dashed, however, when the Japanese government announced that imports of American beef (that amounts to about US\$ 800 million per year) would be halted by September 1 unless the United States could guarantee that its beef contained no product from Canada. This greatly complicated the border opening.

On August 8, the American Secretary of Agriculture Ann Veneman announced that the United States would permit the importation of low-risk beef products from Canada under a permit system. Firms could apply to export boneless cuts from animals less than 30 months of age and boneless veal from calves under nine months of age. The border would remain closed to the export of live animals for the foreseeable future. Though the announcement would accommodate slightly less than half the previous level of exports of Canadian product to the United States, it gave instant cheer to the frustrated (and financially devastated) beef industry in Canada. Three days later, the Mexican government followed with a similar announcement. Killing protocols and a system of import permits still had to be developed however. Finally, the first Canadian product began to cross the border in early September, 113 days after the disease was announced and the border was closed.

<sup>6</sup> The team consisted of Prof. U. Kihm (Switzerland), Prof. W. Hueston (USA), Dr. D. Heim (Switzerland) and Dr. S. MacDiarmid (New Zealand).

On October 31, 2003, the USDA published a proposed rule aimed at ending the ban on imports of Canadian cattle under 30 months old. The proposed rule creates a new U.S. category for low incidence countries, like Canada, that have had effective BSE safeguards in place prior to detection, and that have adopted additional measures based on risk analysis. It also outlines proposed protocols for the resumption of imports of certain live ruminants and ruminant products and byproducts from Canada. Interested parties have 60 days (until January 4, 2004) to make submissions in support of it or raise concerns. This will be followed by a review of submissions, after which the U.S. could reopen the border to live cattle under 30 months of age from Canada. However, the border remains closed to exports of live animals and meat from cattle older than 30 months, bison, sheep, goats and other ruminants. This has put considerable strain on cow-calf producers who have no ready market for their annual slaughter of animals culled from their breeding herds. There have been reports of cull cattle fetching less than ten cents a pound. The inventory of these potential cull animals has increased as producers have refrained from marketing them at a loss. Marketing of the annual run of weaned calves has produced more volatility in prices than is usual in western Canada. Alternate bouts of pessimism and optimism among feedlot buyers have sent prices down and up by twenty or more cents per pound.

### **Implications and Issues**

The financial chaos endured by industry stakeholders during the BSE crisis demonstrates the vulnerability of this export-based industry to a sudden border closure. While producers can adjust rations and feeding schedules, and beef products can be stored for some time prior to consumption, the capacity for short-term adjustments in the industry is limited. Feedlot operators need to purchase feed for their animals and bankers become nervous about extending further credit when sales of finished animals are disrupted. Operators can reduce rations so the animals grow more slowly, but heavier animals are subject to major discounts in the marketplace when they finally can be sold. In addition, freezer capacity is limited and available space quickly becomes filled with slower moving cuts. The marketing channel can quickly become bottlenecked.

The crisis reinforced the need for continuous investment, improvement and extension of the cattle identification system, initiated after several years of debate, on January 1, 2001. Developed by industry stakeholders and the Canadian Food Inspection Agency, the purpose of the Canadian Cattle Identification Program is to identify each beef or dairy animal in Canada using an ear tag. The tag enables inspectors to trace animals that have moved beyond their "herd of origin" to ensure that reportable diseases and food safety defects are contained and eliminated. Although participation in the program was less than comprehensive, it helped to track animals that had any previous connection with the condemned cow. An industry in which producers supply a perishable product dependent on export markets can ill afford a supply chain that cannot quickly isolate problem situations.

The single incidence of BSE in Canada is certain to increase the probability that regulations in the United States for mandatory labeling of meat according to country of origin will be implemented by September 30, 2004. Although the entire meat trade and most important livestock organizations, including the National Cattlemen's Beef Association and the National Pork Producers Council, continue to oppose the country of origin labeling scheme, the BSE occurrence in Canada has re-energized U.S. interests that support labeling as a way to discourage Canadian livestock and meat imports.

Slaughtering and processing of beef in Canada has also been changed. The federal government announced that, effective July 24, specified risk materials -- brain, skull, eyes, tonsils, vertebral column, spinal cord and all dorsal root ganglia from cattle over 30 months of age, and small intestines of all cattle -- would no longer be allowed to enter the human food chain. These are the materials that are suspected of carrying BSE across the species barrier and causing the new variant Creutzfeldt-Jacob disease in humans.

The single incident of BSE has dealt a major financial shock to the rendering industry in Canada. Since 1997, the use of ruminant meat meals in feed of ruminant cattle has been prohibited. That has now been extended to all meat, bone and feather meals. Ruminant rendered material may still be used for

feeding hogs and chickens, which cannot contract the mad-cow disease, but this may be restricted on the notion that if such material is available in the feed trade it could be illegally used in cattle feeds, especially where feed is prepared and mixed on the farm.

This tragic episode points to the need for a suitable safety net for a vulnerable export industry. The beef industry in Canada has been very competitive internationally, adding about C\$3 billion to Canada's balance of payments annually in recent years. Until this year, the industry has had minimal government assistance. Since the mid 1990s, the producer subsidy equivalent for the beef industry has varied between six and nine percent (OECD, 2003).

There is no private insurance available for beef producers in Canada for a BSE type disaster. Instead, the federal and provincial governments are revising the taxpayer-funded producer safety net through the Agricultural Policy Framework<sup>7</sup>. As part of this framework, the Canadian Agricultural Stabilization Program will allow producers to protect their farm enterprise against income declines. The philosophy of the program is that taxpayers and producers should share the burden of replacing lost producer income. To participate, producers are required to make a deposit a participating financial institution for their share in protecting a reference margin. For smaller losses, producers and taxpayers share the burden equally. For larger losses, the taxpayers' share increases to four times the amount contributed by the producer.

### **The Way Forward**

Canada's beef industry has been severely strained as a result of the BSE episode in 2003. A number of lessons appear to have been learned and measures implemented to reduce the chances of further infections. Specific risk materials have been banned in the use of animal feeds. Increased inspections have been mandated. A new laboratory facility to detect livestock diseases in Edmonton, Alberta will enable scientists to test about 25,000 cattle per year, up from the 850 tests performed in 2002 in Alberta. Across Canada, about 3,200 tests were performed in 2002, but with new facilities this could increase to 65,000 per year. The industry has imposed much stricter rules on animal identification. The Canadian Cattle Identification Agency recently decided to adopt Radio Frequency Identification tags and to phase out the familiar bar coded tags by January 1, 2005. The majority of producers seem to have learned and accepted the need for increased measures to assure the safety and acceptability of their product for foreign (as well as domestic) consumers.

Canadian consumers have shown no loss in confidence in the safety of Canadian beef. Indeed, many communities and agencies have sponsored beef promotions resulting in much higher sales of product than normal in western Canada. There is some evidence that pork sales have deteriorated due to the increased sales of beef during the summer of 2003.

The incident clearly shows the need for improved methods to deal with border closures. The Office International des Epizooties has a protocol to close borders immediately on discovery of BSE and other serious diseases. However, there is no similar science-based mechanism to re-open the borders when scientific procedures ensure there is no significant chance of further incidences of the disease. This can be devastating for any industry that is highly dependent on export markets for a perishable product. International negotiations are needed to find solutions to this problem.

With the separation of the two markets, prices in the United States have reached record levels in October 2003 -- US\$116/cwt in Kansas and \$120/cwt in Nebraska (Farmers Independent Weekly, 2003). Canadian producers have looked with envy at the divergence in prices between the two countries.

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<sup>7</sup> The Agricultural Policy Framework is the structure of agricultural policy in Canada for the first part of the 21st century.

It would be a serious setback to growth and productivity in the beef industries of both Canada and the United States if long-term trade between the two countries is restricted. Consumers in both countries have come to rely on safe and nutritious beef made available at reasonable costs. The best way to ensure long-term competitiveness of beef relative to other meat products is continue the practice of harmonizing rules and standards of production throughout North America.

### References

Canfax. Annual Report. 2002. [www.canfax.ca](http://www.canfax.ca)

Farmers Independent Weekly. "U.S. Cattle Market Goes Wild." Vol. 3. No. 11, pp. 2, 3. 2003.

Organization of Economic and Co-operative Development. Agricultural Statistics. 2003.  
[www.oecd.org](http://www.oecd.org).

Perlich, Ken. Cattle on Feed Report. August, 18, 2003.

Statistics Canada. Census of Agriculture. 2001.  
<http://www.statcan.ca/english/agcensus2001/index.htm>

United States Department of Agriculture. United States and Canadian Cattle. 2003.  
<http://usda.mannlib.cornell.edu/reports/nassr/livestock/uscc/uscc0203.pdf>

Western Producer. Various Issues. [www.producer.com](http://www.producer.com).

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## Lottery Economics: The Role of Luck, Skills and Endowments in Determining Who Gets the Toys

by  
Philip R. Wandschneider<sup>1</sup>

(This paper is an adaptation of Dr. Wandschneider's Scholar's Address at the annual meeting of the Western Agricultural Economics Association in Denver, Colorado, July 2003)

*"The race is not to the swift, nor the battle to the strong, neither yet bread to the wise, nor yet riches to men of understanding, but time and chance happeneth to them all." -- Ecclesiastes 9:7-12*

Why do some people receive large incomes and wealth, while others live in poverty? One view is that market rewards go to those who are productive – through either their own labor or their property. This view is codified in the marginal productivity theory of standard economics. Another view is that wealth and income are distributed according to socially defined positions. For instance, in classical economics, class determines earnings. But, what of the Preacher's words above? What role does luck have in determining who gets the toys?

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<sup>1</sup> The author is a Professor, Department of Agricultural and Resource Economics, Washington State University.

Acknowledgment: The guidance of the editor and a wise reviewer elevated some sloppy arguments and greatly improved the brevity and clarity of this discussion. I also benefited from the insight of many colleagues, including members of a seminar on the sociology of risk led by Gene Roza. Remaining errors and illogic belong to the author.

The purpose of this paper is to present the case that chance is as important as economic productivity or social position in affecting the distribution of income and wealth. I propose that chance affects the strategies and psychology of economic agents in the “economic game.” In the conclusion, I discuss how the explicit introduction of chance could increase our understanding of innovation, system stability, and motivation in the market economy.

Both marginal productivity and social position theories of distribution have ethical and ideological counterparts with policy implications. A normative partner to marginal productivity theory is the idea that people are paid what they deserve in a market economy. A normative counterpart to the social position theories is that elites can extract undeserved shares of the total social output, illustrated by Marx’s critique of the capture of the economic surplus by capitalists. I shall conclude with a brief discussion of normative and policy implications.

## **Life as a Game**

It is useful and stimulating to think of life as a game, in both the formal sense of game theory and the informal sense of a board game like *Monopoly*. In this board game metaphor, the winners of the game are those who get the greatest income and wealth. Of course, this metaphor is flawed because income and wealth are neither necessary nor sufficient conditions for happiness or well-being, but that is another story.

In outline the game is as follows. At birth, each player receives endowments of (quite different) initial sets of assets. As a player matures, she builds financial, human, and social capital. She enters the game proper by pursuing career paths and by accumulating wealth. Her progress in career paths and wealth accumulation depends on her stocks of human, financial and social capital interacting with luck. Throughout this process the player makes choices from opportunities presented by endowments and chance. The player’s choices have much to do with personal qualities, including risk aversion. The player’s choice is like placing a bet, with the stake being the player’s effort and endowment, and the payout generated by a combination of structural factors and chance.

### **Stage 1: The Birth Lottery**

Birth is the first, and perhaps most influential, lottery. I define a *lottery* as a stochastic process generating a particular life event. The most successful players (agents) start the game by “choosing” the right parents and location. The “wheel of fortune” endows the player or agent with three initial resources: genotype, social position, and geopolitical position.

Starting at birth, the player’s genetic code interacts with the family physical and social environment to create the agent’s physical and intellectual capabilities and her “character,” including her individual tastes and risk attitudes. In economics, personal characteristics usually appear as the tastes and preferences (including risk preferences) that determine the value the agent places on different choice outcomes. But personal characteristics include physical and mental capacities as well as character. The genetic components of personal characteristics like sex, size, and hair color are obvious, but recently geneticists have found the genetic basis for a large number of personal characteristics including: shyness, risk for alcohol/nicotine addiction, sense of taste, and wake times. Genes bestow economic advantages and disadvantages. Professional athletes epitomize the role that genetics and environment (training) play in both career choice and opportunity.

Also, the birth lottery places the player in a particular family (social setting) and in a particular geo-temporal location. Birth to a wealthy family in Seattle, Washington in 1980 creates different potential than birth on a peasant farm in Bangladesh in 1948, the year of the Great Famine. The family of origin creates initial positions in the player’s social and financial capital. (Of course, social and genetic family may differ)

## Stage II: Building Endowments

*“The rich get rich and the poor stay poor...” -- God Bless the Child, Holliday and Herzog*

As the agent grows, she builds assets in four accounts –three capital accounts and an inventory of personal characteristics<sup>2</sup>. Personal characteristics were described above. Clearly the player’s initial financial capital plays a key role in building financial assets. Investment choices and luck interact with the agent’s other assets to influence outcomes. Thus, the player might have better returns in the stock market if she has “inside information” (more social capital), and her expected prospects may be greater if she is a risk seeker. The role of perspicacity, initial endowment, and luck in building financial endowment seems more obvious than that for labor income, so this paper will concentrate on labor income. However, note that entrepreneurial occupations, including farming, ranching, small shops, and “CEOing,” blend the wealth game and the labor income game.

The player begins life with an initial endowment of social capital. Social capital includes access to information, obligations and expectations, and social norms (Coleman). Social capital is like financial capital in that one can invest to increase its size, and one can use it to acquire other consumer goods and services. Serendipitous contacts can dramatically affect the details of a player’s social capital. I define *serendipity* as a (statistically) independent interaction between one player’s life path and the life events of other players and other stochastic events.

Human capital is the set of accumulated skills that agents gain through training and education. (See the work of Gary Becker and Jacob Mincer *inter alia*.) Modern theories of the distribution of personal income have focused on investment in formal education as measured by years of schooling. (Mincer is seminal.) The recent legal action concerning the admissions policy of the University of Michigan provides a conveniently numerical example of the college selection process. Candidates were assigned a score from a potential total of 150 points. The points were distributed as GPA (80 points); test scores (12 points); academic factors such as difficulty of classes and reputation of high school (18 points); family alumni or legacy (4 points); sports, clubs and other activities (10 points); and special factors including race and “President’s discretion” (26 points). The same process, albeit with different weights and less obsessively quantified, occurs at every college in the country.

One way that chance influences college selection is through serendipity. In college selection, the player’s choice of colleges for application is frequently capricious, and the match between prior life events and the college rating categories is somewhat haphazard. A fully informed rational agent would choose activities that maximize the sum of current utility and future value, but life is not so tidy. Moreover, entrance to college is a stochastic contest. It is a multi-dimensional game of musical chairs, with the “best” colleges having the lowest ratio of chairs to players. The musical chairs game is a multidimensional stochastic tournament. A *tournament* is a competition among agents for a prize or position (e.g., Gibbons). Some agent will be the “winner,” but which agent will win depends upon effort, endowments, productivity, random events, and the evaluator’s judgment. In different tournaments, the relative weights of the factors vary.

A player’s success in the game of life is heavily influenced by the human and social capital gained at college and both are chancy. For instance, it is said that Harvard rejects a group of candidates, equal in size to the number admitted, whose qualifications are equivalent to those who are admitted. Generally, which candidate is accepted at the margin is a matter of arbitrary factors and luck at all colleges. Attendance at an elite school is an ex ante investment in both human and social capital, but the outcomes, especially for social capital, will depend on serendipitous events: does one marry a Ford, or drive one?

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<sup>2</sup> An interesting stochastic theory of scale free networks shows that hubs, once designated, grow disproportionately to the rest of the network.

### **Stage III: The career opportunity set: joining the “labor league”**

Sometime in a player’s teens or twenties (in the USA) the player enters the job market, joining a labor pool. There is no grand, homogeneous labor pool. In many societies, agents have clearly different prospects: in some, an agent simply does whatever her parents did. The economic structure of the United States is much more complicated and fuzzy, and players have much greater choice and mobility, but economic prospects still differ. In real life, building human capital, joining a labor pool or work force, and getting a job are linked processes. However, separate treatment of admission to the labor pool highlights the role of endowments, particularly social capital (status), in determining economic rewards. However, in this framework social status does not dictate the agent’s job category and income, but it shapes her (fuzzy) career opportunity set. The player chooses which labor market and, eventually, which job slots to apply for from within the opportunity set. The agent evaluates job prospects ex ante, considering expected earnings along with other job characteristics (location, tedium, risk). Here, we remember that some players will accept lower economic prospects for other rewards.

### **Stage IV: Jobs, payouts and promotions**

*“It may be that the race is not always to the swift, nor the battle to the strong -- but that’s the way to bet.”  
Damon Runyon*

At this stage in the game of life, marginal productivity, position, and luck combine to determine individual payouts, the ex post distribution of personal income. To follow this part of the game, we must examine how the player gets into the job slot, and then how the economy rewards the job slot. The agent’s choice of job is a wager on expected outcomes (ex ante) in the economic game. Some bets are conservative, while other bets are risky.

Because of the interplay of luck and choice, agents with the same “qualifications” (endowments) may have very different career paths. To illustrate the role of serendipity, consider a well-qualified new PhD student. Entering the job market in year  $t$ , she finds four available jobs in four places in her specialty, applies to three she likes, and receives offers to two. Graduating a few years earlier or later, she will find a different number (and location) of open academic positions in her specialty. Chance also plays a role in “tournaments and “musical chairs” at job entry and promotion. For instance, a sales manager may win a promotion because of a chance contact from within her social network (social capital + luck), rather than because of her superior job skills or conventionally measured productivity.

Where is marginal productivity theory in this story? Labor payments are largely defined by the prevailing wage of a particular job slot. Surgeons are paid more than pediatricians, finance professors more than history professors, and electricians more than pre-school teachers. These payments are based largely on the marginal productivity of the job slot, rather than the specific effort, skills or productivity of particular individuals. Within slots, effort based job contracts (piece work) and merit premiums can individualize rewards. However, often an individual must change job slots to change payments – through promotion tournaments or career change.

While marginal productivity is the proximate determinant of expected payments to the job slot, one must not ignore underlying forces. Prices are set in a general equilibrium framework. A particular general equilibrium outcome is determined by factors including the initial endowments to the demanders, scarcity, tastes and preferences, and random shocks to the economy. Importantly, the individual chooses career and job slot ex ante, based on expectations. Players with similar endowments and ex ante expectations who “bet on” different careers or employment at different firms (Microsoft, Enron, Tyco, etc.) will experience different outcomes.

### **The Impact of Chance on the Economy**

I have presented a four-stage game of life to illustrate that success in the game of life depends on a blend of luck, productivity, and skills and endowments. Existing general equilibrium and property rights

theories show how assets and market processes (demand, productivity) affect outcomes, so the claimed novelty of this paper is the addition of the role of chance. One might question whether including chance matters to our understanding of economic processes. For instance, one might argue that, while particular distributional outcomes are random, this does no more than add a random term to the structural models. I will argue that outcomes do matter for policy below, but let's suppose that stochastic processes have little direct explanatory importance. We would still want to know how significant random components are in the workings of the economy. To use an analogy from econometric theory, we want to know the  $R^2$ , the variation of the dependent variable explained by the model<sup>3</sup>.

However, I want to make a stronger argument, an argument that stochastic processes are structural features of the economic system. To use (or abuse) the econometric analogy, a good model specification requires an account of the stochastic processes. Specifically, I believe that chance affects the workings of the economy through the psychology and actions of economic agents. This implies relevance to at least two inter-related research agendas: stochastic game theory and behavioral economics. In the description of the game, I have alluded to three stochastic processes: lotteries, serendipity, and tournaments. But in this section I want to focus on behavioral economics.

First, consider Schumpeter's theory of "creative destruction." A major engine of growth in capitalism is the continuous introduction of more productive processes or more popular products. Schumpeter argued that innovators are motivated by the prospect of windfall gains. In the process of innovation, fortunes are made (enhanced by monopoly rents) and lost, superseded by the latest innovation. It is the chance to win the lottery that inspires the innovators: psychologists tell us that intermittent rewards are very effective motivators.

A corollary to Schumpeter's theory is the role of the economic lottery in helping to stabilize and legitimize the capitalist market economy. Throughout America, many players hope that their business, property, stock or other stake in the system will win the prize. Just as the promise of reward in the afterlife is said to have helped win the allegiance of the peasant to the feudal system, the possibility of winning the economic lottery helps maintain the allegiance of the general population to the market system.

A third possible effect of the lottery economy may be to reduce productivity in the economy. Weber argued that the economic rise of Europe and industrial capitalism rested on the protestant ethic of hard work. A widespread belief that rewards have more to do with winning a lottery than effort, skill or productivity may reduce levels of individual industry in the economy and may interact with the agent-principal problem and rent-seeking to create perverse effects. A recent article in *The Economist* on the excesses of executive compensation bemoans the damage to executive behaviors induced by the "immense and random windfalls that stock options can bring."

### **Luck, rhetoric, and ideology: implications for policy**

While it may be that stochastic process, not specific outcomes, are most interesting for theory, the nature and perception of the ex post distribution is critical for policy.

One inspiration for this paper is the recurring theme of "I earned it" asserted by some smug winner in the game of life. The most egregious example of the rhetoric of deservedness by winning came from the social Darwinists of the "robber baron era." They claimed that the capitalist market economy comprises a contest in which the best, the "fit," are rewarded, while the unfit perish. This rhetoric rests on a misunderstanding of evolutionary theory. Any organism that exists has (provisionally) won the contest of life. However, some organism must win the "game" of evolution (Dennett). For example, suppose one has a contest in which 100 participants "cast lots" until only one player emerges to win the

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<sup>3</sup> Interestingly, cross-sectional analysis of the determinants of personal income have  $R^2$ s of about 30%, leaving a large unexplained component.

game. Generally, winning depends on some combination of luck, skill, assets, effort and productivity, and we usually cannot tell which is decisive. More significantly, in most ethical systems, winning is not sufficient moral grounds for deservedness.<sup>4</sup>

The behavioral aspects imply that chance matters to economic policy. Chance affects perceived legitimacy, which is as important as efficiency in the design of policy. For instance, unemployment insurance, social security and farm commodity programs are commonly seen as “insurance” payments against the vicissitudes of fortune rather than as transfer programs. In contrast, individual income support payments are perceived as fixed “gifts” supporting non-productive players. The lesson is that policy designers should recognize how agents will react to the random effects of the programs. For instance, while state lotteries may generate revenues for meritorious government services, do they enhance or reduce “lottery mentality,” innovation, or allegiance to the economic system.

In conclusion, I believe integrating the role of chance more fully into our models will advance our understanding of economic processes. As an economist, I think that marginal productivity is an important factor in explaining payments to factors (job slots), but it has less to say about the rewards that go to specific individuals. I conclude that a model of distribution in the economy should embrace social position, marginal productivity, and randomness, integrated through game theory and behavioral economics. Many pieces of this theory exist in the literature. But I think the general, integrated approach of this paper generates some interesting research topics with important policy implications.

### References

- Alchian and Demsetz. "Production, Information Costs and Economic Organization," *AER* 62 (December 1972): 777-795.
- Becker, Gary S. "Investment in Human Capital: A Theoretical Analysis," *J. of Political Economy* 70(supplement) (October, 1962): 9-49.
- Coleman, James C. "Social Capital in the Creation of Human Capital," *American Journal of Sociology* 94(1988): S95-S120.4
- Dennett, Daniel, *Darwins' Dangerous Idea*, NY: Touchstone/Simon and Schuster, 1995.
- Gibbons, Robert. *Game Theory for Applied Economists*. Princeton, NJ: Princeton University Press, 1992.
- Mincer, Jacob. "Investment in Human Capital and Personal Income Distribution," *J. of Political Economy* 66(August 1958): 281-302.
- The Economist*. "Fat Cats Feeding: Special Report on Executive Pay," in *The Economist*. (October 11, 2003): 64-66.
- Schumpeter, Joseph. *Capitalism, Socialism and Democracy*. NY: Harper & Row, 1976 (reprint of 1950 edition).
- Weber, Max. *The Protestant Ethic and the Spirit of Capitalism*. NY: Translated by Talcott Parsons. Charles Scribner's Sons, 1958.

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<sup>4</sup> Even without the introduction of luck this claim has serious problems. If one assumes that much of the production of the economy is due to team activity, than one must ask the question of how the returns to the team production are distributed among the team members. Generally, the allocation of awards among any set of factors engaged in joint production is fairly arbitrary, although some scholars argue that efficient effort in a team organization requires that an agent who claims the residuals or profits of the enterprise monitor the team to prevent reduced effort (shirking) (Alchian and Demsetz).