CHOICES
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A Statement from the Editors

Welcome to our tenth issue of *Choices* (Q4 2006).

In this issue of *Choices,* we offer two collections of papers. One theme covers the topic of setting the stage for the next farm bill, by updating the justification for farm programs, reviewing policy issues likely to affect the 2007 Farm Bill, projecting the effects of continuing the 2002 Farm Bill with less spending, and examining new program options based on land stewardship programs. The other theme addresses changes in fresh produce marketing and small farms'/firms' response strategies in order to remain competitive, profitable, and economically viable in this changing market. This issue also contains articles on obesity lessons from Japan and on formula versus grant-based funding for agricultural research.

Look for future issues where we plan coverage on Immigration and U.S. Agriculture, Export-Led Food Quality, Animal Identification, and Returns to Research and Extension. See our thematic coverage page at www.choicesmagazine.org for a complete list and planned schedule.

In light of the AAEA Board's decision regarding Choices' funding and the uncertainty as to whether another funding source will allow continuation, the editors will no longer accept new thematic proposals. Our schedule is full through June 2007 when our editorship ends. Proposals

Choices is the outreach vehicle of the American Agricultural Economics Association (AAEA) and is designed to provide current coverage regarding economic implications of food, farm, resource, or rural community issues directed toward a broad audience. *Choices* publishes thematic-oriented groupings of papers and individual papers. The broad themes we will repeatedly visit in *Choices* are agriculture and trade, resources and the environment, consumers and markets, and agribusiness and finance. Submitted manuscripts are subject to peer review for publication consideration.

Choices is published at the end of each quarter of the year by the American Agricultural Economics Association. Visit our web site at http://www.choicesmagazine.org.

Editorial Communications

Potential manuscripts, thematic proposals, and comments can be submitted through http://www.choicesmagazine.org/submissions.htm or directly emailed to the editors at Choices@ag.tamu.edu. Editorial communications can be sent to Choices@ag.tamu.edu.

currently in process will be moved through to publication. This policy will continue unless funding conditions change. Grab bag submissions will continue to be processed until all issues through June 2007 are full and we still have room. We encourage you to submit single articles for the "Grab Bag" section of *Choices*. For submission requirements, see http://www.choicesmagazine.org/submissions.htm.

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Washington Scene

Coordinated by Joe L. Outlaw, Co-Editor, *Choices*

As we begin 2007, the landscape in Washington has changed dramatically. The November elections have "flipped" the Congress in terms of the party in control. The 110th Congress will convene with the Democrats having more than a 30-seat advantage in the House of Representatives and a 1-seat advantage in the Senate.

The last few days of the Republican-led 109th Congress were busy with a late night session that saw a number of bills completed prior to adjourning. A number of popular expiring tax breaks were extended, including a deduction for college tuition, a deduction for state and local sales taxes in states without income taxes, and the corporate-tax credit for research. However, at least one thing that did not happen – failure to pass the majority of appropriations bills that fund the government was left for the new Congress to handle. Only two appropriations bills were completed before Congress adjourned. Incoming Democratic appropriations committee leadership have indicated that they will pass a continuing resolution (referred to in Washington as a CR), when the current CR expires February 15th, that will fund the government at last year's levels to cover the remainder of the fiscal year through September 30th.

Other than funding the government, one of the early priorities for the Democratic-controlled 110th Congress will be an attempt at an ethics overhaul. Many point to the often used Democratic election slogan of the "Republican Culture of Corruption" (along with the Iraq War) as the primary reasons for the outcome of the November elections. These types of statements have been made before with little or no change – regardless of who is in control of Congress. So what is expected to happen? There is going to be an attempt to sever the ties between lawmakers and lobbyists. There have also been hints at restricting the use of corporate jets and tightening the rules on gifts and travel by lobbyists. There will also be an attempt to provide more transparency for Congressional earmarks by requiring the sponsor's name to appear next to the project in the appropriations bill.

Farm Bill

The next farm bill will be written in a new political setting with less money available for programs. The March 2007 CBO Baseline (with adjustments, if any, from the budget resolution) will be used to score the 2007 Farm Bill. At this point, it appears that commodity prices are projected to be sufficiently high and that there will be less money being spent on current programs, which leaves less money for the new farm bill. Like most committee chairmen, the wish lists of the incoming House and Senate Agricultural Committee leadership each expand current programs (CSP and energy) or enact new ones (permanent disaster assistance) – both of which will require more money. That calls into question what has to be cut to fund the new priorities. Farm bill discussions are expected to begin in earnest by the spring, but most observers are waiting to see how much money will be in the baseline.

Doha Round

At this time last year, the Doha Round was in a serious stage as far as needing progress. Currently, talks have been suspended with only a few countries trying to get the round moving forward again. The Doha Round isn't dead, but there really isn't much time left to get an agreement prior to Trade Promotion Authority (TPA) expiring for President Bush in July 2007. There has been some talk about extending TPA if an agreement appears eminent.

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Domestic Farm Policy for 2007: Forces for Change

by Stephanie Mercier and Vince Smith

JEL Classification: Q18

The fundamental political rationale of U.S. farm policy, to support and stabilize the incomes of family farmers, has been embodied in farm bills since the early 1930s. U.S. agriculture has changed dramatically since the Great Depression in ways that matter from the perspective of policy makers. In the 1930s, farm household incomes and wealth were lower on average than nonfarm household incomes and wealth. In 2006, that situation has reversed. In the 1930s, the average farm size was much smaller than in 2006, both in land area and value of sales. The types of products being produced were also far less diverse. In the 1930s, more than 75% of all farms raised commodity program crops such as corn and wheat. Today, only about a quarter of all farms grow such crops. In the 1930s, agricultural resource policy was focused on enhancing farmland productivity. In 2006, preserving natural resource attributes of that farmland is also a major policy concern.

These changes in structure and focus have created substantive policy issues. Some ideas, such as imposing tighter limitations on government payments to individual farms and proposals to target assistance more towards low income households, have been sources of controversy for several decades. Other issues, such as expanding the scope of government support to be provided to other commodities, including fruits and vegetables and livestock, are relatively new concerns. All are in play in the context of current debate over the likely shape of the 2007 Farm Bill. In addition, since 1994, U.S. farm policy has been constrained to some degree by the U.S. Government's commitments under the Uruguay Round Agreement on Agriculture (URAA), as implemented through the World Trade Organization (WTO). Further, funding for farm programs, and therefore the scope and structure of those programs, are contingent on the status of the federal budget during the period in which a new farm bill is debated. The next farm bill is also likely to reflect broader societal interests, with particular attention paid to the environmental and energy impact of farm policy.

Budget Issues

When legislators have been faced with substantial federal budget deficits, as in the 1990s, many farm programs have been cut back or eliminated. In contrast, the 2002 Farm Bill was developed in a brief era of budget surpluses when funding was much less constrained. The March 2001 budget baseline released by the Congressional Budget Office (CBO) projected a $5.7 trillion budget surplus in the federal budget over the period 2002-2011. In this environment, farm state members of Congress were able to obtain $73.5 billion of additional funding for the 2002 Farm Bill. The August 2006 CBO baseline assessment paints a very different picture, projecting a ten-year cumulative deficit of $1.8 trillion.

Moreover, this official or 'status quo' CBO baseline projection does not account for the potential extension of expiring tax cuts after 2010, changes in the Alternative Minimum Tax to reduce its adverse tax impacts on middle-class Americans, and the cost of a continuing military role in Afghanistan and Iraq. A separate CBO analysis, which accounted for these impacts, results in annual budget deficits averaging more than $500 billion over the next ten years. In addition, the increase in the national debt implied by these deficits will raise federal debt service interest costs. In this fiscal environment, framers of the next farm bill are likely to have to work with no more than current baseline funding, and conceivably less (Figure 1).

Under the budget resolution for fiscal 2006, the House and Senate Agriculture Committees were required to cut

spending by $3 billion over five years, along with similar cuts required for other Congressional Committees. For agriculture, the largest cuts were in commodity and conservation programs and agricultural research funding. For reconciliation, CBO projected that spending for all mandatory farm programs (including food stamps) over the five-year period 2006-2010 would be $278 billion. Since the effort to make cuts in the fiscal 2006 budget was successful, Congress is more likely to repeat the exercise in the future, further reducing funding for the 2007 Farm Bill.

The Farm Security and Rural Investment Act of 2002 consisted of ten separate titles. These included commodity and conservation programs, trade (including food aid), nutrition, farm credit, rural development, agricultural research, forestry, renewable energy, and miscellaneous issues. Under the August 2006 CBO baseline, spending on farm bill programs (other than nutrition programs) is expected to be about $195 billion over the ten-year period beginning in 2008.[1] Proposals for new programs or modifications to current programs in the 2007 Farm Bill will likely have to fit within the baseline funding level to be projected by CBO in March 2007.

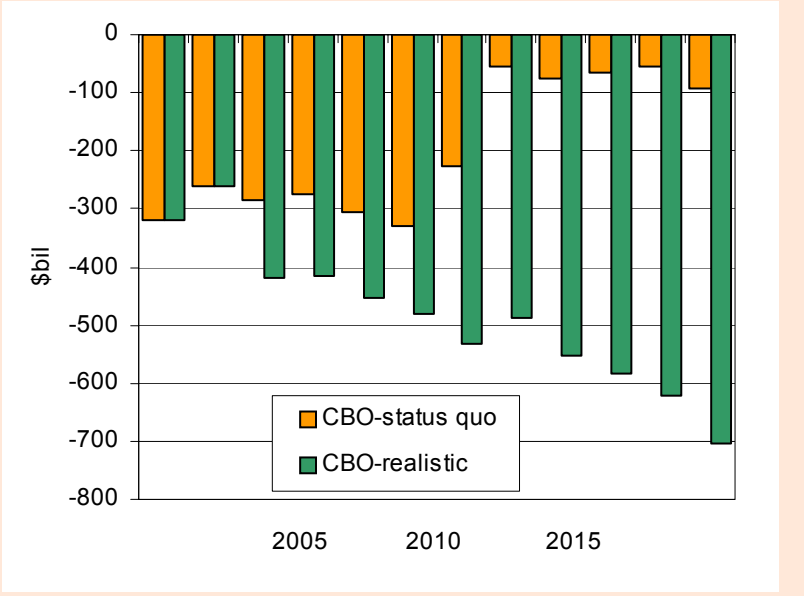

Figure 1. U.S. budget projections, 2007-2016.
Source: CBO budget baseline, August 2006.

Changing Demographics

Farm bills are not written in a vacuum. Although farmers and rural communities are the direct beneficiaries of farm programs, the interests of other groups also matter in the current political environment. In the U.S. House of Representatives, agricultural interests are not the force they once were. Every decade, seats are reallocated to states on the basis of new Census population estimates and Congressional District reapportioned by state legislatures. Over the last 50 years, the regions in which agriculture is economically important have shrunk significantly. An analysis by USDA's Economic Research Service (ERS) shows changes in farming-dependent counties between 1950 and 2000.[2] In 1950, farming-dependent counties were located in nearly every state. By 2000, these counties had dwindled in number and had become concentrated in a belt 1-2 states wide stretching from eastern Montana to the Texas panhandle.

The political implications of this demographic shift are important. Data from the 2002 Census of Agriculture indicate that among all Congressional District (representing an average of 646,000 residents), fewer than half contain more than 1,500 farmers. Thus, only a minority of members in Congress have substantial farm-based constituencies that are committed to maintaining funding for federal farm programs. Moreover, the proportion of families in the United States directly involved in farming has become very small, about 2% of the population. Most Americans have no, or only distant, connections with agriculture as a source of income and a way of life.

Many members of the general public who do hold opinions on U.S. farm policy base their views on information from the mass media, which is often critical of the distribution of farm program funds. For example, in 2001, data on farm program payment recipients disseminated by the Environmental Working Group sparked public interest and debate about whether wealthy farmers with large operations should receive substantial annual government pay-

1. *The current CBO baseline runs for 2007-2016. The $195 billion figure extrapolates spending trends for 2017, the last year of a ten-year baseline for a 2007 Farm Bill, excluding food stamp spending.*

2. *ERS defines farming-dependent counties as those with at least 15% of income from farming.*

ments. An amendment to sharply limit payments was added to the Senate version of the 2002 Farm Bill, but dropped from the final legislation at the insistence of conferees from the House Agriculture Committee. This issue has already resurfaced in discussions about the 2007 Farm Bill, but faces opposition from commodity groups, especially rice and cotton producers in California and the South, which include most recipients of large payments because of the structure of their farms.

The Evolving Structure of Political Interest Groups

The politics of agricultural policy have generally become more complicated over the past two decades. Arguably, the major commodity policy elements of the 1985 Farm Bill were framed to address the concerns of feed grains, cotton, rice, soybean, sugar, wool and mohair and wheat producers along with environmental interest groups concerned about conservation. Among livestock producers, dairy operators with a price support program to preserve were probably the most active participants in the policy process. Players in the current debate over the future of farm programs are more numerous. In the last Farm Bill, along with the producers of traditional program commodities and sugar and dairy, growers of minor oil seeds and pulse crops sought and acquired loan rates for their crops. They too have a stake in maintaining loan rate programs or negotiating other means of support if loan rate benefits were to be reduced.

In addition, producers of fruits and vegetables have become actively engaged in the 2007 policy debate. This is partly because of the increased importance of the federal crop insurance program as a source of subsidies and risk management for these commodities. Beef cattle producers also have recently become involved in crop insurance debates as new policies covering grazing land and livestock price risks have been introduced.

Advocates for low income household programs such as food stamps and school lunches and breakfasts are also participants in farm bill debates, although child nutrition programs are usually handled in separate legislation. Further, in addition to environmental interest groups, advocates for renewable energy production are now active advocates for certain farm bill programs. Given the recent sharp increases in oil prices and the resulting expansion of interest in renewable fuels, lobbyists for the ethanol and biodiesel industries may be effective voices in the writing of the next farm bill. These groups seek energy-related incentives or mandates aimed at increasing domestic demand for major commodities such as corn and oilseeds and reducing exportable surpluses. Energy programs that increase domestic consumption of grains may also be viewed benignly by other countries and could therefore resonate with legislators.

Other groups without a direct stake in agriculture are also seeking to be heard in the policy process. Humanitarian groups such as Oxfam America are raising questions about the adverse impact of U.S. farm programs on farmers in developing countries. Some conservative or libertarian groups, such as the Cato Institute and Heritage Foundation, assert that farm programs represent corporate welfare and should be ended.

Inertia is also an important factor in policy formation. Gary Becker pointed out that major policy shifts tend to occur only when the economic and political benefits of change outweigh the costs. The increased income flow from farmland resulting from most U.S. commodity policies has led to an increase in the value of U.S. farmland over time. Ending some of these programs or reducing the subsidies they provide will inevitably lower land values, with concomitant impacts on farm wealth. By some estimates, for example, abandoning loan rate programs and direct payments could reduce prices for agricultural land in several states by 20% or more. Farm interest groups are deeply concerned about such effects, and policy makers, therefore, have to be conscious of the impacts of proposed policy changes on land prices in evaluating the 2007 Farm Bill.

Implications of the WTO Agreements for the 2007 Farm Bill

For the first time, under the terms of the 1994 URAA, agricultural policies that affect trade were to be subject to an agreed set of international rules. The URAA also introduced new and binding procedures to resolve disputes between member countries over whether specific trade policies were consistent with WTO obligations. Previously, individual member countries had been able to block the implementation of panel findings.

In September 2002, the government of Brazil filed a landmark case against the U.S. Government's cotton support programs, the first in which one country claimed that another country's domestic support programs were incompatible with that country's WTO obligations. Several important elements of Brazil's claims were supported by a WTO panel's rulings in August 2004 and were subsequently upheld by the WTO appellate body in March 2005. The WTO

panel found that the United States had forfeited protection under the peace clause of the URAA by spending more each year on domestic support for cotton between 1999 and 2002 than in 1992, the benchmark year.[3] Further, U.S. price-related support programs had depressed prices in the world cotton market. The WTO panel therefore determined that the U.S. government must modify or eliminate those programs. The panel also found that the Step 2 cotton program and U.S. export credit guarantees were export subsidy programs, and should be modified or eliminated.

In response, the U.S. Government took some steps to bring the relevant programs into compliance. USDA modified the operation of the export credit program by issuing new regulations, basing fees that countries must pay on the risk of nonrepayment of loans made under the program. The Step 2 cotton program was terminated August 1, 2006, Congress having let the program complete the 2005 marketing year.

The WTO panel report offered no further guidance on U.S. compliance. However, Congress may also need to make changes to domestic price-related programs, chiefly the marketing assistance loan and countercyclical payments (CCPs), to comply with the panel's findings. In addition, current limits on the use of land for the production of fruits and vegetables associated with the direct payment program may have to be modified. Within policy circles, Congress is expected to incorporate any changes it deems necessary into the 2007 Farm Bill and, for reasons of political balance, will likely make similar changes to programs for all crops, not just cotton.

Since November 2001, WTO member countries have also been engaged in agricultural negotiations in the Doha Round, aimed at further reductions in domestic support, improved market access, and elimination of export subsidy programs, in addition to reforms in trade in services and market access for manufactured goods. However, in July 2006 negotiations appeared to collapse, mainly over gaping differences between the United States and other countries such as India and the European Union with respect to agricultural provisions, and negotiations were formally suspended. There is widespread agreement that Trade Promotion Authority (TPA) for the President is a necessary prerequisite for any new WTO agreement to insulate legislation to implement the agreement from Congressional amendments. Current TPA legislation expires July 1, 2007, and there is no guarantee it will be renewed beyond that date. Thus, the Doha Round of WTO negotiations may have very few implications for the 2007 Farm Bill. However, some farm groups are advocating an extension of the 2002 Farm Bill for a few years until the Doha Round can be completed. Under those circumstances, the 2007 Farm Bill could have a very short lifetime, and significant policy change could come in response to a delayed Doha Round Agreement.

U.S. negotiators did submit a substantive proposal to the WTO on agricultural reform in October 2005, whereby the United States would reduce the ceiling for its trade-distorting domestic programs from $19.1 billion annually under the URAA by 60%, to a maximum of $7.6 billion annually. Had the U.S. proposal been adopted, the U.S. Government would have obligated itself to make changes in many of the programs that make up the farm safety net. Congress could respond to such constraints in three ways: 1) simply cut program spending, 2) transfer a portion of spending into direct payments while maintaining a reduced farm safety net within the new caps, or 3) undertake a fundamental shift from price-related support to decoupled, 'green box' programs, including those which address broader societal objectives such as conservation and rural development. Whether these policy reform proposals will now receive much attention in the 2007 Farm Bill debate is much less clear, although budgetary pressures may be an important driving force for some changes in these areas.

In the current policy mix, the U.S. Government provides a portion of support to farmers through green box programs that are deemed to be minimally trade-distorting, including direct payments and conservation payments. Other U.S. green box programs support development of infrastructure or improved economic opportunities through rural development initiatives and agricultural research programs. To compensate for potential reductions in price-related subsidies resulting from the Brazil cotton case or a resuscitated Doha Round, the United States could choose to expand funding for these programs, while phasing out or substantially reducing domestic subsidies provided by the marketing loan and countercyclical payments programs. Concerns have been raised about the use of decoupled direct

3. *The peace clause is contained in Article XIII of the URAA, and exempted countries from actions against their domestic agricultural policies under other Agreements if support remained below the level provided in 1992. It expired in 2004.*

payments by some farm groups. These groups have argued that a substantial proportion of all direct payments accrue to 'absentee' land owners who are not involved in farming. Second, such payments drive up land values and land rents. Finally, because direct payments are not linked to production–the very characteristic that makes them tenable under current WTO rules–many legislators and the general public could perceive them to be analogous to welfare checks. This perspective, some farm groups suggest, could make direct payments vulnerable to Congressional reduction in periods of fiscal constraint.

Other Free Trade Agreements

While the Bush Administration has undertaken the negotiation of 11 free trade agreements (FTAs)–six in force and five still underway–no FTA has directly obligated the U.S. Government to make changes in domestic farm programs. In fact, U.S. trade negotiators have steadfastly resisted such commitments, reserving domestic policy issues for multilateral negotiations within the WTO. However, providing increases in market access for FTA partners for products that are protected by the use of tariff-rate quotas incrementally reduces the effectiveness of U.S. price support programs for commodities such as sugar and dairy. These indirect effects led the U.S. sugar industry to unsuccessfully oppose the Central American FTA in 2005, fearing a long-term degradation in their support system if more market access is provided in future FTAs.

Conclusions

The 2007 Farm Bill will be developed in a very different political environment than the 2002 Farm Bill. In 2002, Congress and the Administration were enjoying the flexibility in policy making provided by substantial federal budget surpluses. The 2007 Farm Bill will be developed in the context of official federal budget deficits on the order of $300 billion per year, or about 2% of current Gross Domestic Product. Past budget proposals indicate the Administration is willing to support some reduction in funding for agricultural commodity programs; this perspective resonates with many members of Congress.

Federal budgetary constraints are also being reinforced by some recent developments with respect to the obligations of the United States under its WTO commitments. Specifically, the recent WTO Dispute Resolution determination in the Brazil cotton case, that several elements of U.S. cotton programs violate U.S. commitments under the 1994 Uruguay Round Agreement, raises similar questions about U.S. programs for other commodities such as corn, oilseeds, and wheat. Price supports and the level of funding for subsidies derived from marketing loan programs and CCPs have all been brought into question. The Brazil case findings have even raised questions about the validity of direct payments to producers of program commodities under the WTO. The U.S. responses to the Brazil Cotton Case findings, including actions already taken and those that may yet occur, and the U.S. WTO proposal in 2005 to cut amber box payments by 60%, reflect both the domestic budgetary and WTO-related pressures for changes in the structure and funding of farm programs.

Other pressures may also come into play. Domestic agricultural commodity groups may resist changes in the funding and structure of farm programs that adversely affect farm incomes, farm household wealth, and farmland values. Changes in farm programs that fail to largely maintain the benefits currently accruing to the agricultural sector would be resisted by most farm groups. Within the agricultural sector, however, a broader array of interest groups is likely to be involved in the policy process because livestock producers and growers of fruits and vegetables now have a more direct stake in a range of federal programs, including conservation, crop insurance, trade promotion, and agricultural research. Environmental and wildlife groups will also seek to maintain and expand conservation programs that improve environmental amenities in rural areas. In the face of recent spikes in energy prices, a wide range of groups seeking to reduce reliance on imported petroleum may seek additional incentives or research funding for processing agricultural commodities or new dedicated energy crops into biofuels.

This mix of budgetary concerns, political commitments under the WTO, and the broadening of issues to be encompassed in agricultural policy raise an intriguing possibility. While funding for agricultural commodity programs is almost certainly not going to be expanded and most likely will be somewhat reduced, the potential for substantial changes in the structure of U.S. farm programs genuinely exists. Major changes could be made to the marketing assistance loan programs and other programs that are linked to domestic production. However, farm state members of Congress will be reluctant to approve substantial reductions in funding for programs that support farm incomes. Therefore, major reductions in existing programs are likely to be offset by expan-

sions of other existing programs or introduction of new programs that fall into the WTO green box category of agricultural support programs. The results of all of these factors, some of them with pressures moving in opposite directions, could make for a very lively 2007 Farm Bill debate.

For Further Information:

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What Happens if You Try to Run Current Farm Programs on a Tighter Budget?

by Pat Westhoff and Scott Brown

JEL Classification: Q11, Q18

Congress gave the committees writing the 2002 Farm Bill permission to increase farm program spending by billions of dollars per year. The committees writing the next farm bill are unlikely to have the same luxury.

Since the beginning of the 2002 Farm Bill debate, the federal budget has gone from surplus to deficit. In early 2006, Congress passed a deficit reduction bill that reduced estimated U.S. Department of Agriculture spending by $2.7 billion over the next five years. Unless the budget picture significantly improves, Congress could face pressure to make further cuts in spending on farm and other programs.

Trade agreements are also a factor in writing future farm legislation. Under existing World Trade Organization (WTO) rules, Brazil successfully challenged particular aspects of U.S. cotton programs. In the Doha Round of WTO negotiations, there was general agreement that certain types of producer support should face tighter limits. Those talks were suspended in 2006, in part because of a dispute over just how tight the limits on domestic support should be.

Current Farm Programs with Less Money

Budgetary and WTO considerations are certain to be important in the next farm bill debate, but it is too early to predict the precise shape of new legislation. Congress could examine a wide variety of options, including some radical departures from current programs. The one option Congress seems almost certain to consider is a simple extension of current farm programs, perhaps with minor changes required to address budgetary or WTO concerns.

What might such a "status quo minus" approach mean for U.S. agriculture? We examine three policy options to reduce government farm program spending:

1. a 22.2% reduction in direct payments (DPs),
2. a 47.1% reduction in countercyclical payments (CCPs), and
3. a 38.0% reduction in marketing loan benefits (MLBs—loan deficiency payments and marketing loan gains.

Assuming that changes are implemented effective with the crop harvested in 2008, we estimate that each of these options would reduce government farm program spending by a total of $5 billion over fiscal years 2008-2012.

Baselines and Analysis Approach

The point of comparison for the analysis is the 10-year stochastic baseline prepared by the Food and Agricultural Policy Research Institute (FAPRI) based on information available in January 2006 (FAPRI, 2006a). The stochastic baseline is a set of 500 possible outcomes for U.S. agricultural commodity markets. These outcomes share the common assumption that current farm policies remain in place, but make different assumptions about the weather and other factors affecting supply and demand.

DPs are fixed and total $5.3 billion per year. In contrast, CCPs and MLBs depend on market prices—the lower the market price, the greater the payments. Based on Farm Service Agency reports, FAPRI estimates that annual CCPs averaged $2.9 billion, and MLBs averaged $3.5 billion over the 2002-2005 period.

The stochastic baseline projects modest increases in prices for most major crops that reduce average spending on CCPs and MLBs. For example, average corn prices in the stochastic baseline rise from less than $2.00 per bushel in the 2005/06 marketing year to over $2.40 per bushel by 2010/11. Across the 500 baseline outcomes for the 2008-2012 crop years, baseline CCPs average $2.7 billion per

year, and MLBs average $2.5 billion per year. In many of the stochastic outcomes, prices are high enough that there are no MLBs or CCPs; in other outcomes, low prices result in very large payments.

Some suggest that rapid growth in production of ethanol is likely to result in strong growth in prices for corn and other commodities. A short-term baseline update, prepared in July 2006 (FAPRI 2006b), projected higher prices than in the stochastic baseline used for this analysis. All else equal, higher average market prices would reduce estimated CCPs and MLBs—and would suggest that larger proportional cuts would be required to achieve a certain level of budgetary savings relative to the baseline.

One way to achieve the assumed reductions in payments would be to make appropriate adjustments to target prices, loan rates, and direct payment rates. Instead, this analysis assumes that those measures remain unchanged at 2002 Farm Bill levels, but that USDA would be instructed to withhold a proportion of each payment otherwise due to producers. This approach could raise implementation issues ignored in the analysis. For example, producers could choose to forfeit on commodity loans if marketing loan benefits are insufficient to compensate producers for market prices below the loan rate.

Government Spending by Commodity

By design, each of the three options would reduce average government farm program spending by $5 billion over a five-year period (fiscal years 2008-2012). In each scenario, the proportional cut in a particular type of payment is the same across all commodities. As shown in Table 1, however, the impacts on government spending on each commodity differ greatly across the options.

Table 1. Impacts on government outlay.

	Cut Direct Payments	Cut Counter-Cyclical Payments	Cut Marketing Loan Benefits
	(billion dollars, 2008-2012 total)		
Corn	-2.00	-1.68	-1.24
Wheat	-1.08	-0.44	-0.11
Soybeans	-0.58	-0.36	-1.38
Upland cotton	-0.58	-1.92	-1.40
Rice	-0.40	-0.22	-0.37
All other	-0.36	-0.38	-0.52
Total outlays	-5.00	-5.00	-5.00

In the case of direct payments, the results are fairly simple. Corn accounts for approximately 40% of total direct payments in the baseline. Reducing direct payments has only very limited effects on market prices, countercyclical payments, and marketing loan benefits. Corn, therefore, accounts for about 40% of the overall estimated savings, or about $2 billion over the five-year period. Wheat cost savings exceed $1 billion over the same period, with soybeans, rice, cotton, and all the other program crops sharing the remaining $2 billion in cuts.

The picture is more complicated in the scenarios that cut countercyclical payments and marketing loan benefits. First, the baseline level of spending on each commodity is sensitive to market price projections. Second, changes in CCPs and MLBs have larger effects on commodity production and prices than changes in DPs. For example, if reduced MLBs result in acreage shifting out of cotton and into wheat, the resulting changes in prices will affect MLBs and CCPs for both commodities.

The three scenarios have very different impacts on spending for particular commodities. Consistent with differences in baseline spending, wheat outlays are far more sensitive to proportional cuts in DPs than to the corresponding reductions in CCPs and MLBs. Cotton spending is particularly affected by cuts in CCPs, and soybean spending is most affected by changes in MLBs. For both corn and rice, proportional cuts in DPs have slightly larger average impacts than proportional cuts in other payments.

Producer Returns

Reducing government payments reduces estimated per-acre returns (Table 2). For corn, a 22.2% reduction in DPs would reduce annual government payments per base acre of corn by more than $5. Changes in direct payments have only minimal effects on corn production and prices, so the market value of corn production, CCPs, and MLBs are all largely unaffected. For a producer with one acre of corn base for every acre of corn harvested, annual per-acre income would be reduced by a little over $5 per acre.

Limiting CCPs and MLBs would have no effect on payments if prices are high, but could have very large impacts if prices are low. If CCPs are

Table 2. Impacts on producer returns.

	Cut Direct Payments	Cut Counter-cyclical Payments	Cut Marketing Loan Benefits
	(dollars/acre, 2008-2012 average)		
Corn			
Market value	0.18	0.39	0.17
Payments	-5.49	-5.05	-3.59
Sum	-5.31	-4.66	-3.41
Soybeans			
Market value	0.15	0.01	0.42
Payments	-2.63	-1.96	-4.74
Sum	-2.48	-1.95	-4.32
Wheat			
Market value	0.13	0.14	-0.12
Payments	-3.42	-1.35	-0.46
Sum	-3.29	-1.22	-0.58
Upland cotton			
Market value	0.07	1.78	3.80
Payments	-7.65	-30.29	-20.61
Sum	-7.58	-28.51	-16.81

Notes: Market value and loan benefits are reported per harvested acre. Direct and countercyclical payments are reported per base acre. Total payments and the sum of payments and market value are reported per harvested base acre. For individual producers and the country as a whole, base area and harvested area differ significantly.

reduced by 47.1%, annual corn CCPs are reduced by approximately $5 per corn base acre, averaging across the 500 stochastic outcomes. The reduction in CCPs would cause a slight reduction in corn production and increase in corn prices, and these changes would result in a very slight increase in the value of corn production and an even smaller reduction in loan program benefits. The net effect of these changes is to leave average corn producer returns down relative to the baseline by slightly under $5 per harvested base acre.

Reducing MLBs by 38.0% reduces corn MLBs and has modest effects on the market value of corn production and CCPs. Overall, corn producer returns decline relative to the baseline by a little over $3 per harvested base acre. Note that these producer return estimates for corn are consistent with the estimates of government spending—reducing DPs has the largest effect on corn producers, followed closely by reductions in CCPs, with reductions in MLBs having the smallest effects.

The patterns for other crops are also consistent with the government expenditure results. For soybeans, restrictions on MLBs have the largest net effects on producer income, while limitations on DPs are of greatest importance to wheat producer income, and reductions in CCPs have the largest impacts on cotton producer income. In all cases, changes in the market value of production are small relative to the changes in government payments.

An important note of caution is in order: for sake of simplicity, the reported calculations of per-acre returns assume producers have one base acre of the commodity in question for every acre they harvest. This is not the norm. For the country as a whole, base acreage for wheat, corn, and upland cotton exceeds harvested area, while the reverse is true for soybeans. On particular farms, there may be little or no correlation between the current crop mix and the base acreage used to determine DPs and CCPs.

Market Impacts

Reducing government payments has important impacts on producer income, but has only modest impacts on crop production and prices (Table 3). Market effects are especially small when DPs are reduced. DPs do not require production of any particular crop, or even of any crop at all, and the payments are unaffected by changes in market prices. One minor restriction is that DPs are not available if base acreage is used to produce fruits, vegetables, or dry beans. Economists differ in their estimates of just how much such largely "decoupled" payments affect production choices, but most would agree that any production effects of such payments are likely to be smaller, on a dollar-for-dollar basis, than effects of payments that are more closely tied to production or prices.

Reducing CCPs has only slightly larger impacts on production and prices. Like DPs, CCPs are not tied to production of particular crops or even of any crop at all. However, CCPs are affected by changes in mar-

ket prices—within certain ranges, lower season-average prices translate into larger CCPs. As a result, CCPs may play a price insurance role not played by DPs, and thus might be expected to have slightly larger impacts on production. Only in the case of cotton (the crop most dependent on CCPs) does estimated acreage change as much as 1% when CCPs are reduced by 47.1%.

MLBs, in contrast, are only available on actual production. Because producers have to harvest the crop to get MLBs, it seems reasonable to expect that changes in MLBs would have larger impacts on crop production patterns than changes in DPs or CCPs. When MLBs are reduced, estimated acreage declines for crops most dependent on MLBs in the baseline—cotton and soybeans—but actually increases slightly for wheat, the major crop least dependent on MLBs in the baseline. Note that even though cotton producers are more dependent on CCPs than MLBs, estimated effects of reductions in MLBs on cotton acreage are larger than the estimated effects of reductions in CCPs.

Even in the case of reduced MLBs, the main effect of reduced payments is to encourage producers to shift production from one crop to another, rather than to reduce the overall amount of land used for crop production. Total acreage devoted to production of 12 major crops only declines by a little over 0.1% when MLBs are reduced by 38.0%.

Net Farm Income

Policy changes that reduce government spending by $5.0 billion over fiscal years 2008-2012 are estimated to reduce net farm income by $3.3 billion to $3.9 billion over calendar years 2008-2012 (Table 4).

Table 3. Impacts on acreage and prices.

	Cut Direct Payments	Cut Counter-Cyclical Payments (2008-2012 average)	Cut Marketing Loan Benefits
Corn			
Acreage	-0.01%	-0.07%	-0.02%
Prices	0.05%	0.11%	0.05%
Soybeans			
Acreage	-0.03%	0.04%	-0.08%
Prices	0.06%	0.00%	0.18%
Wheat			
Acreage	-0.13%	-0.10%	0.27%
Prices	0.08%	0.09%	-0.08%
Upland cotton			
Acreage	-0.04%	-1.00%	-2.18%
Prices	0.01%	0.38%	0.82%
12 crops*			
Acreage	-0.06%	-0.11%	-0.12%

*Corn, soybeans, wheat, upland cotton, rice, sorghum, barley, oats, sunflowers, peanuts, sugar beets, and sugarcane.

As discussed, the three options to reduce government spending have only small impacts on crop production and prices, so it should not be surprising that crop and livestock receipts are largely unaffected. What may be surprising is that the reported changes in government payments significantly exceed the $5 billion change in government outlays. This occurs primarily because of differences between the fiscal years used to measure farm program spending and the calendar years used to report net farm income. Payments made between October 1 and December 31, 2012 would affect net farm income for calendar years 2008-2012, but not farm program spending for fiscal years 2008-2012, a period which ends on September 30, 2012. This seemingly arcane point may be more important than it seems, as budgetary rules require Congress to stay within spending limits over a specified period of fiscal years, not calendar years.

Reductions in payments do not have a dollar-for-dollar effect on net farm income. Smaller government payments reduce the value to producers of rented farmland, so over time one would expect rental payments to nonoperator landlords to adjust. In other words, at least part of the impact of lower government payments is absorbed by landlords. Other production expenses also decline in response to lower payments.

Table 4. Impacts on net farm income.

	Cut Direct Payments	Cut Counter-Cyclical Payments	Cut Marketing Loan Benefits
	(billion dollars, 2008-2012 totals)		
Crop receipts	0.04	-0.06	-0.19
Livestock receipts	0.02	0.03	0.07
Gov't payments	-5.33	-5.68	-5.11
Sum of above	-5.27	-5.70	-5.24
Rental payments	-1.44	-1.42	-1.29
Other expenses	-0.36	-0.58	-0.90
Total expenses	-1.80	-2.00	-2.19
All other net income	-0.17	-0.16	-0.23
Net farm income	-3.64	-3.86	-3.27

WTO Considerations

WTO considerations could also have important impacts on the design of new farm legislation. In response to a WTO ruling on a case brought by Brazil, the United States has already eliminated a program subsidizing the use of U.S. cotton and modified its export credit program. Brazil has argued that further changes in other U.S. farm programs are also required by existing WTO rules.

Before negotiations for a new WTO agreement were suspended, the United States tabled a proposal in October 2005 that would place limits on certain types of producer support programs. The U.S. proposal would have reduced the allowed level of "amber box" support from $19.1 billion per year to $7.6 billion per year. Based on past U.S. reports to the WTO and discussions with U.S. officials, we assume that U.S. amber box support would include government spending on the marketing loan program for grains, oilseed, and cotton, as well as the imputed value to producers of the dairy and sugar price support programs (these values are set by a formula tied to current support prices and past world prices, and generally far exceed actual budgetary expenditures on the dairy and sugar programs).

Whether the United States would have to make changes in farm programs to comply with its proposed limits on amber support is a matter of contention. If market prices are high, marketing loan expenditures are low, and it is conceivable that total U.S. amber box support could fall below the proposed limit with no changes in current policies. However, low prices could translate into large marketing loan benefits that would cause measured levels of U.S. amber box support to balloon.

In 53% of the stochastic outcomes for 2012, the baseline level of U.S. amber box support would exceed the proposed $7.6 billion limit. Reducing DPs or CCPs would have only minimal impacts on this proportion. Reducing marketing loan benefits by 38%, however, would reduce the proportion of outcomes exceeding the U.S.-proposed limit to 37%. One reason the proportion does not decline even more sharply is that imputed support from the dairy and sugar programs makes up a very large share (approximately $6.4 billion) of the total, and the assumed policy changes would have no effect on that estimate.

The U.S. proposal would also redefine "blue box" support to include CCPs, and limit such support to $4.8 billion per year. In 11% of the baseline stochastic outcomes for 2012, CCPs would exceed this proposed limit. Reducing DPs or MLBs would have little or no impact on this proportion, but reducing CCPs by 47.1% would eliminate any possibility of exceeding the proposed cap on blue box support.

If the U.S. proposal were adopted, there could be pressure to place limits on MLBs and CCPs and to make changes in the sugar and dairy price support programs. One practical question could be how one goes about deciding what probability of exceeding support limits is acceptable? If policies would result in support exceeding proposed limits 37% (or 20% or 10% or 5%) of the time given normal variation in market prices, is that sufficient, or are further reductions in support levels necessary?

Other countries have sought deeper cuts in U.S. supports than in the October 2005 U.S. proposal. If the negotiations resume, there is likely to be continued pressure on the United States to put in place strict limits on producer support measures. MLBs and CCPs are especially likely to be under close scrutiny, and even in the case of DPs, some policy changes may be needed to ensure that payments qualify for the "green box" designation that would make them exempt from limits.

Other Scenarios

The discussion here has focused on simple modifications to current farm programs. The last two farm bills have made significant shifts in policy, and it is very possible that the next farm bill may also result in a change in direction.

WTO concerns may encourage at least some consideration of alternative policy directions. The variability in spending on marketing loan and CCP programs complicates efforts to stay within the types of limits on amber and blue box subsidies that have been proposed. Our results suggest, for example, that with a scaled-back version of current policies, the average level of support provided to producers would have to be well below the proposed limits in order to make sure that the limits are not exceeded when prices are lower than anticipated. Likewise, some might examine the sugar and dairy programs to see if there might be a way to provide a similar level of support to producers without such a large charge in terms of amber box support measures.

Purely domestic concerns could also encourage examination of other policy options. For example, some have suggested examining policies that make payments tied to producer revenue shortfalls rather than to market prices. Other groups important in the farm bill debate—ranging from environmental groups to biofuel advocates to budget hawks—are also likely to recommend other policy options. While many options will be considered, current programs are likely to serve as a benchmark, and budgetary and WTO concerns are likely to receive considerable attention in choosing among the alternatives.

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The Evolution of the Rationale for Government Involvement in Agriculture

by Otto Doering and Joe L. Outlaw

JEL Classification Codes: Q18, Q10

Before change can be introduced successfully, we have to know *why* we are where we are today. This is as true of policy as it is of individual behavior. There are a number of suggestions for substantial change in our agricultural policy. Few address up front the issue of whether government should be involved in agriculture. Thinking about the evolution of today's policy may encourage us to dig a little deeper into our objectives for agricultural policy and ask whether we are attempting to reach these most effectively.

Background

The Jeffersonian notion of agricultural fundamentalism was more a rationale for a kind of democratic society rather than a rationale for government involvement in agriculture. This prescribed the maintenance of a population of yeoman farmers who would be the backbone of democracy as small, independent-propertied individuals. The Louisiana Purchase extended the opportunity for the expansion (geographically and in numbers) of this citizenry, while shutting out the British and the Spanish. Government's involvement in agriculture for the first hundred years was largely land policy (Northwest Territories Act and Lewis & Clark expedition, for example) to create a property survey and rights system and settle the central expanse of the country and the land west of the Mississippi. The creation of the extensive public domain through expansion also involved moving these lands into private hands through veterans' programs and homestead acts.

Government also helped create infrastructure – the most notable early example being the Erie Canal, which opened up the middle of the country to export markets in Europe and set the future for New York as the commercial center of the nation. Agricultural interests agitated for public infrastructure that would ease the transport of goods to market. Later came support for railroads, and ultimately the regulation of rail rates to prevent monopoly charges for transport of agricultural inputs and commodities.

In the 1860s, the Department of Agriculture was established and both the Homestead Act and the Morrill Act were passed. All three were critical to the development of agriculture and all three brought benefits to the farmer, providing resources and infrastructure, but not proscribing production. The rationale for these actions was one of helping agriculture prosper and with it the economic development of the country. Monetary policy and trade also became key issues for agriculture.

One early major role of the Department of Agriculture had been seed distribution. However, under Secretary of Agriculture, Wilson (in the early 1900s), the Department became a scientific establishment capable of leading agricultural research. The early 1900s were a golden age for agriculture. From the Civil War, agriculture had suffered through both the nation's business cycles and the extension of agricultural lands and production that constantly drove down prices. In the early 1900s, the frontier closed and industrialization and immigrant population growth surged and increased net demand for agricultural commodities. It is no accident that farmers chose 1909 to 1914 as the base for parity.

Yet, rural agriculture was still disadvantaged relative to urban industry. Teddy Roosevelt's Country Life Commission (1908) looked into the deficiencies of agriculture and country life and the means by which they might be remedied. From this report came rural free mail delivery, the Smith Lever Act and the state experiment stations, and improvements in rural health and education. Whatever

the rationale, the tradition of government involvement in agriculture was still indirect, helping stimulate settlement, defining boundaries and property rights, building transportation and infrastructure, and improving communications, technology, and education. It was not until the great agricultural collapse after the First World War that government, with a rationale born of prolonged depression, began to enter directly into agricultural markets, production, and the livelihood of farmers.

Agricultural prices broke around the world in the summer of 1920. This was a quick end to the bubble of land prices and input costs that had been occurring since the First World War. A national agricultural conference assembled in 1923 that called for economic equality for agriculture (a fair share of the national income) and adjustment of farm production to demand. From 1923 on, farm groups lobbied for government action to relieve rural distress. The McNary-Haugen Bill became the central vehicle for a policy to help agriculture. This policy would allocate a reduced portion of the crop to domestic demand and raise domestic prices, while the "surplus" would go to the export market. Now government is seen in a price and supply determining role. The Agricultural Marketing Act of 1929 put the government in the role of influencing markets with a Federal Farm Board administering a revolving fund of 500 million dollars to loan to cooperatives to store and withhold commodities. This proved to be futile (Benedict, 1953).

By 1933, the exchange value of farm products to industrial goods was 50% of the pre-war average (Davis, 1940, p. 313). The cash economy in rural areas had ground to a halt. When the Roosevelt Administration came to Washington, there was fear that there would be revolution in the countryside if something were not done.

The New Deal prescribed a new role for government involving direct intervention into markets and individual production decisions by farmers. Much of the discussion of the period was about raising rural standards of living to be more comparable to urban standards. This was different from the earlier concept of purchasing parity based on the 1909-1914 relative industrial and agricultural costs and prices.

Chester Davis, in the *1940 Agricultural Yearbook*, set forth a broad view of the range of government actions that affected agriculture in contrast to the narrow view that only Farm Bills affected the sector

> "A nation's agricultural policy is not set forth in a single law, or even in a system of laws dealing directly with current farm problems. It is expressed in a complexity of laws and attitudes which, in the importance of their influence on agriculture, shade off from direct measures like the Agricultural Adjustment Act through the almost infinite fields of taxation, tariffs, international trade, and labor, money, credit, and banking policy" (Davis, p. 325).

Today we can add environmental policy, food safety, and more. These things now set the larger environment for agriculture, and like Paul Volker's decision to stop inflation in the early 1980s, can be the overriding government influence on the sector.

Where does this leave us? The broadening of interests and policy impacts works both ways. Policies that are not thought of as agricultural can have a determining impact on agriculture. In addition, what are thought of as agricultural policies (the "Farm Bill") can exert strong influence on areas beyond the narrow scope of agriculture. As such, these broad aspects become part of the fabric of what happens in agriculture and beyond.

Reviewing the Legislation

A review of the preambles to 14 major pieces of agricultural legislation from 1933 to 2002 (generally those we now refer to as Farm Bills) provides another characterization of the evolution of the rationale for government involvement agriculture. These broadly defined categories of goals – both explicitly stated and/or implicitly implied reflecting programmatic intent as determined by the authors – are portrayed in Figure 1. Generally, the goals (as indicated in Figure 1) are the perceived problems that the programs provided for in the legislation attempted to alleviate. A few broad conclusions can be made from reviewing the goals. First, many of the goals have been consistently addressed over time. Second, there have been very few recent changes in direction other than making agricultural programs more responsive to market forces and promoting agriculture as an alternative source of energy.

Asking Questions about the Rationale

There has only been one attempt in recent decades to determine some national rationale for agricultural policy. In 1994, the staff of the Senate Committee on Agriculture, Nutrition and Forestry prepared for Senator Richard Lugar a set of questions on prospective farm policy that were circulated around the country

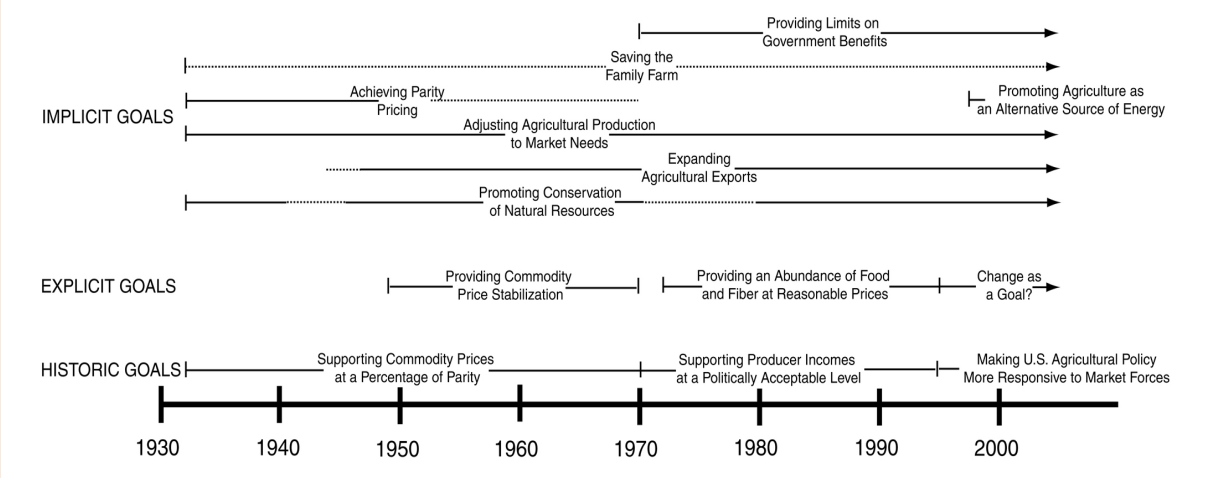

Figure 1. Agricultural policy goals: 1933-present.
Sources: Flinchbaugh and Knutson (2004); The National Agricultural Law Center (2007).

(Schertz & Doering, 1999). Questions were asked about commodity, conservation, export, nutrition, and rural development programs. A summary of these indicates that the attempt was made to ask the question, why do we have the farm policy we do? (i.e., what is the rationale, and are the programs effective in terms of what they purport to do?) The answers the committee received relative to the request were very broad and at least to some degree reflective of the conditions in agriculture at the time. The answers would certainly have been much different if the question had been asked at the height of the record prices in 1995 or at the very low prices realized less than two years later.

The Broad Response to Rationale for Involvement in Agriculture

If one were asked 20 years ago, what is the rationale for U.S. Government involvement in agriculture, a response might have been to increase farm incomes to the levels of urban incomes. Admitting the complication of off-farm income, this objective has been achieved. In addition, "farmers" have more accumulated wealth than their urban cousins, usually in the form of land.

Another response might be a strategic one, i.e., that the nation needs to be self- sufficient in food. Without government involvement, would there still be an abundant food supply, would agricultural exports drop, and would less acres be cultivated? Few seem to be concerned that not enough food would be grown for domestic consumption. However, government involvement of some sort might be justified if food self-sufficiency were a national concern (in spite of the fact we wish other countries to do otherwise so we can increase our exports to them).

There is a strong rationale for government involvement in agriculture to reduce risk from natural causes – drought and flood. We accomplish this partially through subsidized crop insurance and partially through ad hoc disaster payments. There is a rationale for involvement and we are doing it, though probably less cost effectively than we might.

One broad rationale for government involvement under the "reducing risk" heading is the desire to have a stable industry over time. Investments in machinery, buildings, and human capital are relatively large in U.S. agriculture. It would be costly to the sector and to the public, through higher food prices, if there were cycles of capitalization and de-capitalization of these assets over time. This is different from decreases in land values, which the producer (or landowner) bears directly (decreases which farm groups fight to prevent). The banking community also has a large stake in this rationale, especially during times when loans have been based on asset values rather than on the ability to repay, as in the farm financial crisis of the late 1980s.

Price stability is another leg of the "reducing risk" rationale. Traditional farm programs after the 1930s used a "price stability" rationale to boost farm incomes by setting loan rates and later target prices above long-term average prices (contrary to Wallace's "ever-normal granary" concept). Fred Waugh's concern with the use of price stability as a vehicle for increasing farm incomes and the ensuing treasury exposure led him to write an article attempting to show

that price stability was not always best for the consumer (Waugh, 1994). The protection from risk, whether through price supports, direct payments, or insurance, for natural disasters involves a number of rationales for government involvement depending upon where one's interests are – helping beginning farmers, ensuring an inexpensive food supply, keeping farmers on the land, etc. Most have some credence as being in the national interest.

In some ways, agricultural policy and the rationale for it is becoming more closely tied to conservation of the land and the sustainability of agriculture than ever before. While conservation during the dust bowls of the 1930s was a rationale that could stand alone, it also became the vehicle for moving cash into rural areas to meet income needs through payments to farmers for adopting conserving practices and setting land aside. Today, conservation is a strong independent rationale for agricultural policy. The 1985 Farm Bill's cross compliance provision was to enforce basic national conservation standards on those farmers wishing to obtain the risk and income protection of commodity programs. The compliance standards have been reduced and enforcement has proved unpopular so this device has less impact. However, we see that the newer programs for conservation on working lands, EQIP, CSP, etc., reflect a public concern that conservation be a primary rationale for government involvement in agriculture. Programs like the Conservation Reserve Program have brought new supportive constituencies to agricultural conservation – in this case sportsmen and others interested in wildlife habitat, as well as improved water quality.

Nutrition programs are out of the inner circle of what is considered essential to government's involvement in agriculture. If these programs are to remain within the Department of Agriculture, they may have to become more closely linked to the traditional agricultural programs – if for no other reason than their political importance to these programs. The photos in most Congressional offices show the Congressman involved in the school lunch program, not in production agriculture. Food safety is in the same political situation. While nutrition and food safety largely stand on their own, other efforts, like export enhancement and trade liberalization, are intended to increase and/or stabilize the incomes of farmers.

While rural development and things like the FMHA programs remain part of government's involvement, they have not been of major importance since the Great Society. Given the current availability of credit from a variety of sources, there is less argument that a government credit role is as essential as it was in the 1930s. For example, Farmer Mac has not played the role that was envisioned for it and does not appear to be a least cost way to provide a function that may not be essential for government today.

Conclusion

The rationale for government involvement in agriculture has evolved from indirect involvement in the early years of the United States and income parity and the credit availability of the 1930s. Currently, the central remaining issues are risk reduction and the public's willingness to continue to provide income transfers and other assistance to this sector based on its strategic importance or uniqueness. Senator Lugar's questions focused on whether government needed to continue to be involved, and what the most cost effective way to be involved would be if that is required. Few today ask if government involvement is needed, what the rationale is for the involvement, and then what the best way is to provide support. This may change as agriculture becomes viewed as a producer of biofuels and other bioproducts in competition with food and at a potentially higher cost to the environment from more intensive and/or extensive production.

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Theme Overview: Fresh Produce Marketing: Critical Trends and Issues

by Ramu Govindasamy and Suzanne Thornsbury, Guest Editors

Recent Trends

The fresh produce market has experienced significant change, driven in large part by increased consumer demand and sophistication and corresponding adaptations by streamlined supply chains. These changes are accompanied by consolidation of retailers, an expansion of product offerings and movement towards year-round supply, increases in imports, and shifts in marketing efforts.

Increasing Consumer Demand

The national per capita consumption of fresh fruits and vegetables has risen at an increasing rate, up a total of 15% between 1987 and 2000 (283 lbs. in 1987 to 326 lbs. in 2000). Since 1987, the variety of fresh produce items offered by retailers has doubled (173 items in 1987 to 345 items in 1997) and branded items share of produce sales has more than doubled (7% in 1987 to 19% in 1997). Fresh-cut and packaged salad sales have risen even more substantially (1% in 1987 to 15% in 1997). These growth trends reflect increasing consumer demand for variety, quality, and convenience. There has also been an approximate three-fold increase in the share of sales by produce wholesalers to the foodservice channel over the same time period (8% in 1987 to 21% in 1997), reflecting the rise in food dollars spent in the foodservice/restaurant sector (approaching half of U.S. consumers' total food dollars). This rising proportion of foodservice/restaurant sales is another reflection of consumer desire for convenience and value-added products.

Improved Cost Efficiencies and Streamlined Supply Chain

In 1997, $71 billion worth of fresh fruit and vegetables were sold to U.S. consumers. The dollars moving through specialized produce wholesalers have increased significantly, but there has been a decline in the share of produce wholesaler sales to food retailers (and an increase in the share of foodservice) over the same time period. This is in response to the growing demand for specialized and value-added products in a market where traditional outlets, requiring large volumes and year-round supplies, are beginning to bypass traditional wholesalers altogether and increase volume of direct purchases.

Large supermarket retailers continue to strive for lower labor and capital costs, product differentiation, and improved consumer services in order to remain profitable in an increasingly competitive environment. Mass merchandise and warehouse club stores are rapidly expanding and capturing a significant percentage of retail food sales. As a result, there has been a trend toward consolidation of large retailers and distributors to reduce costs and stream-

Articles in this Theme:

line and improve supply-chain management practices. Innovations in procurement and distribution of produce, such as inventory mechanization, direct delivery by suppliers, use of specialty wholesalers, and fixed contracts with suppliers, help to reduce costs and increase efficiencies.

Future Needs

Although there are certainly some large players that exist in produce markets (i.e., Dole, Del Monte, etc.), many small firms remain active, particularly in the fresh produce arena. Many small farmers exist in this arena, struggling to profitably coexist with their large-volume competitors. Profitability and, in turn, farm viability has been particularly challenging to many growers competing in this era of supercenters and warehouse retailers, firms striving to cut costs starting at the farm gate.

In the 21st century, success in commercial production and sales by small farmers and retail firms will likely depend on their ability to focus on high-value, specialty crops targeted at specific niche markets. Small farmers and retailers of fresh produce will need to become adept at identifying such market niche opportunities and successfully differentiating their products. This will enable them to achieve market penetration and increase share (without the substantial costs typically required to dominate the market), uniquely position their products in the eyes of the consumer, optimize product mix, and establish early brand loyalty (either by private labeling or early-to-market efforts) to ensure their economic survival.

The focus of this theme in *Choices* is on changes in fresh produce marketing and small farm/firm response strategies in order to remain competitive, profitable, and economically viable in this changing market. The literature that follows includes six manuscripts which address relevant marketing issues (i.e., demand, regulatory/health, and distribution concerns) and provide appropriate response strategies.

Consumer Demand

Bond et al. analyze results from a 2006 national consumer survey that collected data on fresh produce purchasing habits, with a particular emphasis on those consumers who purchase directly from producers. Direct marketing is integral to the prosperity of most small fruit and vegetable farms. In order to enhance the profitability of these enterprises, it is important to understand the targeted consumers, the role of extrinsic and intrinsic attributes in purchase decisions, and how willingness-to-pay may be affected. The focus of this paper is on consumer response to fresh produce marketing claims. Highlighted are consumers' buying habits such as expenditures, shopping locales, frequency of purchases, priorities with respect to the product attributes, and response to various marketing claims about fresh produce. Differences in consumer response and willingness to pay a premium are analyzed with respect to questions on product and process attributes including the importance of color, taste, production location, production process (organic vs. conventional), and varying nutritional properties.

Govindasamy et al. examine the demographics and marketing of ethnic produce in the Mid-Atlantic States. Continued land development, rising production costs, and increased competition from low-cost suppliers from outside of the region are creating new challenges for traditional agriculture in the Northeast United States. Farmers in the area operate on a relatively small land base with high production costs, making it particularly difficult for viable production of crops, which require substantial acreage in order to break even. This study was initiated to help farmers in this area to identify, size, and seize market niche opportunities for agricultural crops that can be locally grown and was based on data collection and results analysis from an ethnic consumer survey. This survey included ethnic consumers of three different Asian ethnicities (Chinese, Indian, and Korean) in the Mid-Atlantic States to understand their socio-demographic characteristics, shopping patterns, preferences and related practices, and ethnic produce purchases. Findings indicate increased market profitability will be attained by helping retailers and growers exploit the comparative advantages associated with proximity to large, dense, high income population concentrations. The study documents the available opportunities for Mid-Atlantic farmers to grow ethnic crops from a market demand perspective by: (1) assessing ethnic consumer shopping patterns, 2) analyzing consumer willingness-to-pay for ethnic produce, and 3) suggesting products for potential local production.

Regulation and Health Concerns

Fonsah examines economically efficient strategies of formulating and implementing traceability regulations in the fruit and vegetable industry utilizing empirical techniques adopted worldwide by some Multinational Fresh Fruit and Vegetable Corporations. Traceability and Country of Origin Labeling (COOL)

have been at the forefront of those regulations affecting the U.S. fresh produce supply chain and are two areas where the wholesale sector is providing increased services. Concerns about adoption of traceability regulations have centered on the cost of implementation, which may increase the financial burden to growers. Other studies have shown that the cost of implementation is based on the breath, depth, precision, objective of the system, and subsequent advantage perceived by the implementing firm. The specific objectives of this paper are: (1) to provide producers or horticultural farm firms with a practical standard operation procedure (SOP) on how to set up traceability systems, and (2) to provide producers with an alternative on how to economically and efficiently collect accurate traceability record-keeping data.

Carman documents the efforts of some firms to capture benefits from targeting sales to growing demands for the health benefits of specific fresh produce products. For example, there is a significant market segment in the Unites States that is concerned with following a diet that will reduce the incidence of two important sources of mortality, cancer and heart disease. Another segment focuses on the relationship between diet and weight. Fruit, vegetable, and nut producers are attempting to "capture" these market segments by funding research on the health attributes of their particular products and then disseminating the results of this focused research through commodity promotional programs. This paper illustrates such a strategy by documenting health research programs conducted by four California commodity organizations and describing the utilization of research results in demand expansion programs.

Wholesale and Distribution

Thornsbury et al. examine the role of fresh produce intermediaries in away-from-home food markets. This sector of the supply chain is comprised of business operations which in general do not transform a specific fresh product, but rather provide services related to the sale of this product. In contrast to the food retail/grocery sector, many establishments in the foodservice industry remain small- and medium-sized businesses, where purchasing is handled by local buyers or chefs. Still, chain restaurants have high volume requirements and need consistency in products across time and outlets. The dichotomy in size among away-from-home food outlets provides opportunities for a greater number of intermediaries to be active in the supply chain when compared with retail food sales. Results illustrate that changes in fresh produce distribution and management have created new forms of commercial relationships between suppliers and wholesalers. In some cases, these changes represent valuable opportunities for business, beyond the demand for additional marketing services from suppliers.

Hall et al. compare produce market development activities in Georgia, Kentucky, North Carolina, and Tennessee, where the prevalence of small farms and growing seasons are comparable across all four states. Part of the difficulty confronting smaller operations relates to market access. Increasingly, fruit and vegetable growers with good entrepreneurial skills have established on-farm outlets or created niche markets with local independent wholesalers or retailers. Small-volume growers tend to have limited marketing personnel and post-harvest handling equipment, rely more on direct outlets, and sell to final retail consumers, whereas large-scale growers utilize volume-oriented outlets that encompass more involved and specialized marketing activities. Different states have pursued different types of market development to assist small growers and have achieved different degrees of success. This article summarizes the results from a systematic analysis of market development strategies in four states. Kentucky and Tennessee have tended to rely on local initiatives, more independent site selection, and smaller volume outlet activities, such as retail-only farmers' markets or only assembly/packing operations at specific sites. Georgia and North Carolina have tended to develop highly coordinated marketing channels that include regional facilities with activities that range from farmers' markets to wholesaling and brokering at the same site.

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Direct Marketing of Fresh Produce: Understanding Consumer Purchasing Decisions

by Jennifer Keeling Bond, Dawn Thilmany, and Craig A. Bond

JEL Classification: Q13

Direct marketing via farmers' markets, roadside stands, community supported agriculture (CSA) programs, and other outlets, is integral to the prosperity of many small fruit and vegetable farms.[1] Through direct marketing, producers are able to establish a closer relationship with consumers, avoid expenses associated with using a broker or wholesaler, and increase their profits (USDA-AMS, 2002a). Moreover, direct marketing may be one of the most effective marketing system strategies to address emerging demand for more local food systems (Pirog, 2004).

Evidence of direct marketing's popularity among producers can be found in the growth of the number of farmers' markets countrywide. The United States Department of Agriculture reported that between 1994 and 2006, the number of U.S. farmers' markets more than doubled to over 3,700, and the value of U.S. agricultural products directly sold increased thirty-seven percent from $592 million to $812 million (USDA-AMS, 2002b). Furthermore, the 2002 USDA Ag Census found that the number of farmers using direct marketing channels grew from 110,639 in 1997 to 116,733 in 2002, while the average value of direct marketing per farm rose from $5,349 to $6,958 over the same time period.

American consumption trends may be contributing to growth in produce-related direct marketing channels. According to the 2004 USDA Vegetables and Melons Situation and Outlook, U.S. per capita consumption of fresh vegetables and melons increased by 52.6% between 1979 and 2004. Increased demand may have consumers seeking out new sources, including direct marketing channels, to satisfy their desire for fresh produce. Furthermore, a significant number of consumers have expressed a willingness to pay a premium for environmentally friendly (e.g., organic) and locally produced products, both of which are common offerings at many farmers markets and CSA programs (Wimberley et al., 2003).

In addition to farmers' markets, producers may choose to develop their own marketing enterprises, including "pick-your-own" farms and on-farm produce stands, as a way to capture consumers who may drive by or be seeking an on-farm experience. Other programs, like the aforementioned CSAs, allow producers to spread production risk over a number of shareholders by selling shares of the farm production prior to the growing season. As such, direct marketing strategies may play a role in supporting the financial prosperity of small- and medium-sized farms.

This article contributes to the understanding of direct produce marketing by reporting some key results from a national survey that collected data on consumers' fresh produce purchasing habits, with a particular emphasis on those consumers who purchase directly from producers. In particular, we discuss the differences in motivations when selecting fresh produce purchase locations, and compare attribute preferences between direct purchasers and consumers who do not use these channels. With this analysis, we compare how consumers who buy directly from pro-

1. *CSAs are subscription agriculture programs that allow consumers to purchase shares of a farm's production in exchange for a weekly allotment of fresh produce during the harvest season.*

ducers differ from other consumers in terms of fresh produce purchasing habits and which attributes are most valued by different consumer groups.

The Consumer Survey

Consumer data concerning purchasing habits, production practice, and product attributes were collected from a national online survey conducted in May 2006. A total of 3,170 members of the National Family Opinion Organization's online survey database were solicited to take the survey, with 1,549 returned (a response rate of 48.86%). The sample is representative of the United States population in terms of income, household size, and the percent of households with children living at home (USDC Bureau of the Census, 2000); however, Hispanics are underrepresented as is the case in many consumer surveys. The fact that our respondents are predominantly female is similar to findings in several contemporary food and grocery-oriented surveys which determined that females are most likely to be the primary grocery shoppers in a household.[2] Primary grocery shoppers were asked about their general food and fresh produce purchase location preferences, including primary, secondary, and seasonal sources, in addition to those not frequented over the last twelve months. Respondents were also asked to rate how important various motivations were to them when selecting where they purchased produce and an additional question asked how important numerous production practices and product attributes were to consumers when making purchase decisions.

2. *The primary grocery shopper was asked to respond to this survey.*

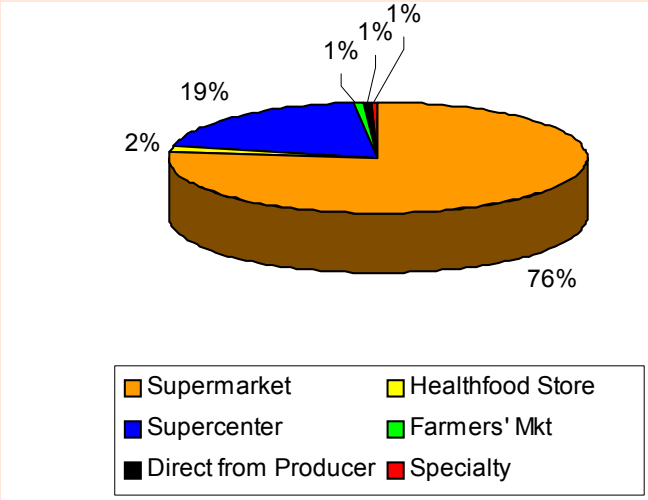

Figure 1. General food primary purchase location preference, n=1549.

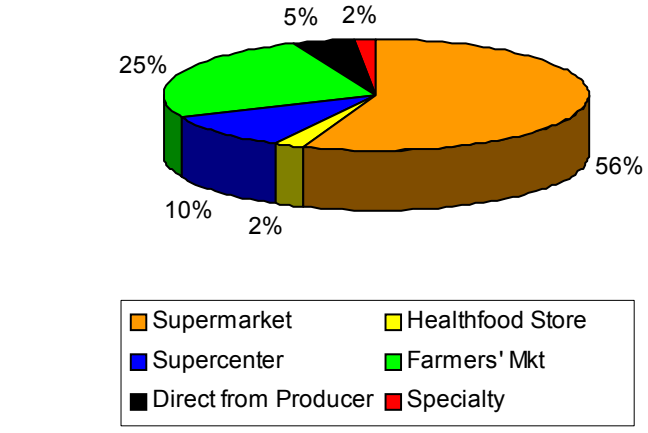

Figure 2. Fresh produce primary purchase location preference, n=1549.

Consumer Grocery and Fresh Produce Shopping Behavior

Survey respondents were asked to identify where they preferred to purchase food in general and fresh produce in particular. Figures 1 and 2 indicate the breakdown of consumers' preferred primary food and fresh produce purchase locations, respectively. Unsurprisingly, for food in general, the majority of respondents (76%) prefer to make primary purchases at the supermarket and another 19% prefer supercenters (e.g., Costco, Sam's Club). Healthfood stores are preferred by just 2% of the group, while direct from producer venues and specialty stores are the preferred primary food purchase locations for only 3% of the survey population. The findings are consistent with expectations that supermarkets are the preferred food purchase location for the majority of shoppers, while other outlets comprise a minority.

Restricting attention to sources of fresh produce (Figure 2), the percentage of consumers who prefer supermarkets as their primary source

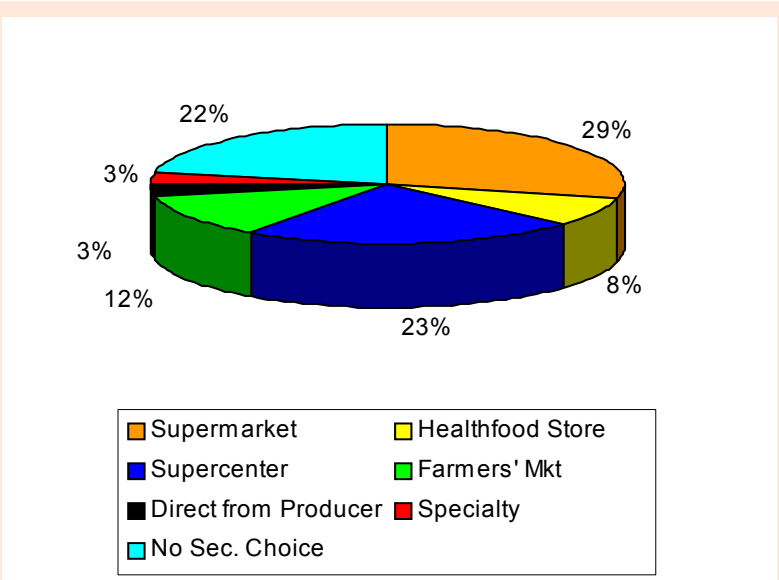

Figure 3. Fresh produce secondary purchase location preference, n=1549.

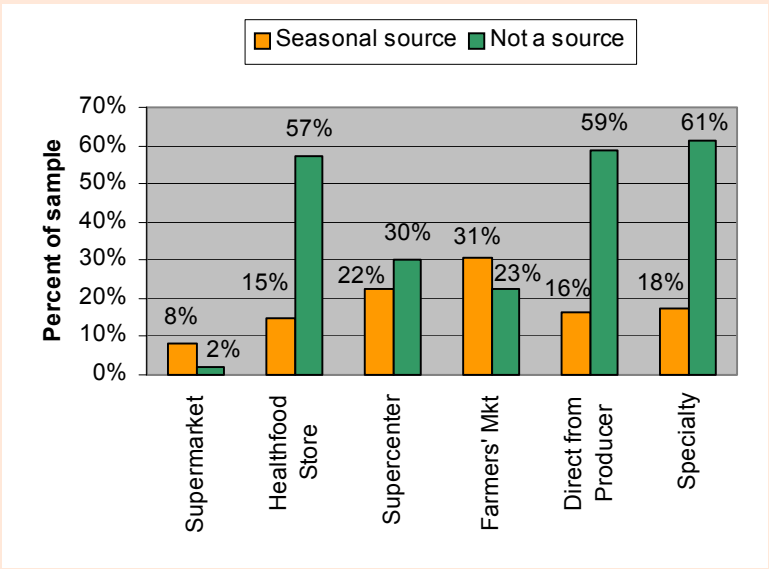

Figure 4. Fresh produce: Seasonal source or not source percentage.

declines to 56%. Thus, it appears that, through product offerings or locational attributes, alternative outlets provide features that make them a relatively more appealing venue for produce purchases over general food purchases. The share associated with farmers' markets and direct from producer channels constitutes a collective 30% of respondents, while just 10% prefer to purchase fresh produce primarily from supercenters and 2% prefer to purchase fresh produce primarily from specialty and healthfood stores.

Consumers were also asked to indicate their preferences for secondary sources of fresh produce (Figure 3).[3] While 22% of the sample had no preferred secondary source of fresh produce, 52% indicated supermarkets or supercenters as a complement to their primary source, and 15% selected farmers' markets or direct-from-producer channels. Relative to primary produce sources, this sample expresses greater diversity in consumers' secondary purchase location preferences. This may be a function of consumers' willingness to "shop around" or make a special trip for specific items, such as ethnic vegetables like kohlrabi or organic herbs that may not be available at their primary produce or general food purchase location.

Just as supplies of local produce in most areas of the country are likely to be seasonal in nature, many farmers' markets and some direct from producer channels are accessible only during certain times of the year (USDA-AMS, 2002a). To capture seasonal preferences, we asked consumers to indicate which locations they preferred to use as a source of seasonal fresh produce, as well as those sources that were not used in the past twelve months (Figure 4).[4] About 30% of respondents indicated a preference for farmers' markets as a seasonal source of produce, followed by about 22% who preferred supercenters. Specialty stores (17.6%), direct from producer channels (16.1%), healthfood stores (15%), and supermarkets (8.3%) follow in order of preference. Just 22.7% and 2%, respectively, indicated they did not purchase fresh produce at farm-

3. *Primary and secondary source categories were both mutually exclusive; in other words, only one primary and one secondary source was identified per respondent.*
4. *Seasonal sources and those not used in the past twelve months were not mutually exclusive; in other words, respondents chose all categories that applied.*

Table 1. Motivations.

Group	Variety Avail	Superior Product	Safety	Support Local	Convenience	Aesthetics	Recommendation	Prices	Social Interaction
Group 1	3.86	4.35	4.17	3.55	3.45	2.76	2.54	3.72	1.88
Direct Primary	(0.89)	(0.79)	(0.94)	(1.16)	(1.05)	(1.16)	(1.09)	(1.02)	(1.08)
	bc	**bc**	**bc**	**bc**	**bc**		**c**		**bc**
Group 2:	3.74	4.05	4.00	3.10	3.61	2.83	2.47	3.77	1.72
Direct Occasionally	(0.90)	(0.91)	(0.98)	(1.10)	(1.00)	(1.12)	(1.08)	(0.97)	(1.01)
	a	**ac**	**a**	**ac**	**ac**		**c**		**a**
Group 3:	3.68	3.88	3.92	2.67	3.75	2.90	2.32	3.85	1.68
Direct Never	(0.93)	(0.96)	(1.05)	(1.19)	(0.99)	(1.12)	(1.10)	(1.04)	(0.98)
	a	**ab**	**a**	**ab**	**ab**		**ab**		**a**

Statistical tests on mean: a=statistically different from group 1; b=statistically different from group 2; c=statistically different from group 3 @ 5%.
Standard errors are in parentheses.

ers' markets and supermarkets over the past year. These results are consistent with the observation that supermarkets are popular primary and secondary sources of produce on a year-round basis, while many farmers' markets are subject to seasonal demand and supply. For example, a 2002 USDA-AMS study of farmers' markets found that just 13% were open year-round, while markets that were not open all year operated for an average of 18 weeks. Nevertheless, the fact that 3 out of 4 respondents evidently shopped at a farmers' market in the past year suggests at least some valuable differentiation on the part of this market channel, and provides some evidence that exploitation of direct channels may help small- and medium-sized producers reach specialized niche markets. It should be emphasized that consumers expressed preferences as opposed to actual purchase locations; hence, it is not certain how correlated these stated preferences are with revealed behavior. However, the contrast in the survey results suggests that consumers value different attributes when selecting a primary general food source as opposed to a primary produce source, and that there is heterogeneity between primary, secondary, and seasonal fresh produce purchase locations as well.

The heterogeneity of sources led us to organize consumers into three groups in order to analyze motivations and produce attributes. The first group, Direct Primary, preferred to make primary fresh produce purchases via consumer direct channels (either at farmers' markets or direct from producers), and represents about 30% of the sample. The second group, Direct Occasionally, preferred to use direct channels as a source of secondary or seasonal fresh produce, but not as a primary source, and includes approximately 50% of the sample. The final group, Direct Never, did not utilize direct sources over the prior twelve months, and accounts for approximately 20% of survey respondents. These market segments are used in the subsequent analysis.

Consumer Fresh Produce Attribute Preferences and Purchase Location Motivations

To better understand consumers' motivations for selecting fresh produce purchase locations and preferences for product-specific features, respondents were asked to evaluate the relative importance of a series of location-specific attributes and three categories of product-specific attributes, including production practice, intrinsic properties, and value/package/convenience. Tables 1 through 4 summarize the mean motivation and attribute rankings and tests for statistical differences in means across the three groups of consumers using a scale of 1 (Not Important) to 5 (Extremely Important). Information from this analysis may be used to inform production practice and varietal selection decisions, as well as produce-specific marketing efforts of direct marketers.

Purchase Location Motivations

Table 1 summarizes the importance of various motivations for choosing where to shop for fresh produce, which may aid producers and location managers in better marketing their venues as a whole to specific consumer groups. Overall, rankings are quite similar, with all groups indicating that superior products, safety, and prices were top concerns. Relative to other groups, however, Direct Primary consumers tended to rank variety available and support for local producers higher than other attributes, while Direct Never con-

Table 2. Production practice attribute importance.

Group	Organic	Pest Free	Traceability	Country of Origin	Locally Grown	Relationship w/ Producer
Group 1	2.58	3.53	2.80	3.18	3.36	2.18
Direct Primary	(1.21)	(1.20)	(1.24)	(1.22)	(1.15)	(1.10)
	bc	**bc**	**bc**	**bc**	**bc**	**bc**
Group 2:	2.25	3.20	2.35	2.85	2.77	1.88
Direct Occasionally	(1.14)	(1.17)	(1.10)	(1.22)	(1.05)	(0.96)
	a	**ac**	**ac**	**ac**	**ac**	**ac**
Group 3:	2.14	2.96	2.17	2.52	2.34	1.74
Direct Never	(1.19)	(1.24)	(1.16)	(1.24)	(1.10)	(0.96)
	a	**ab**	**ab**	**ab**	**ab**	**ab**

Statistical tests on mean: a=statistically different from group 1; b=statistically different from group 2; c=statistically different from group 3 @ 5%.
Standard errors are in parentheses.

sumers tended to discount this latter factor in favor of convenience. Recommendations of friends and family and social interaction were ranked as the least important motivational factors for each group.

Although the rank attributes were similar across groups, there are some subtle differences. For example, Direct Primaries tended to value a connection to local production and their fellow consumers to a greater degree than the other groups, while those that did not frequent direct channels tended to value convenience, aesthetics, and price (attributes more associated with supermarkets) more than the other groups. Furthermore, the Direct Occasional group seemed more closely aligned with Direct Nevers, with five of nine attribute ratings not significantly different from each other. As such, it appears that a marketing strategy that highlights product quality and safety, in conjunction with lowering transactions costs to enhance convenience, may help to grow the market share of direct marketing channels.

Production Practice Attributes

Table 2 reports the mean production practice attribute ratings by consumer group. Pesticide-free production was the most important attribute across all three buyer groups, though Direct Primary purchasers valued the attribute statistically more than Direct Occasionals and Direct Nevers. Locally grown is the next most important attribute to Direct Primary purchasers, while country of origin labeling is ranked second for the other buyer groups (perhaps as a proxy for safety concerns). Although Direct Occasionals use direct marketing channels that are likely to supply much locally grown produce, it is interesting to note that this feature is less important than country of origin.

Given recent growth in availability of organic produce, it is somewhat surprising to find that this production practice attribute ranked sixth out of seven across all groups (Kremen, Greene, & Hanson, 2004). No statistical difference was found between Direct Occasional and Nevers' mean value on the organic attribute, which is somewhat unexpected given that Direct Occasionals are likely to encounter relatively more organic vendors. It thus appears that this group patronizes direct marketing channels for reasons other than access to organic produce, and is consistent with a 2004 finding by Pirog that found "locally grown by family farmers" was a more compelling claim than the bundled "locally grown and organic" claim.

Intrinsic Attributes

Table 3 reports the mean importance placed on produce-specific intrinsic attributes. All buyer groups ranked firmness and texture most highly; however, there is heterogeneity in the importance rankings assigned to the remaining product attributes, particularly between Direct Primaries and the two other buyer categories. Notably, Direct Primary consumers ranked freshness second, followed by color and visual appeal. The freshness attribute is a point of differentiation associated with produce available at farmers' markets (Brown, 2002). Freshness was less important to Direct Occasionals and Nevers who value color and visual appeal relatively more. In general, these two groups ranked attributes that can be assessed visually relatively more than Direct Primaries who tended to value

Table 3. Intrinsic attribute importance.

Group	Vitamins	Other Nutrients	Firm & Text	Color	Visual Appeal	Taste	Carbs	Freshness
Group 1	3.58	3.42	4.11	3.80	3.71	3.26	2.67	3.95
Direct Primary	(1.04)	(1.09)	(0.83)	(0.90)	(0.91)	(1.18)	(1.25)	(0.98)
	bc	**bc**	**bc**	**bc**	**b**	**bc**	**bc**	**bc**
Group 2:	3.27	3.12	3.89	3.62	3.60	3.08	2.46	3.46
Direct Occasionally	(1.01)	(1.04)	(0.90)	(0.94)	(0.95)	(1.17)	(1.15)	(1.04)
	ac	**ac**	**ac**	**a**	**a**	**ac**	**a**	**ac**
Group 3:	3.03	2.93	3.75	3.54	3.61	2.88	2.35	3.20
Direct Never	(1.12)	(1.14)	(0.92)	(0.97)	(0.99)	(1.23)	(1.17)	(1.16)
	ab	**ab**	**ab**	**a**		**ab**	**a**	**ab**

Statistical tests on mean: a=statistically different from group 1; b=statistically different from group 2; c=statistically different from group 3 @ 5%.
Standard errors in parentheses.

health-related attributes such as freshness, vitamin, nutrient and carbohydrate content more highly. These findings indicate that producers may be able to further appeal to consumers in the Direct Primary category by offering nutritionally superior cultivars and marketing the health aspects of their produce. To reach out to consumers in other buyer categories, direct marketers may do well to prominently display attractive and colorful produce of high quality.

Value/Package/Convenience Attributes

Table 4 reports the importance of value, packaging, and convenience attributes to alternative consumer groups. These attributes exhibited the greatest homogeneity across groups, with few of the means statistically different from each other. Only the mean for convenient preparation was statistically different between Direct Primary and Direct Nevers, with the latter placing more importance on convenient preparation of fresh produce (such as prewashed and pre-cut products). As produce offerings at farmers' markets and other direct channels are less likely than those at supermarkets to be processed, it is not surprising that Direct Primary purchasers would place less importance on convenience. Overall, the greatest importance is placed on value, followed by convenience of preparation, and type of package. Despite the Kaufman et al. (2000) finding that shares of branded produce have been on the rise in recent years, brand name of fresh produce ranks as the least important attribute among our respondents.

Table 4. Value/Package/Convenience attribute importance.

Group	Brand	Convenient Prep	Package	Value
Group 1	2.27	2.53	2.49	3.99
Direct Primary	(1.09)	(1.11)	(1.14)	(0.88)
		c		
Group 2:	2.22	2.65	2.51	3.91
Direct Occasionally	(0.99)	(1.08)	(1.10)	(0.90)
Group 3:	2.24	2.70	2.43	3.94
Direct Never	(1.07)	(1.08)	(1.06)	(0.94)
		a		

Statistical tests on mean: a=statistically different from group 1; b=statistically different from group 2; c=statistically different from group 3 @ 5%.
Standard errors are in parentheses.

Advice for Fresh Produce Direct Marketers

In general, we find that consumers who purchase direct from producers are similar to other consumers in that they tend to place a high value on firmness and texture, freshness and taste, safety, and value for the produce dollar. This is interesting in that it tells us that supporters of local food systems still have high expectations for product quality, even if other attributes also enter into their purchase decisions. In terms of choosing where to shop, these direct purchasers feel that having a wide variety of superior and safe produce as well as supporting local producers is important, but tend to rank convenience, aesthetics, and competitive prices relatively lower than consumers who do not express a preference for producer

direct purchases. This information may assist small- to medium-sized farmers determine the dimensions that may be important when promoting their products.

If producers wish to increase patronization by consumers with a strong preference for purchasing through direct market channels, produce could be differentiated with marketing materials that highlight vitamin content, nutritional properties, traceability, pesticide-free, and locally grown claims. To better target this market segment, an opportunity also exists for direct sellers to differentiate their produce through choice of production practice and cultivar to better satisfy the preferences of their consumers for superior, nutritionally enhanced produce that is pest free and locally grown. On the other hand, if producers wish to grow their market share by appealing to consumers who only occasionally prefer to patronize direct market channels, promotion should emphasize safety, country of origin, variety, and visual appeal of produce offerings. In combination with attractive displays that showcase colorful varieties of high quality produce, direct marketers may also consider capitalizing on this segment's stronger demand for convenience by offering semi-processed produce, such as cleaned and roasted chilies and pre-washed salad mixes.

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Ethnic Produce Marketing in the Mid-Atlantic States: Consumer Shopping Patterns and Willingness-to-Pay Analysis

by Ramu Govindasamy, Aparna Nemana, Venkata Puduri, and Kim Pappas

JEL Classification: C41, Q13

Access and proximity to large nearby population concentrations, high population density in general, and high per capita income have traditionally been competitive advantages for commercial farmers in the Mid-Atlantic states and larger Northeast region. However, as population in this already densely populated area has increased, so has land development, causing the commercial growers in the area to operate on a relatively small land base with high production costs. Encroachment on farmland, coupled with the challenge to maintain profitability, make it particularly difficult for viable production of larger-scale agronomic crops that require substantial acreage in order to breakeven. In addition, modern produce distribution practices are allowing commodity products from distant areas, with lower production costs, to be shipped into the Northeast region's population centers. In response to these new challenges and to remain profitable, many farmers in the region have been shifting production and adopting methods to grow higher value horticultural and specialty crops. Such crops are usually targeted toward a specific, small consumer base or market niche that is particularly interested in and highly values the inherent uniqueness of the crop. Therefore, this study seeks to identify the local demand for ethnic produce, assess ethnic consumer shopping patterns, analyze consumer willingness to pay for the ethnic produce, and suggest products for potential local production. The research area is fresh Asian ethnic fruits and vegetables, and in particular those preferred by Chinese, Indians, and Koreans. The perishable nature of such crops, combined with the local growth trends in these Asian segments, will well position farmers in the region who grow such crops to exploit the comparative advantages associated with marketplace proximity.

Identify Ethnic Market Niches (Who?)

The study targets Asian consumers as an ethnic market niche opportunity, chosen for their prevalence and significant growth in the United States, and even more notable growth in the Northeast. The significant Asian population proportions and recent growth trends in the Northeast are consistent with Asian representation and trends at a national level (U.S. Census, 2000; 4.0% and 3.6% Asian population in the Northeast and United States, respectively, with growth over U.S. Census 1990 at 60% and 48%, respectively, for the Northeast and United States). Correspondingly, the Northeast's absolute population growth of Asians exceeds that of any other race category, contributing significantly to the overall population growth for this region. Another consideration for selection, and for which the Asian group stands out at a national level, is the purchasing power for each ethnic population segment. With median household income as the selection criteria, Asians far exceed the national totals for all races combined, as well as Whites, Blacks, and Hispanics, and have consistently done so since before 1990 (Current Population Survey, 2000, 2004).

Assess and Address Ethnic Market Demand (Research Approach)

The research approach entailed the use of a mail-administered written survey that was sent to and completed by the

(self-identified) principal grocery shopper for each household. Prior to survey administration, a panel of experts was formed to provide input, offer suggestions, and ultimately review the three ethnic group selections and varieties of fruits and vegetables included in the questionnaire for each Asian group. Upon completion of the crop selection and survey design process, the questionnaires were mailed to samples of Chinese, Asian Indian, and Korean residences (presumed households per address, as identified by leads purchased via InfoUSA.com) throughout New Jersey, New York, and Pennsylvania. Specifically, sample targets were identified based on 2000 Census populations for Chinese, Asian Indians, and Koreans in the three Mid-Atlantic states (NJ, NY, PA). A sample size of 1,800 surveys was statistically determined, with 600 surveys for each of the three groups. Further sample size requirements were established, based upon ethnic group by state, in accordance with a stratified random sampling method. A total of 447 useable surveys were returned. A roughly 25% response rate was realized and was fairly consistent across groups. The usable surveys by group were 152 from Chinese, 135 from Indians, and 160 from Koreans, with overall response rates of 25%, 23%, and 27%, respectively. The corresponding results for each ethnic group (irrespective of state) yields a margin of error of approximately 8% in order to achieve the desired 95% confidence interval.

Respondents were separated into two groups; consumers and nonconsumers (more than 90% and less than 10%, respectively, in each of the three ethnicities), based on a surveyed criteria of having purchased ethnic (Chinese, Indian, or Korean) produce in the past year. Both groups were questioned for sociodemographic information. Only the consumer group was questioned as to their specific produce expenditures and shopping patterns and preferences. Despite the variation in survey usability by question (not every question applied to each respondent; not all questions were completed for each survey), a margin of error of less than 9% is maintained throughout the study.

1. Prioritize Potential Production Crops for Local Entry (What?)

The respondents' average weekly expenditures for total fresh fruits and vegetables, whether traditional U.S. or ethnic produce, is $45.48 (all respondents, consumers and non-ethnic produce consumers; ranging from $38.60 for Koreans to $54.06 for Chinese respondents, with $43.53 for Indians being relatively close to the average for all three groups). Specific produce expenditures for respondents that purchased ethnic produce within the past year (ethnic produce "consumers") were also documented. Expenditure data was collected for thirteen ethnic produce items for each respective ethnic group. The crops of interest were selected based upon their potential for production in the Mid-Atlantic states and larger Northeast region, with specific consideration for the growing cycle of specialty crops and their conduciveness to the climatic patterns in the area. The top five ethnic produce items purchased in each group, ranked in descending order on the basis of average weekly respondent expenditure are as follows (with the corresponding expenditures in parentheses); for Chinese, Flower Chinese Cabbage ($3.18), Edible Snow Peas ($2.68), Chinese Kale ($2.66), Bitter Gourd ($2.65), and Oriental Eggplant ($2.36); for Indians, Bitter Gourd ($3.14), Okra ($2.95), Yam ($2.95), Mustard Leaves ($2.73), and Black Eyed Beans ($2.69); and for Koreans, White Nectarine ($3.76), Fuji Apple ($3.39), Korean Cabbage ($2.58), Korean Cucumber ($2.39), and Green Onions ($2.32). The individual respondent expenditures for each item were calculated based on the corresponding quantity purchased and price paid for each, in an attempt to prioritize and target individual ethnic crops with the highest market potential in the Mid-Atlantic area.

2. Understand Shopping Patterns of Respondents (When? Where?)

i) Shopping Frequency . The shopping patterns of respondents included the responses of ethnic consumers who identified themselves as having purchased ethnic (Chinese, Indian, or Korean) produce in the past year (Figure 1). Just under half of these ethnic produce consumers shop once a week (ranging from 41% to 48% by ethnicity). Another roughly 40% shop either more than once a week or once every two weeks. Fewer than 20% in each group shop once a month or less. However, there is variation across the groups, as the Chinese typically shop slightly more frequently than their Indian and Korean counterparts; 36% of Chinese shop more than once a week compared to 15% of each of the Indian and Korean groups in this category.

ii) Multi-Store Shopping and Establishments Frequented. Consumer responses indicated that approximately three-quarters of those purchasing ethnic produce shop at more than one food store for their ethnic produce (Figure 2). Not surprisingly, as seemingly correlated with more frequent store visits, slightly more

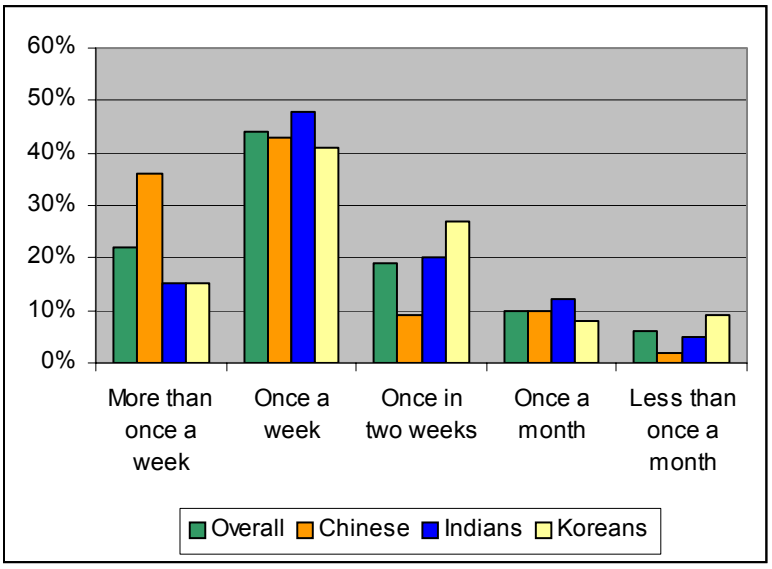

Figure 1. 2005 ethnic consumer survey: Shopping frequency of ethnic respondents.

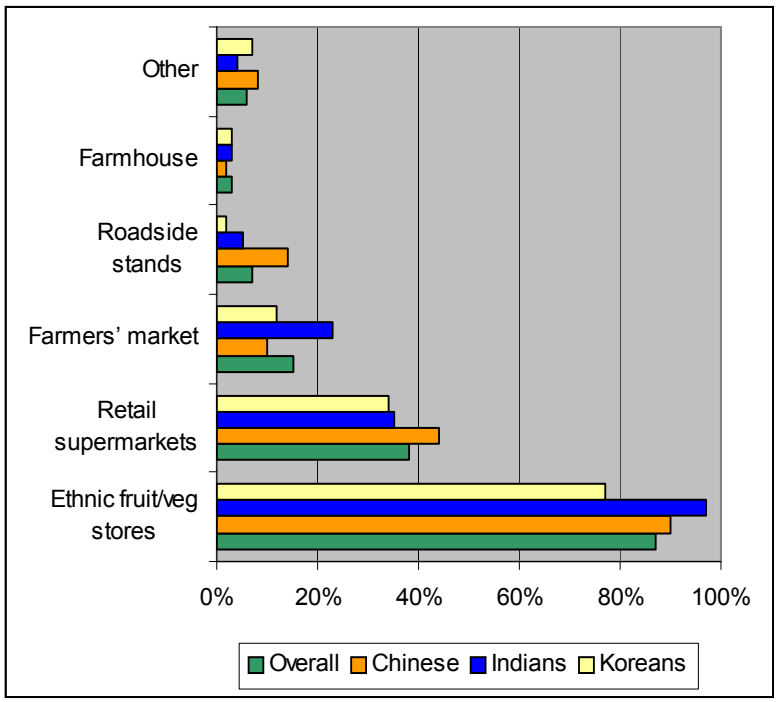

Figure 2. 2005 ethnic consumer survey: Establishments frequented for ethnic produce.

Chinese consumers shop multiple stores than Indians or Koreans. To ascertain which establishments consumers shop at for ethnic produce, respondents were asked to indicate all types of establishments from which they purchase ethnic produce during the peak season or "summer" months (as not all types are available at non-peak times of year). Each respondent was provided a list of five types of establishments, as well as an "other" category. They were then asked to indicate all that apply. More than three-quarters of the consumers in each group indicated that they purchase from ethnic stores. Although all three ethnic groups display high "brand loyalty," there is notable variation across the sample groups as the ethnic store shoppers range from 77% of Korean consumers, compared to 90% of Chinese, and a staggering 97% of Indian consumers. Approximately 40% of the consumers surveyed indicate that they purchase ethnic produce at retail supermarkets (with relatively little variation across groups, ranging from 35% to 44%). Between 10% and 23% of consumers surveyed indicate that they make purchases at farmers' markets, with Indians at the high extreme and Chinese and Koreans at or close to the bottom of that range.

iii) Proximity to Market. One factor that may affect consumer shopping patterns is each consumer's ability to shop, based upon store availability (or lack thereof). To assess store availability, the consumers purchasing ethnic produce were asked to indicate how close the nearest ethnic store is to them (Figure 3). The results reveal that more than half (53%-68%) of the consumers in each sample group has access to an ethnic market within 10 miles. Another 20% or so have a market within 10-20 miles, while fewer than 25% do not have an ethnic store within 20 miles. The Korean consumers sampled appear to have fewer stores within a 10-mile radius, relative to the Chinese and Indians sampled. A higher percentage of Koreans, relative to Chinese and Indian consumers, indicated that the nearest store is greater than 20 miles away.

3. Determine Willingness-to-Pay Ethnic Produce Premiums (How?)

The modeling section of the study examined the consumer profiles of respondents who purchase ethnic produce to ascertain whether relationships exist between their perceptions, practices, and socio-demographics and their willingness to pay (WTP) a premium over traditional American produce for ethnic produce (Figure 4). Roughly half of the respondents from each ethnic group indicated they would be willing to pay a premium for ethnic produce. The respondents were questioned as to their willingness to pay premiums in increments of 5%, up to 20% (1-5%, 6-10%, 11-15%, 16-20%), or more. Roughly 25% indicated a willingness to pay a premium of up to 5%, and an additional 14% indicated a willingness to pay premiums of up to 10%. The results in subsequent categories were significantly lower and varied slightly by ethnicity (12% or less, with most categories within ethnic groups having 5% or less). As such, the categories that captured respondents' willing to pay premiums of more than 10% are determined to be more discriminating for the purpose of identifying and targeting ethnic consumer groups, and a criterion for WTP modeling is established accordingly.

A WTP variable is modeled against relevant consumer 'belief' and related practice variables, demographic variables (age, gender, number of adults in the household, education, income, number of years in the United States), and fixed effects for the states and ethnicities (dummy variables). The 'belief' variables reflect consumers' opinions and perceptions (for example; 'availability' is an important/very important factor in shopping for ethnic produce, and 'prices' of products from ethnic markets are better than American produce). Related practice variables include consumers' approximate spending on all produce (traditional and ethnic), whether or not they regularly read advertisement brochures, and whether they have a garden at home.

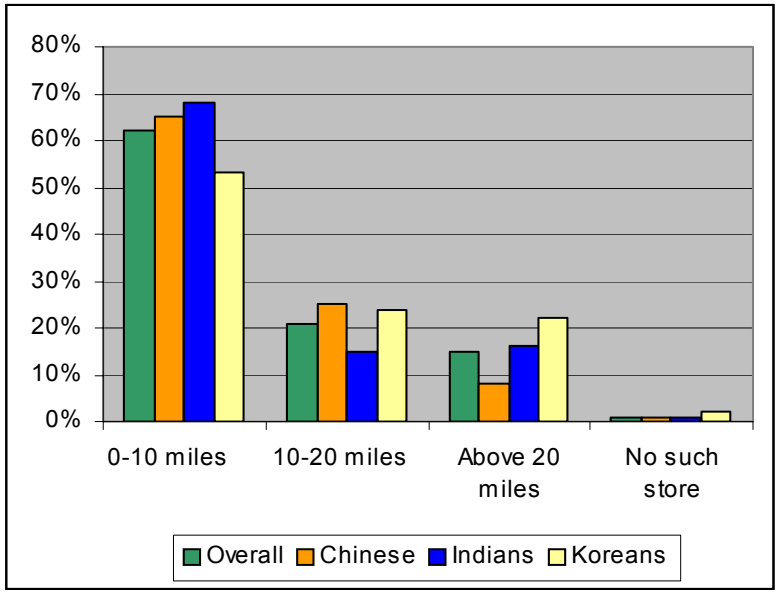

Figure 3. 2005 ethnic consumer survey: Proximity of ethnic market to respondents.

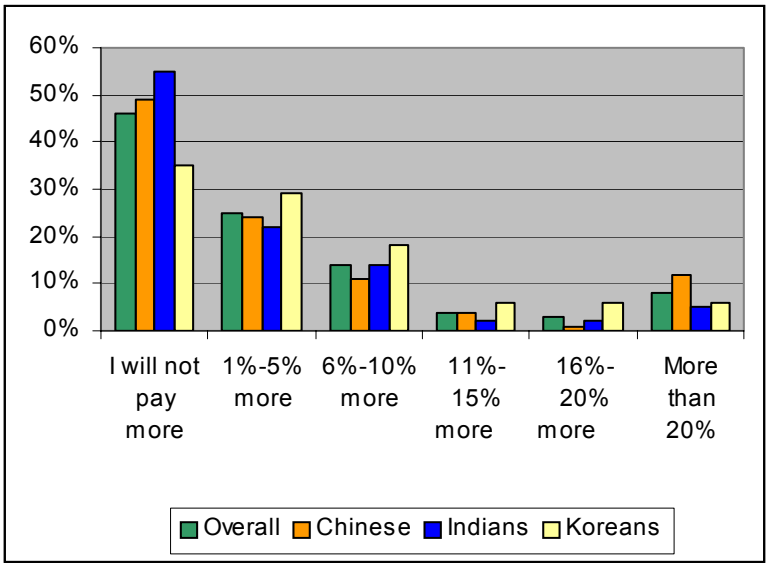

Figure 4. 2005 ethnic consumer survey: Willingness to pay a premium for ethnic produce.

Results derived from the model indicate that consumers in households earning greater than $60K seem 9% less willing to pay a premium of more than 10% compared to consumers in lower income groups, despite the counter-intuitive nature of this response, given that produce purchases represent a rela-

tively small portion of total expenditures for high income consumers. However, it is plausible that, due to their higher income, they have more luxury-type food alternatives available to them (such as eating out) than their lower-earning counterparts who view ethnic produce as more of a staple in their diet. Females are 13% more likely to pay a premium of more than 10% for ethnic produce than male shoppers.

In addition, ethnicity and state of residency appear to play a significant role in consumers' willingness to pay a premium. For example, Koreans and Chinese are 16% and 13%, respectively, less likely to be willing to pay a premium than Indians. Further, consumers in New York and New Jersey are 9% and 7%, respectively, more likely to be willing to pay a premium than those in Pennsylvania. As a result of these predictions, it would be most beneficial to growers and retailers to place premiums of greater than 10% on ethnic produce purchased by consumers earning less than $60,000 annual income, females, Indians, and New York/New Jersey residents.

4. Combine Consumer Profiles and Predictive Modeling to Exploit Local Ethnic Market Opportunities (Why?)

This study assessed the survey results of 447 respondents of three different Asian ethnicities (Chinese, Indian, and Korean) in the three Mid-Atlantic states to identify the local demand for ethnic produce, suggest crops for potential local production, assess ethnic consumer shopping patterns, and analyze consumer willingness to pay for ethnic produce. The survey results reveal that a vast majority (more than 90%) of respondents in each of the three ethnic groups purchased ethnic produce within the past year. Further, more than half of the consumers in each group shop once a week or more frequently for ethnic produce. Three-quarters shop at more than one food store for these purchases. More than three-quarters of those purchasing ethnic produce have access to an ethnic market (store) within 20 miles. The results of the study's "Willingness-to-Pay" model suggest that premiums for ethnic produce in excess of 10% over traditional American produce should be limited to consumers earning less than $60,000 annual income, females, Indians, and New Jersey/New York residents. These results can be used by public policy makers, retailers, and commercial growers in each state to identify and address niche market opportunities in the ethnic produce sector.

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Traceability: Formulation and Implementation of an Economic Efficient System in the Fruit and Vegetable Industry

by Esendugue Greg Fonsah

JEL Classification: Q18

Traceability is a "record keeping system designed to track the flow of product or product attributes through the production process or supply chain" (Golan et al., 2004; Fonsah, 2005a). The globalization of world trade, the North American Free Trade Agreement (NAFTA), food safety in the fresh produce industry, and political and commercial realities have put the traceability regulation on the radar screen. Canada, which is now the number one trading partner of fruit and vegetables from the United States, has become an advocate of traceability, which means that the United States fruit and vegetable industry has no choice but to comply if they must export fresh produce to Canada (PMA, 2005; GS1, 2006; Fonsah, 2003a,b; Huang, 2004).

This study is aimed at developing economic efficient strategies of formulating and implementing traceability regulations in the fruit and vegetable industry. It utilizes techniques adopted by some multinational fresh fruit and vegetable corporations the world over. The specific objectives are (1) to provide fruit and vegetable producers with a practical standard operation procedure (SOP) on how to set up traceability systems, and (2) to provide producers with an alternative on how to economically and efficiently collect and handle traceability records.

How Can Traceability be Formulated in a Farm Firm?

The formulation phase of an integrated traceability process in a farm firm is a function of the following factors: (a) the food safety and quality management system, (b) identification of risk and opportunities involved in the operation, (c) identifying strengths and weaknesses of the organization, (d) aspiration and values of the stakeholders/owner of the organization, and (e) recognition of the non-economic factors to society. Management plays a vital role in both the formulation and implementation phases of traceability regulations adoption in a farm firm. A well-formulated strategy can still fail if not well managed. On the other hand, good governance can transform an inferior formulated strategy to success (Fonsah, 2003b).

Is the Implementation of Traceability Possible in a Horticultural Farm Firm?

Anecdotal experience shows that an effective implementation of an inferior strategic formulation can provide successful result. On the other hand, the ineffective implementation of even a superior or well-orchestrated strategic formulation can lead to failure (Fonsah, 2003b). That simply means that, although the formulation of a traceability program is important, the implementation is of utmost importance. The best place to start is with the organizational structure and relationship (see Figure 1).

Although the participation of each department on the organizational chart in Figure 1 is crucial, the most important person to implement and follow up the traceability adoption in a farm firm is the operation manager (OM), since he/she is expected to be adept with all the operations in the project. Figure 1 can be adjusted to reflect the structure of any small-, medium- or large-sized horticultural farm producing fruit and/or vegetables. A large farm in this study is defined as greater than 5,000 acres, while a medium-sized farm is from 1,001–5,000 acres. A small farm in this study is defined as less than 1,000 acres.

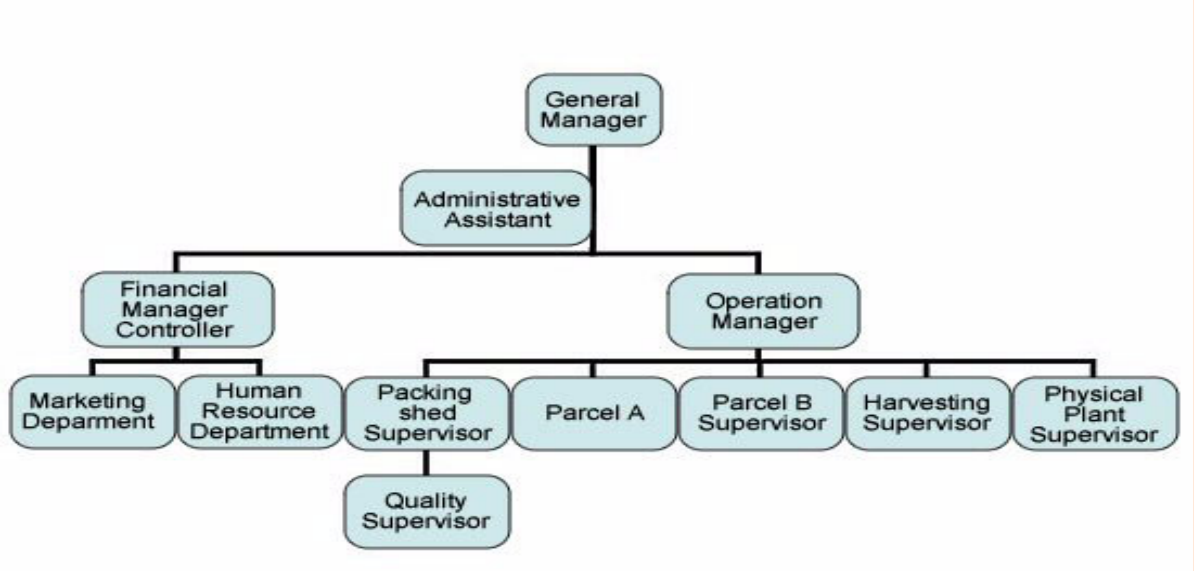

Figure 1. Organizational chart for implementing traceability in a large- and/or medium-sized farm operation.

What are the Functions of the Operation Manager in Implementing Traceability?

First, records of the day-to-day operations of the farm firm from planting to packaging must be kept in writing. This record keeping process only requires the operation manager to reallocate his/her work schedule to accommodate time for compiling records. A ledger or a notebook is required in the case of a small-sized farm firm or a computer in the case of a large- or medium-sized farm. Some corporate and multinational fresh fruit and vegetable companies around the world have adopted the ledger system because of its cost effectiveness (Fonsah & Chidebelu, 1995). The advantages of the ledger are as follows: (1) All supervisors must read and sign the ledger prior to going to the field; (2) Any unclear or well-defined instruction must be clarified prior to carrying out the operation. The clarification can be done either by radio, telephone, or the fastest means of communication available; (3) When the ledger is full, the beginning and ending date is labeled on it and filed for future reference; (4) If any field operation is wrongly implemented, it is easy to trace where the communication breakdown occurred; and (5) It is cheaper to use a ledger than a computer, especially in the case of small farmers who in most cases lack computer proficiency and do not even want to be bothered with it. It is recommended that the records be kept for at least five years.

What Techniques Can We Use for Traceability Data Collection/ Record keeping?

The rule of thumb is to have a surveyor demarcate the farm into parcels or plots and draw it into a map. A good map should have the following information: (1) parcel numbers; (2) acreage per parcel; (3) all primary and secondary roads; (4) all ponds or rivers; (5) irrigation system main and secondary lines, if applicable; (6) drainage system, if applicable; (7) bridges, if applicable; (8) offices, packing house, physical plant, or any building infrastructure; (9) cableways network, if applicable; and (10) nursery, if applicable. Mapping is a common practice.

How Do We Obtain Traceability Information from Field Operations Using a Map?

A staff person can be designated to enter these instructions in the ledger for the supervisors to read and implement. These instructions must be written at least one day prior to execution to give the supervisors enough time to read, collect, and arrange for all the logistical needs to successfully carry out the recommended operations. In the case of a large- or medium-sized farm, the physical plant or field operation supervisor or a combination of technical people will be the ones to implement these instructions. For example, the following is some pertinent information to be entered in the ledger during the planting of bell pepper: (1) date; (2) state manual or mechanical planting, plot, or parcel number, (3) planting pattern (for example double or single rolls); (4) crew number and names of

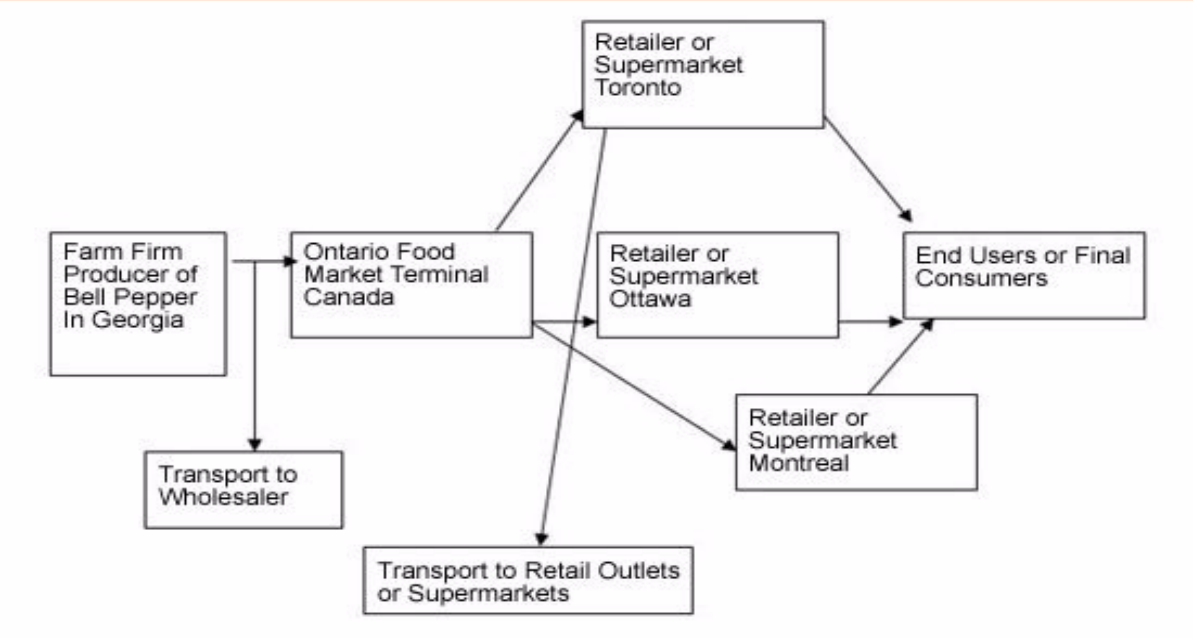

Figure 2. Traceability in a two-level distribution channel for horticultural crops.

crew members; (5) seed number and company from which it is bought; (6) origin of seed and date purchased; and (7) color plot or parcel where the planting operation took place. Enter the same information for all the plots or parcels planted and use different colors for different planting dates. It is suggested here that the same information must be entered for all plots or parcels planted such as weed control, fertilization application, irrigation, insect, pest and disease control, harvesting, handling, and sanitation, respectively.

How Can Packing House Information be Collected for Traceability?

Each packed box must be legibly coded prior to leaving the packing station with a simple stamp code. The coded number should contain the following information: (1) date the box was packed; (2) packer's number – optional; (3) packing station number if the company has many; (3) packing line number – optional; (4) harvested date; (5) harvested plot number; and (6) harvested crew number and names. If the crop is field packed, the packer will stamp each box immediately after the operation. The stamps are small and self-inked.

Tracking Traceability Back to the Farm with All the Information Gathered

Assuming there is an outbreak of disease on bell pepper shipped to a supermarket in Montreal, how do we trace it back to the farm? In Figure 2, simple steps to follow are presented, assuming the produce goes through a two-level distribution channel: (1) The customers report to the retail chain manager of company ABC supermarket in Montreal, Canada; (2) The manager complains to the wholesaler at the Ontario Food Market Terminal; (3) The wholesaler requests the box number and consignment date from company ABC manager in Montreal; and (4) The Ontario Food Market Terminal manager sends the number to the horticultural farm firm manager where the pepper was cultivated; (5) On receiving the box packing code, the manager or his associate immediately determines the date on which the box was packed and by which packer; and (6) The manager opens the ledger on the packing date and retrieves the following on packaging, harvesting, fertility application, irrigation, weed, pest and disease control, land preparation, cultivar, and source of the seed that was planted. All of these operations can take less than 30 minutes. Strategic management decisions can then be made in a timely manner to minimize further costs incurred because of the disease outbreak.

Cost of Implementing Traceability

The economic efficient initial cost of formulating and implementing trace-

Table 1. Economic efficient cost of implementing traceability per acre in a farm firm producing bell pepper in Georgia, 2006.

Operations	Medium/Large Firm No Traceability ($)	Medium/Large Firm With Traceability ($)	Small Firm No Traceability ($)	Small Firm With Traceability ($)
1. Field Operations	$2,725.00	$2,725.00	$2,725.00	$2,725.00
- Includes all pre-harvest variable cost components such as plants, fertility, insecticides, fungicides, nematicides, herbicides, plastic, drip tapes.				
2. Harvesting Operations				
- Picking & hauling	$1,275.00	$1,275.00	$1,275.00	$1,275.00
3. Packing Shed Operations				
- Container/boxes/crates	$1,125.00	$1,125.00	$1,125.00	$1,125.00
- Grading and packing	$1,650.00	$1,650.00	$1,650.00	$1,650.00
- Marketing	$1,275.00	$1,275.00	$1,275.00	$1,275.00
- Stamps with code number		$25.98		$25.98
4. Transportation				
- Temperature recorder (2)	$128.00	$128.00	$128.00	$128.00
- Mixed cargo	$27.52	$27.52	$27.52	$27.52
5. Fixed Costs				
- Machinery	$56.27	$56.27	$56.27	$56.27
- Irrigation	$220.65	$220.65	$220.65	$220.65
- Land	$129.53	$129.53	$129.53	$129.53
- Overhead and management	$408.75	$408.75	$408.75	$408.75
Total Budgeted Cost	$9,020.72	$9,046.70	$9,020.72	$9,046.70
Total Cost of Traceability	**0.00**	**25.98**	**0.00**	**25.98**

ability in a small, medium, or large-farm firm producing bell pepper in Georgia is estimated at $25.98 per acre, respectively (Table 1). This is the cost which the grower will incur for purchasing a personalized rubber stamp with the packer's code number. Although one stamp is capable of producing thousands of impressions, this study assumed that at least two packers will be needed to pack 1,500 boxes of bell pepper per acre to be economically efficient, irrespective of whether the fresh produce was packed at the packing shed or in the field. The initial cost will eventually reduce as only a self-inking replacement pad which cost from $4-$7 will be needed after the ink runs out.

The field operation or pre-harvesting variable cost, harvesting, packing, and fixed costs were derived from an enterprise bell pepper budget (Fonsah, Escalante, & Byrd, 2005c). It was assumed that two temperature recorders was needed per container worth $64, and since 1,500 boxes of pepper can fill 1.64 containers, a total of four recorders worth $128.00 would be required. However, this is a common practice whether traceability is adopted or not. Further, the cost of polyethylene pallet covers needed for tracing co-mingled produce in the same container was $27.52. This is also a common shipping and/or refrigerated container transportation SOP. Different color polyethylene pallet covers can be used for each consignment. One roll that can cover 88 pallets costs $77.50. The cost of a ledger was not included because any notebook will suffice and it is part of the office stationery.

Is Traceability Possible During Transportation?

During transportation, any kind of recording device that would provide accurate documentation in different time and temperature ranges could be used to track any fluctuation in temperature that would affect the quality of the fresh produce. There are so many inexpensive ones, such as the cox recorder or a disposable strip temperature chart recorder. The price ranges from $10 to $450 per unit and it is recommended to have at least two in a container, one at the back and one at the front. This is a standard procedure in the fresh fruit and vegetable business irrespective of whether traceability is implemented

or not. A grower, small, medium, or large, who is yet to adopt this technology, is taking a great risk. There are more sophisticated data logging software that can be installed in the computer to monitor all containers carrying fresh produce to various destinations around the world right in the office. Although these are more expensive, they are better for well-established larger growers and the price becomes cheaper in the long run. In this study, 4 disposable strip temperature chart recorders were utilized for the price of $32 each, which is equivalent to a 1.64 container of fresh pepper and to 1,500 boxes per acre.

Is Traceability Possible if There are Mixed Produce in the Same Container?

In the case of co-mingling of produce, one of the most economic efficient ways to trace them is by using a different colored pallet strap for each category of produce. Another technique is to use different color covers. Some of the commonly used ones are the polyethylene and insulated pallet covers, respectively.

How Can One Use Rubber Stamp for Traceability?

A rubber stamp is an efficient method to trace who and when the produce was packed, and possibly where, in the case of multiple packing stations. Although any shape of rubber stamp will do, for quality and cosmetic appearance purposes, a round self-inking stamp will suffice. One of these is capable of producing thousands of repetitive impressions without re-inking and better still, the stamp can be re-inked. The stamp is small, light, portable, and convenient to carry. Furthermore, you can customize it and the prices range from $12.99 to $23.99 each. Assuming 1,500 boxes of bell pepper per acre, 2 stamps at $12.99 each should suffice.

Discussion Notes

In the first section, information on how traceability can be formulated was provided. Secondly, information on the implementation strategy was discussed. Thirdly, the functions of the operation manager in implementing traceability were elaborated. Then the techniques on how to collect traceability data and/or record-keeping were provided. Next, the methods of obtaining traceability information from field operations using a map were vividly discussed. In section six, the strategies utilized to collect packing house traceability information were provided. Section seven provided information on tracking traceability back to the farm in the case of a disease outbreak. The cost of formulating and implementing traceability using our economic efficient model was discussed in section eight. Section nine provided information on how traceability could be adopted during transportation of fresh produce. Section ten discussed the implementation of traceability when fresh produce are co-mingled. Finally, the use of rubber stamps in the adoption of traceability was elaborated.

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Preventive Health Maintenance Information Brought to You by Your Local Fruit and Nut Producers

by Hoy F. Carman

JEL Classification: I12, Q13

When we were children, our mothers told us that "eating an apple a day keeps the doctor away," that "carrots contribute to good eyesight," and we saw "Popeye" gain amazing strength from consuming cans of spinach. This was reinforced by please "eat your vegetables; they are good for you," but we also remember that food and vitamins that were good for us often did not taste very good! Regardless, these appeals were effective. Spinach growers credited Popeye with a 33% increase in U.S. spinach consumption–and saving the spinach industry in the 1930s (King Features, 2006).

Fast forward to the 21st century. Now many consumers have moved past accepting generalities and want to know the dietary and health contributions of specific food products. There is a significant and growing market segment that is concerned with consuming a diet that will reduce the incidence of important sources of mortality, including obesity, cancer, heart disease, and diabetes. These same health issues are a public policy priority, and government provides general diet recommendations to improve public health. Many commodity groups, looking for a "New Popeye" to spur their product demand, believe in the "special beneficial attributes" of their products, but are faced with U.S. Food and Drug Administration (FDA) requirements that product and health claims be factually correct. Several have moved to fund diet and health research designed to discover and document relevant special product attributes. This article describes the diet and health research efforts of the Almond Board of California, the California Avocado Commission, the California Strawberry Commission, and the California Walnut Commission.

Developing Health-Oriented Research and Promotion Programs

Producer-funded research by California's marketing orders and commissions has traditionally focused on production problems and, to a much lesser extent, marketing issues. At the same time, generic promotion programs were based on messages about the origin, taste, and appearance of the fruit, vegetable, and nut products. Public relations activities included news releases about product availability, new recipes, articles on choosing, storing and preparing the products, and other newsworthy events. References to health attributes of commodities were based on U.S. Government diet recommendations such as the "Food Pyramid" or references to vitamin or nutrient content. The California Walnut Commission (CWC) was one of the first mandated marketing programs to fund health and nutrition research in 1992, when it decided to counter diet recommendations urging consumers to reduce or constrain consumption of nuts because of their high oil content. The Almond Board of California (ABC), the California Avocado Commission (CAC), and the California Strawberry Commission (CSC) initiated funding for health and nutrition research in 1995, 1997, and 2003, respectively. A review of budgets for the five-year period 2000/01 to 2004/05 indicates that these four organizations spent a total of over $8.1 million on health and nutrition research.

Health and Nutrition Research Expenditures and Topics

Annual health and nutrition research expenditures for the four commodity groups recently totaled over $2.77 mil-

lion, ranging from 2.5 to 7.0% of total annual budgets (Table 1). Note that health and nutrition research has tended to be an addition to traditional production and marketing research rather than a substitute. The same four groups spent about $3.8 million on production research during the 2004/05 crop year.

Health and nutrition research topics pursued by the four commodity groups have similarities as well as differences (Table 1). Each commodity group has or is seeking evidence on the value of consuming their product on reducing the risk of heart disease. Each of the four commodity groups has evidence that product components may lower the risk of certain cancers and each of the commodities contains antioxidants that are known to slow the aging process and protect against heart disease and various forms of cancer. Almonds, avocados, and walnuts can be a component of a diet to control weight gain, and each can be part of a diet for managing and controlling diabetes. Following is a short summary of research interests for each commodity.

Table 1. Health and nutrition research expenditures and areas of interest mentioned by four California commodity groups.

	Commodity			
Expenditures, 2004/05	**Almonds**	**Avocados**	**Strawberries**	**Walnuts**
Amount	$1,200,000	$444,754	$605,000	$525,260
Percent of Total Budget	5.0	2.5	7.0	6.8
Research Area				
Cardiovascular Disease	X	X	X	X
Weight & Obesity	X	X		X
Cancer Prevention	X	X	X	X
Diabetes	X	X		X
Antioxidants	X	X	X	X
Aging	X	X	X	X
Prostate Health				X
Bone Health				X

Walnuts

Initial studies funded by the CWC concentrated on the relationships between walnut consumption and the risk of coronary heart disease and walnut consumption and cholesterol levels. Focusing on relationships between walnut consumption and heart health, the CWC funded a combination of epidemiological and clinical studies conducted by leading universities in the United States, France, New Zealand, Spain, Norway, and Japan and published in medical, nutrition, and scientific journals. These studies indicate that walnuts reduce LDL cholesterol and heart disease risk, the fatty acids in walnuts improve the function of arteries, walnuts reduce cell adhesion molecules and enhance the circulatory system, and that omega-3 fatty acids in walnuts reduce inflammation in arteries. More recent studies indicate that melatonin in walnuts protects against cancer and heart disease, omega-3s reduce blood pressure, arterial inflammation, the stickiness of platelets and have antidepressant-like effects, walnuts can help in weight management, that consumption of walnuts are protective for people with type 2 diabetes, and that the form of vitamin E found in walnuts might halt the growth of prostate and lung cancer cells. Walnuts have high concentrations of antioxidants, which help the body ward off cancer, heart disease, and diabetes, as well as arthritis, osteoporosis, and Alzheimer's disease. The Scientific Research Update for Health Professionals, posted on the CWC website, includes results for 23 professional studies published between 1992 and 2005.

The CWC used their research results to secure an FDA qualified health claim for walnuts on July 15, 2003 that was separate from the health claim for other nuts. The final wording for the claim, issued in March 2004, states: "Supportive but not conclusive research shows that eating 1.5 ounces per day of walnuts as part of a diet low in saturated fat and cholesterol may reduce the risk of heart disease. See nutrition information for fat content."

Almonds

The ABC initiated nutrition research in 1995 with studies on cardiovascular disease, decreased cancer risk, glucose metabolism, and analysis of the nutrient content of almonds. The number of research projects expanded to 12 in 1997-1998, and gained an international flavor with ABC-funded studies at the University of Toronto Medical School and at Beijing Medical University. The most important outcome of the nutrition research program for almond industry promotion was securing the FDA qualified health claim for almonds on July 15, 2003 that states: "Scientific evidence suggests but does not prove that eating 1.5 ounces per day of almonds as part of a diet low in saturated fat and cholesterol may reduce the risk of heart

disease." Shortly after approval of the FDA health claim, an article published in the *Journal of the American Medical Association* on a study known as the Portfolio Eating Plan, found that eating a diet high in heart-healthy foods, including almonds, is as effective in managing cholesterol as taking a starting dose of lovastatin, a cholesterol-lowering statin drug (Jenkins et al., 2003).

The ABC has ongoing research relationships with more than 20 scientific organizations and universities around the world. Cardiovascular research has the largest research budget (24%), followed by research on the composition of almonds (20%), research on antioxidants (19%), cancer research (14%), and research on weight (3%) (www.almondsarein.com). Research projects on topics in the above areas include food allergies, Vitamin E, the chemical composition of almond skins, colon cancer, cholesterol levels and reduction, the effect of almonds on glycemic control and insulin response, and the effects of almond consumption on appetite, energy and weight. The ABC website lists references for 46 publications reporting nutritional characteristics and research results on potential health benefits of consuming almonds.

Avocados

In 1997, the CAC made a strategic decision to proactively communicate the health and nutritional benefits of avocados through their public relations and outreach programs and to fund nutritional research. Research focused initially on a detailed analysis of the composition and nutrient content of avocados, including fatty acids, vitamins, and minerals. Recent emphasis has shifted to quantifying and qualifying various phytochemicals (i.e. pytosterols, carotenoids, glutathione), as well as their health benefits and effects on disease processes. The CAC communicates the results of ongoing research to health and nutrition professionals in publications and on their website. For example, three of the seven short articles in the Summer/Fall 2006 issue of *California Avocado Healthy Times* are based on recent research publications (See CAC website: www.avacado.org/healthy_living/healthcare_professionals.php).

Strawberries

The California Strawberry Commission's health and nutrition research and promotion programs are a change in strategy stemming from changing industry structure. Prior to 2003, the CSC jointly promoted California strawberries with major retailers. This strategy began to conflict with large shippers who were establishing their own brands and also sponsoring joint promotions with retailers. In a major strategic change in 2003, the CSC established a health and nutrition research program and shifted its marketing emphasis to consumer-oriented promotion based on the health benefits of consuming fresh strawberries. The CSC introduced a new promotion campaign, the "Red Edge" campaign, that targets health and nutrition professionals, the consumer, and trade media through trade events, and media materials that communicate findings from CSC-sponsored research on the health benefits of consuming fresh strawberries. In their recent request for proposals, the CSC states: "The primary goal of the California Strawberry Commission nutrition research program is to develop the scientific basis for a qualified health claim in chronic disease prevention. Improved understanding of the bioactive components of strawberries, bioavailability, and mechanism of action are considerations. Priority areas are cardiovascular health, cancer prevention, cognitive function, and obesity." The CSC accepts proposals for up to three years of research funding. The CSC website has references and links to nine research papers related to their research program.

Health and Nutrition Promotion

The promotion strategy used for health and nutrition varies by commodity. Public relations programs have proven to be very effective for dissemination of health and nutrition research results and are used by each of the four commodity groups. Based on laboratory testing of advertising themes, the California Walnut Commission (CWC) concluded that the message on the health benefits of walnuts is best communicated through a third party such as a magazine, newspaper, doctor, nutritionist, or other credible source. The advertising emphasis has been on quality, taste, and uses for walnuts in meal preparation, with public relations used for the health and nutrition message. The CAC also focuses on the use of public relations to disseminate the health and nutritional message for avocados rather than using paid advertising and promotion. The CAC's public relations program, emphasizing health and nutritional benefits associated with avocado consumption, has garnered the attention of news organizations and has been widely disseminated with a modest expenditure of funds. In addition, most consumers place much more credibility on a news story about health and nutrition benefits of consuming a product than they do on advertising with the same message.

The Almond Board of California (ABC) began disseminating results from their nutrition studies through their public relations program during 1997-1998. The 1998 Almond Almanac noted that expenditures of $761,000 on public relations gained exposure that would have cost over $1.72 million using traditional advertising and promotion. During 1998-1999, public relations expenditures increased to $1 million, but the advertising value equivalency of exposures related to health benefits of consuming almonds increased to $7 million (Almond Almanac, 1999). The health message was extended to ABC advertising in Japan during 1998-1999 and to Europe in 2000-2001.

With FDA approval of a qualified health claim for almonds on July 15, 2003 and a "partnering" agreement with the American Heart Association (AHA) that permits use of the AHA logo in almond advertising, the ABC focused on a health message in most of its advertising and promotion. The copy for one 2004 magazine advertisement, for example, reads "California Almonds; Admired by Great Chefs & Prominent Cardiologists Alike" (Almond Almanac, 2004). Note that 2003-2004 advertising and public relations expenditures based on the health and nutrition message accounted for about two-thirds of the ABC budget ($16 million).

Success Encourages Imitation

Marketing program innovations improve the competitive position of commodity groups. Health and nutrition research for almonds, avocados, strawberries, and walnuts, funded by the respective marketing programs, has reported results that document the value of consuming each product. These results are of interest to health conscience consumers and are widely circulated through unpaid newspaper and magazine articles, diet recommendations by health professionals, and recommendations by health organizations such as the American Heart Association and the American Diabetes Association. The value of media space devoted to health and nutrition aspects of these four products is a large multiple of the public relations budgets. In addition, news stories for these commodities are more believable than advertising to many consumers.

There is anecdotal evidence on the value of health and nutrition research, but empirical studies of the impact of research results on product demand are not available. For example, the CWC firmly believes that McDonald's May 2005 decision to add a fruit and walnut salad to its menu in its 13,700 U.S. restaurants was due to the availability of research on the health and nutritional benefits of walnuts. The positive impact of commodity group advertising and promotion on demand has been documented for many products, but the effects of a health and nutrition message versus alternatives have not (Kaiser, Alston, Crespi, & Sexton, 2005). Never-the-less, the perceived success of health and nutrition research programs for increasing product demand is encouraging other commodity groups to undertake similar health and nutrition research.

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Fresh Produce Intermediaries: Impacts of Change in Away-from-Home Food Markets and Trade Practices

by Suzanne Thornsbury, Roger Hinson, Lourdes Martinez, and Dixie Watts Reaves

JEL Classification: L14, L20, L81

The markets and channels that supply fresh produce are among the most dynamic in the food system. Fresh fruits and vegetables, as a group, benefit from trends in consumer preferences. A stream of evidence from the scientific community confirms the health benefits of fresh produce in a world of concerns about health issues. Convenience is essential to many time-starved consumers, encouraging product development and advances in packaging. Most, if not all, fresh produce items are available year-round, and the variety of products has continued to grow. Consumption is dramatically affected by safety issues, as illustrated by the recent illnesses from *E. Coli* on spinach. Continuing consolidation at retail affects supply chain relationships, as efficiencies in that area are thought to be a sustainable competitive advantage. Another dynamic is the emergence of large distributors serving the retail grocery and foodservice segments, placing additional pressure on small- and mid-size companies in the areas of market access and supply chain efficiencies.

Food away from home, or the foodservice sector, represents an increasing share of food purchases in the United States. Expenditures on meals eaten outside the home increased dramatically over the last six decades (Figure 1). Rising incomes, changing demographics (smaller households, busier lives), and other factors have encouraged consumers to expect conveniences from food providers. In this article, we address the food away-from-home segment of the produce industry and the impacts of changes on wholesalers and other intermediary businesses that serve the segment, with implications for firms across the size spectrum. The implications of changing trade practices are also highlighted.

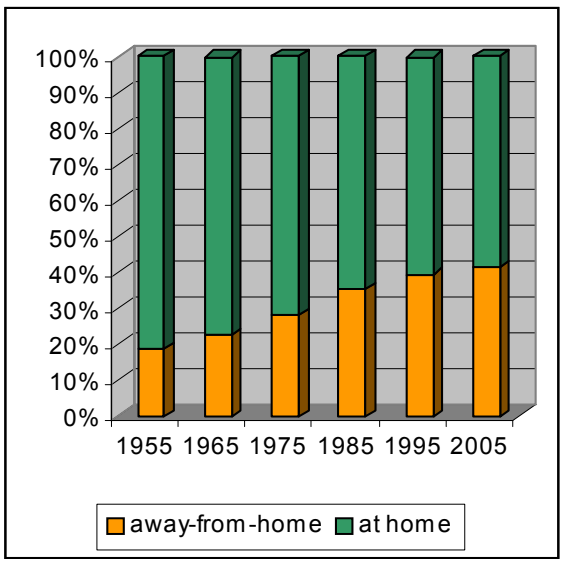

Figure 1. Food away-from-home share increases in the United States.
Source: USDA 2006.

Wholesale and distribution businesses are intermediate stage operations that provide services related to product sale. Historically, a 'wholesaler' operated from a warehouse often in central markets, and usually received and sold goods. A much greater variety of services and functions now characterize this sector.[1] We use the inclusive term "intermediary" to describe agents who (i) take title to product, such as wholesale merchants, distributors,

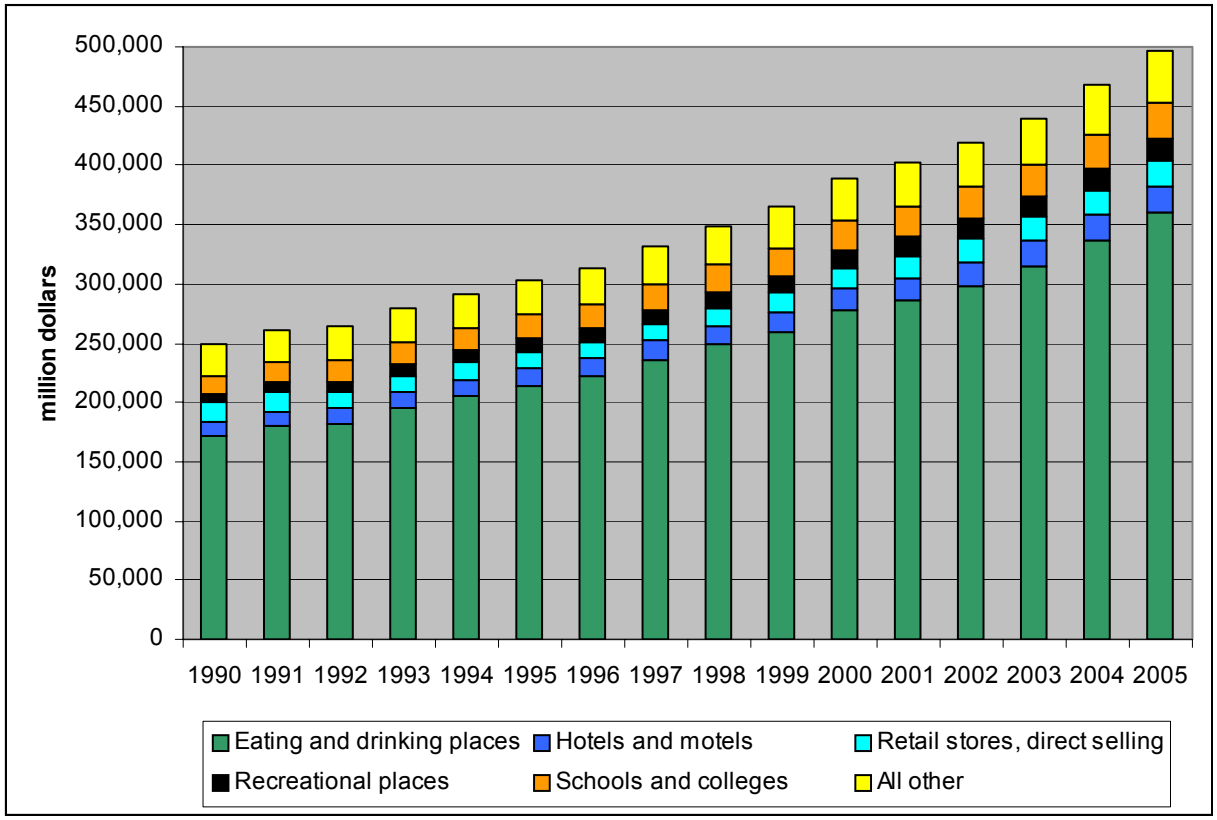

Figure 2. Total expenditures on food away-from-home by type of outlet, 1990-2005.
Source USDA, 2006

import/export merchants, and sales branches; (ii) charge a fee but do not take title, such as brokers and commission merchants; and (iii) provide services such as sorting, packaging, and labeling. Also, there is a common distinction between *broadline wholesalers,* who sell a wide variety of products, and *specialty wholesalers,* who deal with a limited product line, such as fresh produce or dairy products. In terms of distribution of sales in 2002, the four-firm concentration ratio for general line grocery merchant wholesalers was 40%, compared to just under 10% for fresh fruit and vegetable merchant wholesalers (U.S. Department of Commerce, 2005). Since large retail grocers are self-distributors, they are not included in this analysis.

Intermediaries in Food Service

Not only has the proportion of away-from-home food sales grown in the United States, but there have been important shifts among outlets within this broad category (Figure 2). Away-from-home foods normally include restaurant sales (eating and drinking places; hotels and motels), take-away (or ready-to-eat) foods such as prepared food from counters at grocery stores, and institutional foodservice, including schools, military, and retirement institutions. The remaining away-from-home food sales are provided by recreation places, bars, and vending machines. Historically, food away-from-home sales of produce were lower when compared with sales of other food products. This is no longer true. Perosio et al. (2003) estimated that approximately 45% of fresh produce is sold through foodservice channels.

The largest sector of away-from-home food sales remains eating and drinking places, which can be further analyzed by type of outlet. In 2002, sales through full-service and fast food restaurants were almost 80% of the total dollars spent on away-from-home foods (Stewart et al., 2004). Share of sales in fast-food restaurants grew steadily from 29% in the 1980s to 38% in the mid-1990s. The share for full service restaurants declined

1. *Due to the diversity and number of services provided by intermediaries, consistent definition and categorization of firms is difficult. See U.S. Department of Commerce (2005); Harris et al. (2002); and McLaughlin, Park, and Perosio (1997).*

over the same period, from 42% to 38%. Consumer spending in both of these outlets is projected to increase between 2000 and 2020, by 18% at full-service restaurants and by six percent at fast-food restaurants. Even within these two categories there are important distinctions such as the "fast-casual" segment, an important area of fast-food growth (Perosio, McLaughlin, & Cuellar, 2003). Unlike full-service restaurants, fast-casual outlets offer an atmosphere targeted primarily to adults and often feature fresh, high-quality ingredients, including produce.

Chain restaurants (fast-food or upscale establishments) have multiple outlets and often have wide geographic reach. These firms demand high volumes and require consistency, portion control, and other product characteristics across time and outlets. This is the dominant market for broadliners, who reported that about 95% of their sales were made to these buyers (Perosio, McLaughlin, & Cuellar, 2003). In addition to food, broadliners may supply equipment, packaging, uniforms, and other items to foodservice customers.

In contrast to large chain restaurants and the documented concentration of the food retail/grocery segment, most establishments in the foodservice industry remain small-or medium-sized. These businesses include local fast-food, fast-casual, up-scale fine dining, and hotel foodservice, where purchasing is handled by local buyers or chefs. A cross-section of these outlets is prevalent in all geographic regions, a pattern expected to continue in the foreseeable future. Small foodservice establishments often demand smaller volumes of a range of fresh produce, with a product mix that may vary across seasons. They are important and active customers for produce intermediaries. In a study that included both small- and mid-sized broadliners and produce wholesalers, differentiation strategies emphasized high levels of service and product quality, strong specialty product availability, freshness, and daily (or very frequent) service (Hinson, Sinoha, & Reaves, 2006)

The dichotomy in size among foodservice outlets provides opportunities for a greater number of intermediaries to be active in the supply chain when compared with retail food sales. While growth and additional volume in the overall market are one opportunity, changes in the venue, where the food dollar is spent, represent valuable opportunities for produce suppliers.

Trade Practices and Enabling Technologies

Trade practices are the services provided and the overall structure of transactions between intermediaries, their customers, and their suppliers. Evolving trade practices include increased emphasis on product characteristics, chain management, and commitment-based relationships such as strategic alliances. Successful intermediaries (both small and large firms) have been able to adapt and adopt new trade practices to serve different fresh produce customers, including those in away-from-home food markets. Understanding evolving trade practices and their enabling technologies is fundamental for intermediaries who want to gain or maintain market share, or to re-position themselves, within the away-from-home market.

Trade practices based on consumer concerns. Fresh produce intermediaries are aware of the growing concern about health and safety. These concerns include farm-based and handler-based issues such as the use of 'good agricultural practices' to reduce microbial contamination and pesticide residue risks, validation of claims such as organic, and other credence attributes. Preferences regarding origin can be important. Some consumers feel that locally produced fruits and vegetables are fresher and that statements such as 'organic' are more credible from local farmers. The possibility of regulation to require ability to trace a product to its origin has already established traceability as a channel requirement in many cases. Intermediaries often supply these assurances through third-party certification that all parties in the chain, including themselves, are following the rules. Compared with 2000, increased buyer demand for third-party certification and traceability were reported in 2005, with further increases expected by 2010 (Martinez & Thornsbury, 2006). Intermediaries may meet special requests applicable to packaging and organic/environmentally friendly products in multiple ways, including coordination with their suppliers to make product or service adjustments (Hinson, Sinoha, & Reaves, 2006).

Trade practices based on service requirements. For the large number of small- and mid-size foodservice outlets, produce intermediaries provide extensive services to customers. Examples include the willingness to break cases to assemble the mix of products and sizes ordered, delivery of less-than-truck-load quantities, and the ability to adjust orders on short notice. Although some large intermediaries that supply large foodservice establishments (for example, Sysco and Gordon Food Service) also service these small firms, many small foodservice establishments remain

highly reliant on local intermediaries.

Trade practices – the personal relationship. Although the use of contracts has increased particularly among the larger firms, personal relationships with both suppliers and customers remain a cornerstone of exchange in foodservice. Many smaller suppliers maintain a very traditional personal contact approach. Results from a 2005 survey indicated that 31% of fresh produce intermediaries had maintained commercial relationships with their primary suppliers for six to ten years, while 12% had worked with their primary supplier more than 20 years. Long-term relationships are also predominant in intermediary relationships with customers. Over one-third of survey respondents indicated having worked with the same customers for more than six years (Martinez & Thornsbury, 2006).

Enabling technologies and innovations. Enabling technologies have the potential to increase efficiency across the supply chain and include the internet as a platform, hardware for data sources, and intellectual property software. For example, sharing of bar-code and radio frequency identification (RFID) scanner data provides information within firms and across firm boundaries to provide better customer service levels. They can facilitate efficient replenishment and category management. Studies report that produce wholesalers believe inventory management will be increasingly important. Produce distributors used electronic data interchange (EDI) and cross-docking technologies more than their broadline competitors, but lagged in continuous replenishment and automated purchase orders (Perosio, McLaughlin, & Cuellar, 2003). Ratings by small- and mid-size businesses indicated that partnerships and e-commerce would increase in importance, while lower-ranked issues were pallet bar-coding, RFID, returnable containers, and flow through/cross docking (Hinson, Sinoha, & Reaves, 2006).

In addition to electronic technology, long-term partnerships, alliances, and software-based property are knowledge-based innovations that enhance coordination. As an example, Collaborative Planning Forecasting and Replenishment (CPFR) allows firms to coordinate supply chains through sharing of retail-level demand forecasts, which are developed iteratively using a web-based procedure. When forecasts converge to pre-agreed limits, they become the order and the basis for production and replenishment plans (Fleidner, 2003).

While this level of technology and application may be less common among smaller intermediaries, customer and consumer demands are little different from those expected of their larger competitors. Gaining the benefits of these technologies requires both the acquisition cost of the technology and the learning curve associated with implementation. Benefits arise from widespread adoption. While large intermediaries can more easily absorb these costs, small- and mid-size companies are at a disadvantage. Outsourcing to third-party logistics providers is an increasingly important model that helps smaller firms acquire the benefits of technology. Development costs are spread across many customers by the third-party provider, and each intermediary is then able to provide services that in many ways mimic those offered by large firms.

Outlook for Fresh Produce Intermediaries

Demands from consumers are driving subtle and overt changes in fresh produce supply chain requirements and the firms that serve these markets. The dichotomy between large chain restaurants and the many smaller consumer outlets active in the away-from-home food market has provided opportunities for multiple success strategies among fresh produce intermediaries. All intermediaries continue to adapt their offerings to meet the needs of a marketplace increasingly driven by dollars spent on away-from-home foods and evolving trade practices. Large broadline companies generally target chain restaurants and more frequently use partnerships and alliances. They pursue growth goals through existing accounts, increasing market share through acquisitions, and entering smaller markets. More typical fresh produce intermediaries are small- and mid-size businesses with many small accounts. They compete by providing high service levels on items important to their customers, such as small order sizes, special deliveries, procurement of products appropriate to the customer base, and promotion, technology, and other customer support. As a part of chain management, electronic and software-enabling technologies including EDI, barcodes, RFID, and internet platforms have become the standard. Many smaller suppliers, however, maintain a very traditional personal contact approach.

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A Marketing Systems Approach to Removing Distribution Barriers Confronting Small-Volume Fruit and Vegetable Growers

by Charles Hall, John Brooker, David Eastwood, James Epperson, Ed Estes, and Tim Woods

JEL Classification: L11, L25

Fruit and vegetable growers have always faced dynamic, rapidly changing markets because of underlying factors such as consumer tastes and preferences, weather patterns, regulatory legislation, insect/disease infestations, production costs, and marketing logistics. In addition, evidence suggests that significant changes in market structure are occurring in the fresh fruit and vegetable industry in that the flow of produce from farm to consumer follows a different path than it once did. Rather than making heavy use of the wholesale terminal markets, retailers (large ones in particular) are purchasing a larger portion of fruits and vegetables directly from shippers. Farms and supermarkets alike are expanding, while it appears that the wholesaler sector is decreasing in size. Alternative forms of pricing, such as rebates, slotting fees, and other kinds of allowances, are becoming more common. Some industry sources suggest that mergers at the retail level are driving many of these changes.

In light of these structural changes occurring in the produce industry, fruit and vegetable growers find themselves in a continual cost-price squeeze as the downward pressures on price (resulting from the increased purchasing power associated with fewer produce buyers) forces growers to increase their volumes in an attempt to minimize per-unit production and marketing costs. Today's produce transactions are very different from the traditional emphasis/focus on f.o.b. commodity-oriented pricing, with growers competing for shelf space through "ad" pricing. Instead, growers must offer value-added services and product traits demanded by produce buyers, such as: (1) growing varieties that have been specifically designed/developed for taste and nutritional qualities; (2) using cooling technologies in the field, packing shed, and during transport to reduce product temperatures, enhance quality, and increase shelf life; (3) offering on-time and just-in-time delivery schedules, sometimes involving multiple deliveries per week; (4) customizing palletizing, packaging, and product labeling requirements; (5) tracking and traceability from the field to the site of sale; (6) producing in a manner that is "safe," that is, free from microbial and pesticide contamination; (7) developing fresh produce contracts, sometimes on a multiple-year basis; and (8) offering a year-round supply of diverse produce items.

Although these services do tend to act as a means for growers to differentiate themselves from the competition, they also increase costs dramatically, further eroding profits, especially for small and mid-sized fruit and vegetable growers. Volume and per-unit costs are inversely correlated, so unless sufficient volumes can be produced and/or marketed by the grower (or grower organizations) in some vertically coordinated fashion to reduce per-unit costs, the chances of long-term survival are much lower for independent smaller-volume growers.

In the midst of these structural changes, facilitating the roles of key produce industry participants is more involved and crucial than with other crops or livestock, particularly because of the seasonality of fruit and vegetable production, the perishable nature of these products, and the con-

stantly shifting supply from produce regions. Historically, Extension Services, Experiment Stations, and state Departments of Agriculture have been actively involved in the marketing of fruits and vegetables. Production-related research has been conducted over several decades regarding best management practices associated with fruits and vegetables. Research in agricultural economics has focused on the costs and returns of growing, packing, and processing operations; market windows; and competitive position studies. The Cooperative Extension Service has provided educational programs and assistance in facilitating market development. Several types of marketing support have also been provided by state Departments of Agriculture. Notably, several Southern states have provided coordinated development of public marketing facilities and marketing activities. The extent of their involvement seems to be positively correlated with the growth of fruit and vegetable production in their respective states. But none of the extant research viewed produce market development from a small versus larger grower perspective and the ways these operations contributed to the development of market infrastructure and channels from the farm gate to the consumer.

Georgia and North Carolina rank among the top ten U.S. states in income obtained from fruit and vegetable production. The USDA ranks Georgia as third in the United States in harvested fresh vegetable acreage and fifth in value. North Carolina ranks first in the United States in production of sweetpotatoes, flue-cured tobacco, and turkeys raised, while the state's growers are ranked among the leading five states in cucumbers for pickle production, bell peppers, strawberries, blueberries, and snap beans. In Georgia and North Carolina, harvested fruit and vegetable acreage usually exceeds 300,000 acres annually, with sweetpotatoes, watermelons, sweet corn, tomatoes, and sweet onions identified as important sources of horticultural income. In Kentucky and Tennessee, fruit and vegetable sales are relatively small sources of total farm income for most growers, and therefore only limited information is available about horticultural growers. Surveys indicated that, on average, about 10,000 acres of fruits and vegetables were grown in Kentucky annually. The Tennessee fruit and vegetable industry is somewhat larger than Kentucky's, but it is probable that Tennessee growers collectively farm fewer than 60,000 acres of fruits and vegetables each year.

This paper reports on a recent assessment of the comparative produce market development activities in the states of Georgia, Kentucky, North Carolina, and Tennessee because of commonalities such as the prevalence of small farms, the reliance on tobacco as a cash crop, and the comparable growing seasons in all four states. Each state has historically had a large number of small-volume growers, but production in Kentucky and Tennessee has not kept pace with the other two states. To examine the reasons for this discrepant performance, separate surveys were conducted of Extension Services, Departments of Agriculture, growers, and produce marketing agents and market managers.

Extension

County agents with horticultural responsibilities were personally interviewed in each state about produce-related programs, professional training and development activities, and the need for additional support [respondents n = 19 KY; 20 NC; 14 GA; 12 TN]. Extension agents were asked to indicate the relative importance of produce-related information and services being demanded by growers. Overall, there was a fair amount of agreement among the states with respect to the relative positions of the service areas. Pest control was most frequently requested in all three states. Soil tests, market development, and variety recommendations comprised a group of information requests that had comparable overall scores after pest control. The county agents in all four states indicated they had offered programs in establishing or managing farmers' markets; pesticide certification; market pricing; and meetings, short courses, or conferences. North Carolina and Georgia had provided assistance in all the areas listed. Neither Kentucky nor Tennessee had developed programs in agritourism, direct sales to schools and restaurants, or marketing weather-damaged produce. Unlike their North Carolina and Georgia counterparts, Kentucky respondents had not provided information on packaging or vegetable field days and Tennessee respondents had not conducted educational tours of other production regions.

All four states have implemented comparable staffing strategies. However, the divergence in the number and size of produce operations has resulted in quite different numbers of Extension agents with produce responsibilities. In those counties in which there is sufficient activity, there are horticultural Extension agents. Staffing levels in Kentucky and Tennessee were several times lower than those for Georgia and North Carolina. The latter pair of states also had industry-oriented

training programs for new hires that reflected demand in counties where produce production was high. North Carolina had horticultural agents in every county. The simultaneity encountered here was that fewer and smaller produce operations led to lower demand for Extension programs with respect to not only staffing, but also in terms of production, post-harvest handling, and marketing support.

Growers

Produce growers in each of the states were also surveyed [respondents n = 385 KY; 87 NC; 198 TN]. Kentucky and Tennessee farmers tended to have smaller operations in terms of acreage, produce sales, and farm income than the typical Georgia and North Carolina counterparts. Growers were asked to estimate the percentages of their sales that went through each of the possible market outlets. The weighted averages by state for each type of outlet were calculated, and both Tennessee and Kentucky had significantly higher concentrations of direct market sales than Georgia and North Carolina. Tennessee's largest outlet share was "wholesalers," while North Carolina was almost evenly split between "direct to retailers" and "wholesalers" and had the highest average for "direct to retail store." The share for Tennessee's "wholesalers" was larger than the other two states, and Kentucky had the largest share of weighted sales going to "co-ops." Notable among the percentages is the "shipper-packer" share for North Carolina, which was 17.4% versus less than 1% for Kentucky and Tennessee.

The extent of North Carolina and Georgia's produce activity vis-à-vis Kentucky and Tennessee, was consistent with the produce-related behaviors of the typical growers in the states' samples. The percentages of each state's grower respondents indicating interest in expanding their operations were 58% for Kentucky, 69% for North Carolina, and 53% for Tennessee. Respondents were given a list of 14 factors that could limit expansion and were asked to indicate the extent to which they were limiting. The rankings of the average scores were similar across states, with "labor availability, market outlets, and prices received" being the three highest factors stated, and "equipment, transportation, and credit availability" the lowest. North Carolina growers tended to indicate that "prices received, market outlets, and cooling" were limiting, which is consistent with these growers having greater interaction with the commercial distribution system. Tennessee growers were more likely to have indicated "disease control" was a problem.

In general, the level of grower activity in North Carolina and Georgia greatly exceeds that found in Kentucky and Tennessee. North Carolina and Georgia growers have created "critical mass" in terms of volumes and interest in marketing, compared to Kentucky and Tennessee. For example, when asked to indicate the organizations or people they would consult with about marketing a new crop, the states had similar proportions of growers who stated they would first ask "other growers," closely followed by "Extension." The only exception was "the co-op," for which Kentucky and North Carolina were more likely than Tennessee growers to use as a market information source.

Produce Marketing Agents

We interviewed representatives from "marketing agent" firms, defined as that subset of wholesalers who conducted the bulk of their transactions in the four-state area and were in business primarily to buy and resell fruits, vegetables, and melons [respondents n = 10 KY; 19 NC; 9 GA; 35 TN]. The number of these intermediaries that operate in the respective states is one important indicator/measure of the extent of market development in each state. Secondary references (e.g., the Red Book and Blue Book) indicate that Georgia and North Carolina have considerably more marketing agents than Kentucky or Tennessee, which is reflective of the greater orientation toward the commercial produce-marketing systems in those states. Important functions that these intermediaries provide include buying in bulk quantities from growers, grading and repacking, fresh/canned/frozen processing, refrigerated storage, and sales and transport to independent grocers, institutions (e.g., hospitals, schools, etc.), restaurants, supermarket warehouses or retail sites, and other distributors. The ability of small independent growers to forge relationships with these agents is more limited in Kentucky and Tennessee. That is, the lower frequency of larger growers in these two states lowers the likelihood that smaller growers have had the opportunity to work with marketing agents. And, as noted in the next section, the scope of the activities at public markets in Kentucky and Tennessee exacerbates the problem.

Public Market Managers

To be included in the survey, these markets had to have a manager, be open for the entire harvest season,

have permanent buildings, and have received public financial support. Kentucky had no such market. Georgia had six, and North Carolina and Tennessee both had five of these markets. Managers of each of these markets were interviewed. All three states with public farmers' markets received some level of public financial support to cover operating costs, utilities, and/or capital expenditures, so none were completely self-supporting. Georgia was the only state in which utilities were subsidized. North Carolina markets received their support from the state. Georgia and Tennessee also obtained financial assistance from cities, counties, and development districts. Only one market (in Georgia) had received federal funds. Funding is a critical issue, however, and the success of the markets with respect to fostering the development of the produce industry from the farm through the retail levels varied by state. The results of these interviews revealed the importance of the inherent simultaneity associated with market development, and the synergy associated with having a *variety* of marketing activities occur at centralized locations.

Kentucky and Tennessee are similar in that there are no public outlets for produce marketing other than retail. Hence, there is little incentive for growers to provide adequate supply to attract stakeholders who are involved in other market channel activities, such as brokering, wholesaling, and repacking. On the other hand, Georgia and North Carolina have created facilities that encompass a range of produce-marketing activities, including retail. In addition, these markets have successfully encouraged complementary enterprises, such as food distribution and institutional suppliers (e.g., for school systems), to locate in close proximity to these state markets. The variety of marketing activities encourages production because growers have alternative outlets available at centralized locations. Similarly, wholesalers, brokers, and repackers operating independently have the retail markets as backups to fill unexpected orders. Furthermore, retail vendors often look to the wholesale side of the market to fill in product shortages. This tends to offset the seasonal aspects of the retail activity, increase the range (diversity) of products offered at the market, and accentuate the appearance and perception of being a professionally run market. The breadth and scale of operations tend to be self-sustaining. The wholesale side of these public markets is successful in generating sales dollars and volume, while the retail side is successful in generating awareness and public support for the markets.

State Departments of Agriculture

Within each state Department of Agriculture, people responsible for fruit and vegetable marketing were interviewed. Georgia and North Carolina indicated the greatest numbers of their respective department's staff are assigned to fruit and vegetable marketing with 20 and 15 marketing specialists, respectively (not including market managers or assistant managers). Interestingly, several of North Carolina's Department of Agriculture staff are former Extension agents. Kentucky and Tennessee had considerably fewer personnel assigned to produce marketing with six and one staff persons, respectively.

In Georgia and North Carolina, a number of publicly funded farmers' market facilities were built. The state of North Carolina built five public farmers' markets, while Georgia constructed 16 publicly funded community markets. Conversely, the states of Tennessee and Kentucky did not build a single farmers' market facility using state appropriations, although several city and county governments in Tennessee did construct community markets that serviced local produce and specialty crop growers.

Marketing services from Departments of Agriculture typically included fruit and vegetable directories of growers, packers, wholesalers, or brokers (several were also on-line Internet-based directories); state-focused generic promotional programs; trade show hosting and promotions; export promotions and reverse trade missions; farm-to-school programs where produce is sold and distributed to local school systems; and sponsorship of state farmers' markets and/or marketing centers.

The types of financial support offered to fruit and vegetable growers by the respective departments differed between North Carolina/Georgia and their Kentucky/Tennessee counterparts. Georgia and North Carolina provided funding for advertising, promotion, and market development grants; salaries of market managers (North Carolina even provided salary funds for market workers); subsidies to pay for the utilities of state farmers' market facilities; and organic third-party certification. Kentucky and Tennessee only provided grants for advertising and organic certification. Both North Carolina and Georgia reported an increase in funding over the last five years.

Publicly sponsored (through Departments of Agriculture) produce markets also play a key role in market development. Managers of all the

public produce markets (for which there were permanent buildings and utilities on the sites) were surveyed during 2001 to obtain a snapshot of the types of market channel activities present in each of the four states. Kentucky had no such markets in 2001, although there were seasonal tailgate community markets in the state. There were six, five, and five farmers' markets in Georgia, North Carolina, and Tennessee, respectively, that were included in the public market manager survey. Wide disparities in the scale of operations were present within the Georgia and North Carolina markets. With the exception of one market in Tennessee that only focused on assembly/packing/shipping, all of the markets had retailing activity.

This suggested that Tennessee and Kentucky producers had fewer marketing options and assistance available to them than did either North Carolina or Georgia growers. Marketing assistance was critical for many Kentucky and Tennessee farmers, because most farms (about 91% in Tennessee and 88% in Kentucky) reported total annual sales of less than $50,000 in 2000. In Georgia and North Carolina, a majority of farms also reported total annual sales less than $50,000, but a large percentage (25%) of firms reported sales greater than $50,000. Thus, the average sales figures in Georgia and North Carolina were much higher. In addition, the steady-to-declining demand reported by many Tennessee and Kentucky growers was in direct contrast to the positive sales growth reported by other growers, especially Georgia and North Carolina growers.

Simultaneity and Produce Market Development

The disparity in the development of the produce industries among the states studied is only partially related to grower behaviors. Results of the surveys of the four other stakeholder groups indicate they have important roles in overcoming the simultaneity barriers in market development. In general, the level of activity in North Carolina and Georgia has exceeded that found in Kentucky and Tennessee.

Differences have been identified for the breadth and variety of programs and in the number of people involved with produce marketing activities. With respect to public farmers' markets, the states differ widely in terms of the financial support and the types of facilities in operation. For example, Tennessee does not provide any operating assistance for them, whereas North Carolina does. The types of facilities also vary. The Tennessee and Kentucky markets generally provide limited services. North Carolina and Georgia accommodate brokers and wholesalers at several of its locations, which also have cooling and repacking capabilities. The number of brokers and wholesalers operating in each state varies. Both Kentucky and Tennessee have fewer of these stakeholders versus North Carolina and Georgia. Extension programs with produce marketing emphasis are quite different. The latter has many more programs to assist growers in marketing their crops, including activities to bring buyers and growers together. The Tennessee Department of Agriculture has one full-time produce marketing position, while North Carolina has nearly thirty.

Taken together, the surveys point to the need for critical masses to be present in order for development to proceed. A sufficient number of large growers, who may also be shippers, is needed to attract buyers at the first-handler level. Just building facilities is insufficient as critical masses of buyers and sellers need to come together with products that are in sufficient volumes, over sufficient time periods, and with the properties that buyers want. Then, smaller operations have outlets for their production beyond direct outlets, such as roadside stands and farmers' markets. Extension and state Departments of Agriculture need to have the personnel and programs in place to assist in produce marketing decision making and in bringing buyers and growers together. Public markets with facilities to attract brokers, wholesalers, and repackers could help facilitate development.

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Reducing Obesity: What Americans Can Learn from the Japanese

by Benjamin Senauer and Masahiko Gemma

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Japan has one of the lower rates of obesity, although it is increasing as virtually everywhere, and the United States has one of the highest rates of obesity in the world. Only 3.6% of Japanese age 15 and over had a Body Mass Index (BMI) over 30 in 2002, which is the international standard and is determined by dividing a person's weight in kilograms by their height in meters squared (Ministry of Health, Labor, and Welfare, Japan, 2002; WHO, 2006). In contrast, 32.0% of Americans age 20 and over were obese, and a total of 66% were either overweight (BMI over 25) or obese in 2003-04; some two-thirds of the adult population (NCHS, 2006). Because the distribution of body fat affects health risks and Asians tend to have more abdominal fat at lower BMI levels, the Japanese government uses a BMI over 25 to define obesity. For Japanese age 20 and over, the same age group as for the U.S., 25.6% had a BMI over 25, which is still lower than the U.S. rate. Much can be learned about how to reduce obesity in the United States if we can explain why the rate is so much lower in Japan.

Being obese and overweight is associated with an increased risk of many chronic diseases and premature death, plus significant increases in health care costs (WHO, 2006). Viewed at its simplest, a person gains weight when their caloric intake exceeds the calories expended through basic metabolism and physical activity. The average person in Japan both eats less and is more physically active than the typical American.

Food Consumption, Prices, and Dietary Traditions

The average daily intake of Japanese over one year old was 1,930 calories in 2002, whereas Americans ages 1-85 consumed 2,168 calories on average in 2001-02 (Ministry of Health, Labor, and Welfare, Japan, 2002; NCHS, 2006). The typical adult in Japan is smaller in stature than the average American, thus obviously needing fewer calories. However, this factor explains only a modest portion of the difference of over 200 daily calories. Moreover, the average daily fat consumption in Japan was 54.4 grams, compared to 80.6 grams in the United States.

Food balance sheets, also referred to as food supply and utilization data, can be used to compare the per capita availability of calories back to 1960 in the two countries. The quantities of food available at retail are derived by applying conversion factors, which account for losses in processing and distribution, to the estimated supply of each agricultural commodity, such as potatoes. The nutrients across all food categories are aggregated to determine the nutrients available for consumption. The calories available rose only slightly in Japan between 1960 and 2003, from 2,291 to 2,558 (Ministry of Agriculture, Forestry, and Fisheries, Japan, 2005). Over the same period, the U.S. per capita availability of calories increased from 3,100 in 1960 to a rather astounding 3,900 in 2003 (ERS, USDA, 2006). While the increase from 1960 to 2003 was only 267 calories per capita in Japan, in the United States it was 800 calories per person. As expected, these figures are higher than actual caloric intake, which was provided in the previous paragraph. However, this data does suggest the sheer abundance of food, especially calorie dense food, Americans have available and, hence, are tempted by. A reflection of this is the "supersizing" of serving portions, with many Americans losing any sense of what a normal serving size should be.

Expenditures and Prices

As is obvious to anyone who visits Japan, food is considerably more expensive than in the United States. As a share

of total consumer expenditures, the average Japanese household spent 23.2% on food in 2003, 19.6% for food consumed at home, and 3.6% for food away from home (Ministry of General Affairs, 2005). In comparison, the average American household devoted only 13.1% of their total expenditures to food, 7.7% for food at home and 5.4% for food away from home in 2003 (Bureau of Labor Statistics, 2005). Per capita income is almost as high in Japan as in the United States, so this difference can not be explained simply by the decline in the budget share spent on food as incomes rise. The Japanese spent 84.5% of their total food expenditures for food at home, while Americans spent only 58.8%. Dietary content can be better controlled when preparing food at home than eating away from home.

A comparison of prices in 1999 found the overall price of food to be 49% higher in Tokyo than in New York City (Ministry of General Affairs, 1999). The authors made a simple comparison of prices in April 2006 in a grocery store in Tokyo and a supermarket in St. Paul, Minnesota. For a loaf of white bread, a carton of eggs, a pint of Haagen-Das ice cream, and five kilograms of medium-quality rice, the Tokyo prices were more than double those in Minnesota. Japan has long been criticized for its protectionist rice policy, which causes the domestic price to be far higher than the world market price of rice. The food supply chain is far less efficient in Japan, with more layers than in the United States, where intensive competition and information technology has substantially reduced distribution costs. However, given their high level of income, food prices have a limited effect on the Japanese level of caloric intake. A comparison of the relative prices of more healthy foods, such as fruits and vegetables, and other foods, such as fats and sugar, in the two countries would be an interesting topic, but is beyond the scope of this paper.

Dietary Traditions:

The traditional diet in Japan is built around a base of rice and other grains, with plentiful consumption of vegetables and fruits, and also fish, but relatively little animal fat, meat and sweets. In Japan, the presentation of the food is very important, and particular attention is given to the colors and textures. There is an old Japanese saying, "we eat with our eyes." Portions are much smaller at Japanese restaurants or in home-prepared meals than is typical in the United States. An elegant dining experience might consist of dozens of small dishes, some no more than a few bites. The meal is meant to be beautiful, as well as delicious. Fruit is usually served at the end, rather than a rich dessert. Traditionally in eating, the Japanese have applied the concept of "enryo" (restraint) (Samuels, 2005). Although more Western foods are being eaten, traditional food customs are still quite strong in Japan.

On a recent visit to a daycare facility in Tokyo by the authors, the careful attention to the nutritional quality of the food provided was impressive. A sample lunch is placed under a glass cover for all the parents to see as they pick their children up at the end of the day. A newsletter provides the meal plan to the parents in advance and suggests foods to serve at home to nutritionally complement those provided at the daycare. In addition, unlike in most American schools, students are taught even at an early age to appreciate and respect food. The students must wash their hands before eating and are expected to use good table manners. They sit at low tables with small chairs and are served their trays individually. Before eating, they thank the farmers who grew the food and those who prepared it.

Physical Activity and the Cost of Inactivity

Another explanation for the much lower rate of obesity is that the Japanese are more physically active than Americans. However, this is not because they go to the gym or engage in planned physically activities more than Americans. Only 29.7% of Japanese age 20 and older reported they engaged in regular physical exercise activities in 2002 (Ministry of Health, 2002). In 2003, 46.0% of Americans 18 and over said they engaged in a moderate level of physical activity for 30 minutes or more at least five times per week, or a vigorous level for 20 minutes or more at least three times a week (U.S. Census Bureau, 2006). However, these figures may be inflated since they are self-reported.

Walking

The major difference is that Japanese walk much more in their daily lives than Americans. Walking is a simple, but effective form of exercise in which everyone except the disabled can engage. The average person in Japan, 15 years old and above, walked 7,421 steps per day in 2002, about 3 ¾ miles at 2,000 steps per mile (Ministry of Health, 2002). Men walked an average of 7,573 steps and women 7,140. A recent nationally representative survey of Americans on walking by Harris Survey found that men walked an average of 5,940 steps and women 5,276 (Hill, 2006). Pedometers were provided to participants in both surveys that counted their steps. The average

length of a step for the Japanese may be less than for the average American, who is taller, but only modestly so.

The Japanese walk an average of about 2,000 steps more per day than Americans, which burns about 100 additional calories (Shape Up America, 2006). The reason they walk more is they rely far less on automobiles and far more on mass transit to get around. The use of public transportation usually entails walking, since it does not take you from the door of your home to that of your workplace or other destination. Americans who commute to work in their cars or drive to go shopping may simply drive from their garage and then park only a few hundred feet or less from their workplace or the shopping mall, doing whatever they can to minimize any walking. Moreover, in crowded Japanese cities, the easiest way to get somewhere nearby is to simply walk.

Costs of Automobile Use and Public Transportation

There is an economic explanation underlying this disparity in walking between Japan and the United States. The cost of owning and operating an automobile is much higher in Japan, whereas the cost of using public transportation is lower. The Japanese co-author of this article owned a car when he lived in the United States for several years, but he does not own one in Tokyo because it is too expensive.

In terms of the costs of operating a car, the price of gasoline in Japan is about double that in the United States. In addition, the ownership and operation of a car is particularly expensive in Japan because of high automobile taxes and registration fees, mandatory bi-annual inspections, and high parking fees in large cities (Japan-Guide.com, 2006). Anyone who lives in a large city and does not have a parking space for their vehicle must pay a parking fee, which is approximately $300 per month in Tokyo, some $3,600 annually. In densely-populated metropolitan areas, where a majority of the Japanese live, driving your own car is inconvenient. Major Japanese cities are not designed for commuting from outlying areas or traveling within the city by car. Unlike in the United States, cities do not have extensive networks of freeways and expressways or even many broad boulevards. In addition, most American cities have lots of underground and/or above ground parking structures; Japanese cities do not. On the other hand, major Japanese cities have some of the best mass transit networks in the world.

From the economists' viewpoint, the time costs are much lower to use public transportation than an automobile in Japan. Unlike the United States, where many companies subsidize driving by providing parking for their employees or paying for their parking costs, in Japan, many businesses pay for their employees' commuting costs using public transportation (Japan-Guide.com, 2006).

Lessons for the United States

The lower obesity rate in Japan reflects deep structural differences between the two nations. This study, therefore, highlights how challenging reducing the incidence of obesity will be in the United States. However, this comparison does suggest some possible approaches to addressing the problem of obesity. Policies that raise the cost of driving in the United States and make other forms of transportation more convenient, would increase walking in our everyday lives. The recent sharp increase in the price of gasoline is encouraging some Americans to switch from driving to mass transit (Peterson, 2006).

In most cities, mass transit and other alternatives to driving, such as walking and biking, have suffered from under-investment for decades. One of the factors keeping people in their cars is the inconvenience of public transportation, the high time costs, because of poor service. Encouragingly, a number of cities are expanding and improving their mass transit systems. There are fundamental contrasts between the two countries that limit the feasibility of mass transit in many areas of the United States. Although 79% of Americans live in urban areas, public transportation will never be a viable alternative for many, in part because of the complex daily travel patterns of numerous people (U.S. Census Bureau, 2006).

Therefore, other efforts must be made to make exercising more convenient, especially walking. More funds could be put into walking and bike pathways. Walking in many areas needs to be made safer from dangers posed by traffic or crime. Many sprawling U.S. suburbs do not even have sidewalks for walking along busy streets. Employers could give an extra half hour at lunch time to employees who used the time to walk or otherwise exercise. Companies and other institutions could provide on-site exercise facilities or subsidize athletic club memberships for their workers, which could pay off by reducing health insurance expenses. There are several programs, including America on the Move and 10,000 Steps, that provide blueprints to encourage walking for individuals and communities.

Changing Americans' dietary habits will be difficult. Very high taxes have been imposed on cigarettes

and other tobacco products to improve the public's health. However, eating is not like smoking. Eating is both an absolute necessity and intrinsically healthy, whereas tobacco has unquestionably been shown to pose serious health risks. Some have proposed a tax on soft drinks and high sugar foods, which have a high caloric content and lack other nutrients (Squire, 2006). However, a tax on foods for the purpose of reducing obesity would be viewed by many Americans as interfering with the freedom of choice that is seen as the right of adult consumers. A subsidy that lowered the price of fruits and vegetables, encouraging their consumption, might be considered though. A major effort needs to be launched by the government, with the help of the food industry, to educate Americans on what normal serving sizes should be for various foods. Our nation's schools can help start changing young Americans' attitudes towards food from a predominant focus on convenience and quantity.

The key lessons from Japan are that Americans need to eat less, giving more attention to the quality of food and less to the quantity, and get more exercise, particularly by adding more walking to their daily lives.

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Winners and Losers: Formula versus Competitive Funding of Agricultural Research

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State Agricultural Experiment Stations (SAESs) were established with federal formula funding by the Hatch Act of 1887. In 1955, the Hatch Act was amended and a number of subsequent formula funding programs were consolidated under the USDA Cooperative States Research Service (CSRS), which today is known as the Cooperative Research, Education and Extension Service (CSREES). Currently, all of the Hatch funds and a small amount of other formula funds go to SAESs. In 1977, CSRS established its first competitive research grant program. However, this program remained quite small until 1990, when it was re-named the National Research Initiative (NRI) Competitive Grants Program with a much larger funding authorization. Currently, the SAESs account for 60% of U.S. public agricultural research, with 7% of SAESs funding obtained from Hatch funds and 2.3% from NRI Grant funds (Huffman & Evenson, 2006b, pp. 107, 117-118). Hence, the SAES system has become relatively diversified in its funding sources after starting with only Hatch funding.

The characteristics of these funding sources are quite different from a SAES perspective.

- Formula funds are allocated among the states by a legislated formula, the choices of projects and scientists to support are made locally, oversight is local, and funding is recurring.
- Grant or NRI funds are allocated to proposals submitted to programs with identified priority areas; only a small share of submitted proposals are usually funded; the process consumes many resources relative to grant funds awarded, and there is no guarantee of success or continuation of funding after the initial grant period.

The composition of these funds has changed substantially over time. From 1980 to 2003, the USDA-administered federal formula funds declined by 57% or $124 million (2,000 dollars; Huffman & Evenson, 2006a). Over this time period, NRI appropriations increased by $120 million, but less than 40% of NRI funds go to the SAESs. The remainder goes to non-SAES units, especially those in non-land grant universities. Hence, CSREES funding of SAESs has fallen dramatically over the past 25 years. Other changes in SAESs' funding have also occurred since 1980. They include an 88% increase in grants and contracts from non-USDA federal agencies, a 51% increase in contract, grant, and cooperative agreement funding from USDA agencies other than CSREES, and a 100% increase in Congressional earmarks or special grants for research.

Prospects are that the funding composition will continue to change. In the Fiscal 2007 Budget of the United States, President George W. Bush proposed further reductions and eventually elimination of federal formula funding for agricultural research, while replacing these funds with a new competitive grants program for State Agricultural Experiment Stations with perhaps a regional focus. The proposal seems likely to be rejected by Congress, but new proposals to redirect federal formula funds seems likely to resurface in the future. This raises questions of who wins and who loses from such a policy change.

This article examines who wins and loses from a change in the composition of federal funding. We explore the implications by examining

- Differences in who sets the research agenda,
- Implications for priorities in long- and short-term research,

- Capacity to respond to local needs,
- Cost efficiency of distributing funds,
- Distributional effects across the states and regions,
- Payoff to society, and
- Sustainability of future funding.

Who sets the research agenda?

A major issue across alternative research funding mechanisms is who sets the research agenda. With federal formula funds, the research agenda is set by the states, either by the scientists, the SAES directors, or a combination of the two. With a national competitive grant program, the research agenda is set by CSREES, which uses input from the National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board and other advisory groups (Board on Agriculture and Natural Resources, 2001, pp. 86-89). The current CSREES grant agenda tends to take a national perspective, but is also subject to political influence from various lobbying groups, as well as fads in research and public administration. Because crop and livestock production is sensitive to local and regional geo-climatic and economic conditions, many important agricultural research problems are local or regional and not national in nature. If formula funds are eliminated or dramatically reduced, SAES directors in small heterogeneous states might find it difficult to undertake sufficient local agricultural research to meet local needs. Research and extension faculty would spend a greater proportion of their state-funded time writing proposals for federal grants and conducting research on grants based on Federal priorities, with a smaller share of their time addressing state-level research needs. Some experiment stations would also risk losing matching state funds, the amounts of which are tied to the amount of federal formula funds to be received. Hence, there is more at stake than just federal formula funds for agricultural research. Therefore, the influence of national, and perhaps regional, research interests would likely increase at the expense of the influence of local farmers, consumers, and agri-business firms.

How would changes affect the willingness of scientists to undertake longer-term research objectives?

Federal formula and state funding provide secure funding to scientists across a broad set of disciplines related to agriculture for undertaking projects that require sustained multi-year efforts before major objectives and large payoffs can be obtained. Examples of research that took decades to complete, but that generated very high payoffs, include the discovery of hybrid corn (Huffman & Evenson, 2006b, pp. 159-161) and of tillage systems that conserve soil and provide outstanding crop yields.

Uncertainty about when and if scientists will obtain competitive grant funding, coupled with typically shorter- run priorities in grant funding, reduces opportunities for long-term pursuits and shifts research efforts toward shorter-term projects with more predictable outcomes (Huffman & Just, 2000). A larger federal competitive grants program might have the advantage of leveraging state and federal formula SAES funding to focus on medium-term national needs. This focus, however, comes at the cost of reduced opportunities for long-term research. Also, for some states a significant reduction in formula funds might erode their overall capacity to undertake agricultural research. This would mean closing campus and outlying research facilities and research farms. Under the proposed changes in science policy, SAESs would lose flexibility to purse long-term agricultural research objectives, while agricultural research with medium-term national or possibly regional objectives would gain.

Would changes affect the capacity of states to meet local and regional needs or to respond quickly to crises?

Examples of research efforts generating high-payoffs for locally-important crops include developing

- cultivation methods and new varieties of wild rice in Minnesota,
- blueberry cultivars with improved taste and yield in Maine, Michigan, and Vermont,
- wastewater management research in Maryland and North Carolina, and
- improved procedures for combating a new wheat rust in Kansas.

These types of projects are disadvantaged when research funds are allocated by national or regional competitive grant programs, either because these programs are cumbersome and time-consuming to organize, or because they cater to national or regional, and not local, research needs. Also, once scientists have been awarded a large, multi-year competitive grant to undertake a particular line of research, their effort is "locked-in," and they are unable to redirect their efforts to important, new, and emerging local and regional issues. Hence, local research interests would lose and national research interests would gain.

What is the relative cost of distributing the two types of funding?

Compared to external competitive grants programs, formula funding has low administrative costs. Federal formula funds are distributed to the states by a fixed formula: part is allocated equally to all states, part is allocated to states according to their share of the farm and rural populations, and part is allocated for multistate research (Huffman & Evenson, 2006b, pp. 23-25). Allocation of these funds to individual research projects and scientists is under the control of the local SAES administration and is subject to local, but minimal national political pressure. Historically, SAES Directors have built ties to local clientele groups to help prioritize state research needs and have then integrated this information with the research capacity of their local scientists to allocate the total research budget. SAES administrators have generally required a small amount of proposal writing and evaluating, preferring that their scientists dedicate their efforts to conducting research and publishing discoveries. These administrators have a variety of tools for setting incentives for scientists, including repeat contracting and annual evaluations for salary increments.

In contrast, competitive programs significantly increase the amount of scientists' time allocated to proposal writing, assisting with peer review of research proposals, and peer-panel decisions on which proposals to fund. In fact, a new layer of CSREES bureaucracy has been added to coordinate and administer the NRI and other national competitive grant programs. Costs imposed on scientists of competitive grant research are not funded by the NRI or by most other external competitive grant programs. At the current NRI research proposal funding rates of 5-12%, large amounts of resources are being consumed per dollar of research grant funding reaching scientists from this program (Huffman & Just, 1999a). In addition, while federal formula research funds do not pay indirect costs to recipient institutions, the NRI permits indirect costs equal to 25% of project direct costs.

Additionally, the Bush Administration's grant program proposal suggests full funding of indirect costs, which would raise the current indirect cost rate on the NRI to an estimated 45-55% of direct project costs and use this higher indirect cost rate on the new grant program for the SAES.[1] Although land grant universities vary in how they use the revenue from indirect costs, it is common for central administration to take 50% or more of these funds and for the remainder to be split between the college and department of the recipient principal investigators. It is unusual for the principal investigator(s) of an externally funded project to receive part of the revenue from indirect costs. Indirect costs are primarily an accounting concept and not an economic concept, and a university's indirect cost rate for federal grants is a negotiated rate between the institution and the Office of Management and Budget (May & Sarson, 1999).Hence, the new Bush policy would significantly increase the amount of scientists' efforts allocated to proposal writing and evaluating and the share of CSREES research funds allocated to university indirect costs.[2] Central university administrators would in general win, but the SAES system would in general be losers. If non-land grant universities were eligible for new CSREES grant funds, then scientists and administrators outside the SAES system would be gainers at the expense of the SAES system. In fact, unless the pool of competitive grant funds is increased dramatically, the actual funds reaching SAES scientists will decrease.

Which states would be likely to gain or lose?

Competitive grant funding tends to favor institutions that have a large research infrastructure supporting research proposal writing and administration. In 1990, all but 11 SAES units received more than 90% of their CSRS-administered funds from federal formula funds and just 10% from competitive grants. Experiment Stations with larger shares from competitive grants included Massachusetts, New York, Florida, Michigan, Wisconsin, Arizona, California, and Oregon. In 2004 these same states, plus Maryland, Rhode Island, Kansas, Iowa, Illinois, Indiana, and Texas, were the leaders. The states that remain heavily dependent on formula funds are the ones likely to be the most disadvantaged by a shift toward increased funding through competitive grant programs. They are New Hampshire, New Jersey, W. Virginia, Georgia, Louisiana, Minne-

1. *Indirect cost revenue goes to pay for university administration, research facilities (infrastructure), and utilities to laboratories, which are not easily attributable to individual projects, and hence not permitted under project direct costs.*

2. *It is a data-intensive and time-consuming process for universities to document and defend their request for an indirect cost rate to the Office of Management and Budget (May & Sarson, 1999).*

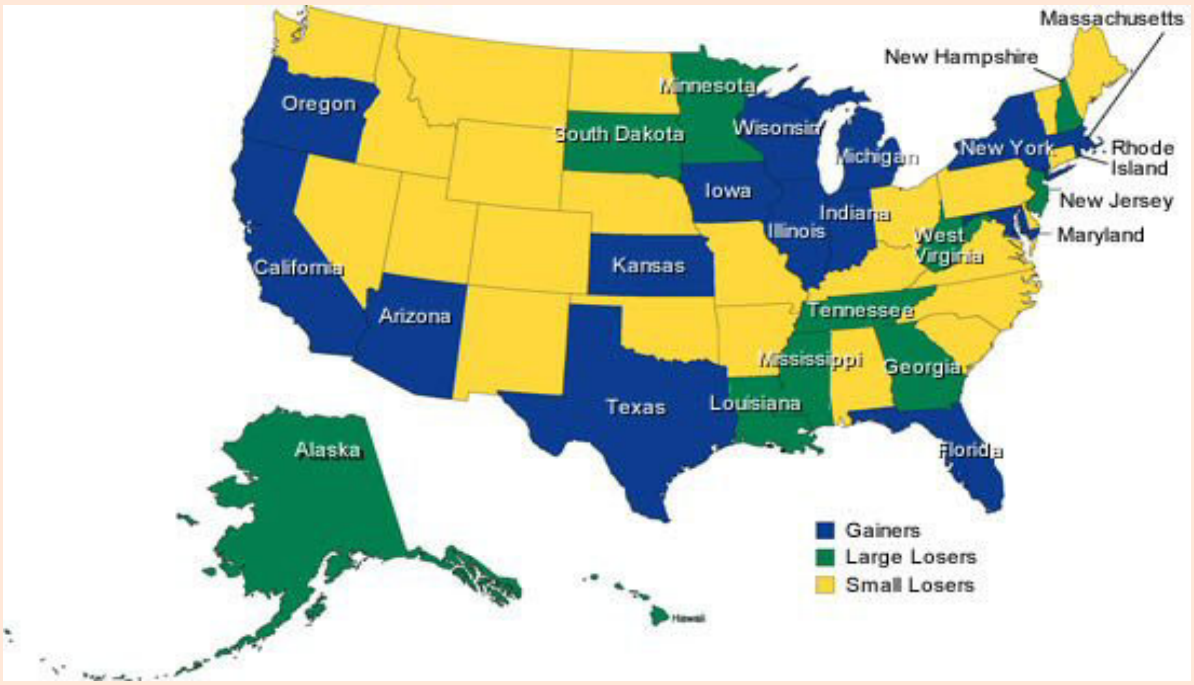

Figure 1. States likely to gain or lose from a CSREES increase of competitive grant funding and decrease in formula funding.

sota, Mississippi, Tennessee, South Dakota, Alaska, and Hawaii. The other 24 states would be small losers. See figure 1. In general, states where the SAES is part of a mid- to large-size land grant university outside of the South-Southeast would be winners and others would be losers, including states with a small agricultural sector. If the new grant program were regional in nature, this would provide a more equitable distribution of the research funds across regions, but it would sacrifice much of the potential gains from high scholarship.

Would society gain or lose?

Under the Hatch Act, federal formula funds are allocated for research across problems in agriculture, marketing, forestry, home economics, and rural and community development, which are researched from the perspective of several disciplines. Washington administrators sometimes suggest that this is too broad—topics or disciplines— or not adequately targeted on important national issues, reducing its overall impact. In addition, a claim is sometimes made that this research is not subject to rigorous research methods, and that projects are reviewed infrequently. But scientists working on these projects must publish in scholarly outlets in order to prosper professionally. Thus, the expectations set by their colleagues and university administrators are a critical factor affecting scientists' efforts in research and other activities. As evidence that public agricultural research is productive, Huffman and Evenson (2006a) found that the social rate of return to public agricultural research remains high—about a 50% real rate of return. However, they also found that shifting federal formula to competitive grant programs would lower its impact and rate of return. In a related study, Huffman and Evenson (2006b, pp. 276-278) found that from this type of fund reallocation only California, Oregon, and Wisconsin would likely benefit from increased research productivity, while the other 45 contiguous states would likely see a decline in productivity. Hence, a case can be made for increasing federal formula funding.

The production process for scientific discoveries contains uncertainty. Scientific efforts result in a continuum of output from no discovery to a revolutionary discovery. Furthermore, unanticipated discoveries sometimes occur. Hence, the social payoff or value of any research project is initially unknown. The uncertainty to stakeholders in scientific discovery can be reduced by research administrators choosing to undertake a portfolio of diverse projects with diverse incentives for

discovery (Huffman & Just, 2000). This implies that more than expected returns are at issue. With a variety of research funding mechanisms, such as federal formula and competitive funding, it is possible for some scientists to be working with strong incentives for discovery and others with weaker incentives. Simultaneously, some can work on long-term goals and yet others on short-term or intermediate goals. Hence, a case can be made for larger competitive grant funding for selective national or perhaps regional priorities. Moreover, a diversified portfolio of projects and funding mechanisms decreases society's discovery risk.[3]

How would changes affect the sustainability of research funding?

If fewer dollars were allocated across the land grant system for formula funding, for example by eliminating formula funds to small SAESs, those dollars could be used to increase the research funds available for competitive grant programs. In this scenario, the country might not "need" more than 20 Colleges of Agriculture and SAESs, and perhaps could get by with even fewer. However, dramatically reducing the number of states receiving federal agricultural research funds would greatly change the political economy of federal agricultural research funding. One prospect is that, over time, the currently strong Congressional support for formula funds would wither under a competitive grant program, and total CSREES appropriations for competitively funded agricultural research would decline. State matching funds would also decline. Another possibility is that the excluded land grant universities would pursue Congressionally earmarked research funds or "special grants" on a grander scale (National Research Council, 2003, pp. 71-72; Huffman & Evenson, 2006b, pp. 116-117; Law & Tonon, 2006). Hence, a few states would win in the short run, but all might lose in the long run. There are also strong implications for complementary university instruction and public outreach (extension) programs of altering the nature of the complementary research support from formula funds.

Conclusions

Some will win and some will lose with changes in the size and relative amount of CSREES-administered formula and competitive grant funding for agricultural research. We conclude that a further reduction or elimination of federal formula funding of agricultural research will significantly impact

- Future research priorities and the research agenda,
- The composition of short- versus long-term research,
- The mix of national versus local needs research,
- The transactions costs of undertaking research,
- The distribution of research funds across the states,
- The distribution of research benefits across states,
- The rate of return that society earns from its research investments,
- The discovery risk faced by society, and
- The sustainability of future research funding.

Although recent research has shown that the social rate of return to public agricultural research would decline as the competitive grant share rises, we believe that the very considerable risks associated with future discoveries in agricultural research will be best diversified by maintaining a portfolio of CSREES administered formula and competitive grants funding in the future. Moreover, a case can be made for continuing and possibly increasing federal formula funding because of their high payoff and at the same time expanding competitive grant funding to address selective high priority national or perhaps regional needs.

For More Information

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Coming Attractions

Agriculture and Trade

Immigration and U.S. Agriculture

Ximing Wu, Guest Editor

Immigrant workers are important to U.S. agriculture. The four articles in this set explore the impacts of immigrant workers, legal or illegal, on various aspects of U.S. agriculture, along with rural labor markets. A number of policy implications are also covered.

Agriculture and Trade

Export-Led Food Quality

Bruce A. Babcock and Helen H. Jensen, Guest Editors

Countries, both developing and developed, are using different public policies and private-sector initiatives to encourage export-enhancing changes in food production systems. Examples show how public policies in developing countries encourage private-sector production and processing systems to meet international standards for food safety and quality, while in developed countries, private-sector initiatives can increase the value of exports through product differentiation.