Order Code RL34019

CRS Report for Congress

Eliminating the Planting Restrictions on Fruits and Vegetables in the Farm Commodity Programs

May 25, 2007

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Prepared for Members and Committees of Congress

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Summary

Owners of cropland with a history of growing "program crops" receive federal subsidy payments without regard to what crops are currently being produced on these base acres. In other words, these "direct payments" are decoupled from crop planting decisions. While the direct payments program is characterized as giving producers the flexibility to make planting choices based on actual market conditions instead of subsidy rules, there are restrictions. There is a prohibition on planting fruits, vegetables, and wild rice on program crop base acres. This planting restrictions policy is now under challenge as Congress debates a 2007 farm bill.

The purpose of the fruit and vegetable planting restriction is to protect growers of unsubsidized fruits and vegetables from competing production on subsidized cropland. As reasonable as this justification may appear, there have been problems with the policy. First, producers primarily of processing vegetables (canned and frozen) in the Midwest sharply curtailed production after soybeans became a program crop in the 2002 farm bill. Second, in a high-profile case by Brazil against the U.S. cotton program, the World Trade Organization (WTO) determined that the prohibition on planting fruits and vegetables was not consistent with the rules required of a minimally distorting subsidy. This determination jeopardizes the "green box" classification of direct payments for all program crops. Largely to meet WTO obligations, the Administration proposes that the 2007 farm bill eliminate the fruit and vegetable planting restriction.

Companion bills have been introduced in the House and Senate that would allow any producer to use base acres to grow fruits and vegetables for canning and freezing as long as they give up program payments on those acres for one year, but without additional penalties ("Farming Flexibility Act of 2007" — H.R. 1371, Baldwin, and S. 1188, Lugar). This partial approach likely would not satisfy WTO concerns. Other options include retaining the status quo, eliminating the restrictions entirely, or eliminating the underlying direct payment. Most fresh fruit and vegetable growers oppose eliminating the restriction without some type of compensation.

This report summarizes and examines five academic and industry studies on the economic effects of removing the fruit and vegetable planting restrictions. These studies indicate that lifting the planting restriction could have an economic effect on certain crops within certain producing areas. However, differences in approach and scope (e.g., regional versus national; plantings of permanent, perennial crops versus easily rotated, annual crops) complicate a direct comparison across all five studies, and make it difficult to generalize about the possible economic effects of lifting the planting restriction. Only two of the studies provide estimates of revenue losses to existing fruit and vegetable growers (ranging from about $1.7 billion to $4.0 billion in the first year of lifting the current restriction). The other three studies do not make quantitative estimates of the impacts, but indicate that adverse effects of removing the restriction likely would be small relative to the overall industry, although there could be larger impacts on individual producers, commodities, and regions.

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The issue of restricting plantings of fruits, vegetables, and wild rice on base acres in the farm commodity programs is a topic of debate in the 2007 farm bill. Following a brief background discussion of the legislative history and policy options for dealing with the planting restrictions on fruits, vegetables, and wild rice, this report provides a side-by-side comparison of five academic and industry studies on the effects of removing these restrictions. The five studies reviewed in this report include analyses by (1) the U.S. Department of Agriculture's (USDA's) Economic Research Service; (2) Michigan State University; (3) Arizona State University; (4) Texas A&M University; and (5) Informa Economics, a private consulting group.

For the purposes of this discussion, program crops (or crops grown on base acres) refers to commodities that receive direct payments authorized in Title I of the 2002 farm bill (those eligible for direct and counter-cyclical payments). These commodities include corn and other feed grains, soybeans and other oilseeds, wheat, cotton, rice and peanuts. Also, the phrase "specialty crops" is used to mean fruits, vegetables, and wild rice.

Background

Restrictions on planting fruits, vegetables, and wild rice are a constraint within a broader policy that allows planting flexibility on program crop base acreage. Planting flexibility allows program crop farmers to respond to market signals when making planting decisions, rather than being required to grow a particular crop to receive subsidies. The purpose of the targeted restriction is to protect growers of unsubsidized fruits and vegetables from competing production on subsidized land. As reasonable as this justification may appear, there have been problems with the policy (see below).

Planting flexibility is viewed positively from an economic theory and world trade agreement perspective because it helps separate production decisions from government subsidies, and makes "decoupled" subsidies minimally distorting to commodity markets. Restrictions on planting fruits and vegetables are viewed positively by fresh fruit and vegetable growers, mostly negatively by growers of processing fruits and vegetables, and negatively in the context of world trade rules.

Officials are concerned that continuation of planting restrictions could undermine the U.S. position at the World Trade Organization (WTO) that the annual direct payments of roughly $5 billion are minimally trade-distorting ("green box"). The United States wants direct payments to qualify as a green box expenditure, which

is not subject to the annual WTO cap of $19.1 billion for "amber box" subsidy payments.

Legislative History

Planting flexibility was first initiated in the 1990 farm bill, which designated 25% of base acres as "flex acres," meaning producers could grow certain crops other than the base crops on those acres (P.L. 101-624, Sec. 1101). The 1990 farm bill also created the restriction on planting fruits and vegetables on program crop base acreage. The 1996 farm bill expanded planting flexibility to all of a farm's base acres (7 U.S.C. 7218; P.L. 104-127, Sec. 118), and the 2002 farm bill continued this policy (7 U.S.C. 7916; P.L. 107-171, Sec. 1106).

Specifically, planting flexibility refers to the ability to receive direct and counter-cyclical payments[1] for a base crop (such as corn) and simultaneously grow a different program crop on those base acres (such as soybeans, but *not* fruits and vegetables). Farmers who violate the planting restriction on fruits and vegetables do not receive direct and counter-cyclical payments on acres in violation, and they must pay an additional financial penalty based on the market value of the fruits and vegetables planted (7 C.F.R. 1412.601). Exceptions in statute allow certain farmers with a history of planting fruits and vegetables to continue to plant such crops by giving up subsidies on base acres that are planted to fruits and vegetables, but without additional penalties (7 U.S.C. 7916(c)). The specific fruits, vegetables, and wild rice that are included in the restriction are itemized in 7 C.F.R. 1412.407(h).

Policy Issues

Two policy issues have arisen about planting flexibility and the related restrictions on planting fruits and vegetables.

First, some midwestern producers who grew primarily vegetables for processing (canned and frozen) have reduced their plantings since soybeans became a program crop in 2002. Prior to 2002, these producers sometimes grew fruits and vegetables instead of soybeans in crop rotations with corn. Landowners typically now stipulate that no fruits and vegetables can be grown on base acres, either to maximize soybean planting history in case base acres are ever again updated, or to receive the soybean direct payments. Processors for canning and freezing have reported short supplies and difficulty contracting new growers. Companion bills have been introduced in the House and Senate of the 110th Congress that would allow any producer to use base acres to grow fruits and vegetables for canning and freezing as long as they give up program payments on those acres for one year, but without additional penalties ("Farming Flexibility Act of 2007" — H.R. 1371, Baldwin, and S. 1188, Lugar). Similar bills were introduced in the 108th and 109th Congresses.

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[1] For background on these payments, see CRS Report RL21999, *Farm Commodity Policy: Programs and Issues for Congress*, and CRS Report RL33271, *Farm Commodity Programs: Direct Payments, Counter-Cyclical Payments, and Marketing Loans*.

Second, in a high-profile case brought to the WTO by Brazil against the United States regarding its cotton program, a settlement panel found that the current restriction on planting specialty crops makes direct payments ineligible for treatment as a nondistorting (green box) subsidy payment for international trade purposes. If this finding is enforced, it could affect the United States' ability to meet WTO subsidy payment limit commitments during years when other farm commodity payments are high.[2]

The Administration proposes that the 2007 farm bill eliminate the fruit and vegetable planting restriction, largely to meet WTO obligations. While H.R. 1371/S. 1188 could satisfy processors and growers of fruits and vegetables for processing, it likely would not go far enough to satisfy the WTO rules since it would only relax the restriction for processing and not for fresh fruits and vegetables.

If the restriction is lifted, fruit and vegetable growers may seek some type of compensation in return, possibly in the form of direct payments, but more likely through support for research, trade promotion, and use of fruits and vegetables in nutrition programs.

Possible Policy Options for Congress

Several policy options exist for handling the issue of planting restrictions on fruit and vegetables.

- **Retain the current restrictions (status quo).** This option would not satisfy concerns in the WTO cotton case and could subject the direct payments program to expenditure limits applied to highly distorting amber box subsidies. Nor does it address the concerns of midwestern fruit and vegetable growers for processing. It could, however, satisfy fresh fruit and vegetable growers who prefer to keep the restriction as compared with simply lifting the restriction.

- **Allow fruits and vegetables for processing** on base acres, without additional penalty, if growers give up government payments when they plant such crops. This option likely would not satisfy WTO rules because it basically keeps the current planting restriction while creating a smaller penalty for a select group of fruits and vegetables (those for processing). Legislation, such as H.R. 1371/S. 1188, could appease midwestern growers for processing, but likely not fresh produce growers.

- **Eliminate the restriction on planting fruits and vegetables.** This option could remedy violations identified in the WTO cotton case, and it would exceed what is proposed by midwestern growers of

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[2] This case and its implications are described in CRS Report RL22187, *U.S. Agricultural Policy Response to WTO Cotton Decision*, and CRS Report RL33697, *Potential Challenges to U.S. Farm Subsidies in the WTO*.

fruits and vegetables for processing. Farmers would not have to give up their government payments (nor face additional penalties as they do now) should they grow fruits and vegetables on base acres. However, this action, by itself, likely would not satisfy fresh growers who may want some other form of protection or compensation because of new competition from subsidized growers.

- **Transition out of direct payments.** If direct payments are eliminated, the planting restriction issue is irrelevant. Some are calling for an end to direct payments in the 2007 farm bill, either to score budget savings for other farm bill priorities, or to recognize the inconsistency of making payments to farmers even when farm income is high. Direct payments were intended to be decoupled and eligible for green box treatment. Planting restrictions have become a barrier to this goal. Thus, the fruit and vegetable planting restriction is seen by some as another reason to reconsider the future of direct payments.

If the planting restriction is eliminated and direct payments are retained (in the second or third bullets above), several additional options exist to respond to the concerns of existing fruit and vegetable growers who may perceive additional and unfair competition from new growers who would continue to receive direct and counter-cyclical payments on base acres.

- **Direct compensation.** Provide some type of direct payment to existing fruit and vegetable growers who do not have base acres on which they plant their fruits and vegetables. The amount of the payment could be based on the level of direct payments received by program crop growers.

- **Research assistance.** Increase federal funding for university and government research on growing, processing, and distributing fruits and vegetables. Implementation of research findings could lower production costs, increase quality or output, and/or increase demand.

- **Increase demand for fruits and vegetables.** To the extent that eliminating the planting restriction increases fruit and vegetable production — which could depress prices and revenue as some existing growers fear — federal efforts to increase demand could offset potential revenue shortfalls. Increasing demand could be accomplished in several ways: market promotion (including healthy diet standards, and farmers markets), foreign trade assistance (negotiating trade agreements to export U.S. produce), and government purchases of produce (for feeding and nutrition assistance programs such as Section 32, school lunch programs, and fresh fruit and vegetable snacks for children).

Summary of Academic and Industry Studies

Following is a side-by-side comparison of five academic and industry studies on the effects of removing the restriction on planting fruits and vegetables on base acres under the 2002 farm bill. The studies include:

- **USDA Economic Research Service** (by Demcey Johnson, Barry Krissoff, Edwin Young, Linwood Hoffman, Gary Lucier, and Vince Breneman), *Eliminating Fruit and Vegetable Planting Restrictions: How Would Markets Be Affected?* ERR-30, November 2006, at [http://www.ers.usda.gov/Publications/ERR30];

- **Michigan State University** (by Suzanne Thornsbury, Lourdes Martinez, and David Schweikhardt), *Michigan: A State at the Intersection of the Debate Over Full Planting Flexibility*, CCR-29, February 2007, at [http://www.ers.usda.gov/publications/ccr29/ccr29.pdf];

- **Arizona State University** (by Paul Patterson and Timothy Richards), *Farm Bill Flex Acre Provisions and Fruit, Vegetable, and Nut Production*, July 2006, at [http://cissc.calpoly.edu/farmbill/farmbillflexacreprovisionsandfruit2.pdf];

- **Texas A&M University** (by Roland Fumasi, James Richardson, and Joe Outlaw), *Lifting the Fruit and Vegetable Cropping Restriction: Potential Impacts on Cropping Preference in the Lower Rio Grade Valley, Texas*, February 2006, at [http://agecon.lib.umn.edu/cgi-bin/pdf_view.pl?paperid= 19484&ftype=.pdf]; and

- **Informa Economics** (for the Specialty Crop Farm Bill Alliance), *An Analysis of the Effect of Removing the Planting Restrictions on Program Crop Base*, February 2007, at [http://www.competitiveagriculture.org/images/FinalReport2007.pdf].

The studies reviewed in this report take very different approaches to measuring the potential effects of lifting the planting restriction. **Table 1** provides a comparison of some of the key differences between these five studies. A more detailed review of these studies is provided in Appendixes A-E.

Approach and Scope

Of the five studies, three are national in scope (USDA, Arizona State, and Informa), while the other two address potential regional impacts only (Michigan State and Texas A&M). The Texas A&M and Arizona State studies use economic modeling approaches to determine potential effects. The USDA, Michigan State, and Informa studies use mostly a descriptive approach with objective judgements to evaluate potential effects, but using very different methodologies. Both the USDA and Michigan State studies take a narrowly focused approach using detailed county-level data in an attempt to precisely identify the producing counties and crops that

may be affected, proceeding through a series of analytical steps and data review. The Informa study also proceeds in a step-wise construction, but instead builds upon limited state-level data and aggregates the potential results to the national level. As a result, these studies provide very different conclusions.

The studies differ in terms of their available input data. Most use either state- or county-level production and acreage data. Michigan State supplemented its published data with survey or interview information. The economic modeling approaches used by Texas A&M allowed it to directly examine the role of expected costs and returns, as well as risk and uncertainty in planting decisions. (The Arizona State study provided no detailed information about its underlying model, which makes it difficult to evaluate.) The Texas A&M and Arizona State studies also examined simultaneous market interactions across a range of crops. In contrast, the approach used in the USDA and Michigan State studies only indirectly considered the role of expected costs and net returns as part of its analysis. The Informa study did not take into account net returns or cost information.

General Conclusions

As indicated by these studies, eliminating the current planting restriction could have an economic effect on certain crops within certain producing areas. However, differences in research approach and scope (e.g., regional versus national; plantings of permanent, perennial crops versus easily rotated, annual crops) complicate a direct comparison across all five studies. Such differences also make it difficult to generalize about the possible economic effects of lifting the current restriction.

The studies also vary in that not all take into account certain production and market factors in the U.S. fruit and vegetable sectors as part of their analysis — in particular, the importance of barriers to entry when examining the mobility of production between crops, especially for fruits and vegetables (see next section, "Production and Market Factors," for more detailed information). As a result, the studies differ in whether they consider the possibility that permanent, perennial crops would be planted, or whether only easily rotated, annual crops would be planted.

Most of the studies did not attempt to quantify the potential price, revenue, and market impacts, making a strict comparison of the potential impacts difficult. Only the Informa and Arizona State studies attempted to quantify the potential market effects on existing fruit and vegetable growers. They reported estimated revenue losses to existing fruit and vegetable growers ranging from about $1.7 billion to $4.0 billion, respectively, in the first year of lifting the restriction. The Arizona State study went a step further and considered effects on all growers, including new entrants, and multi-year effects that account for adjustments beyond the first year. The Informa study's high-end estimated effects, however, are questionable since the study did not account for barriers to entry for fruit and vegetable production. Also questionable is the likelihood of planting base acres to long-maturing tree crops, and plantings by producers without a history of growing fruits and vegetables.

The other three studies did not provide quantitative estimates of the market impacts. However, both the USDA and Michigan State studies indicate that the effects of removing the current restriction likely would be limited to individual

producers, commodities, and regions, and that the total industry effects of removing the restriction would be low. The USDA and Michigan State studies largely conclude that industry impacts would generally be focused on a narrow range of crops with a greater likelihood of conversion from program crops to fruits and vegetables (below). The Texas A&M study also indicates that the effect of lifting the restriction would be limited to certain crops (below).

Nevertheless, these studies do indicate that lifting the planting restriction could have a sometimes substantial adverse effect on certain crops within select producing areas. The USDA and Arizona State studies, which are more national in scope, indicate that the potential economic effects could be greatest for producers of potatoes and processed vegetables. The USDA study suggests particular impacts in certain areas, including dry beans in North Dakota. The Arizona State study shows greater economic impacts and eventual new entrants in some fruit and vegetable sectors. The Michigan State and Texas A&M studies, which are more regional in scope, note possible adverse effects to producers of dry beans, squash, and processed tomatoes in parts of Michigan, and to watermelon and cabbage in parts of Texas. Given that even small acreage shifts in fruit and vegetable plantings can have large price-depressing effects, especially if concentrated within certain growing regions, the localized effect to specialty crop producers in some areas could be great.

Production and Market Factors

Most of the studies take into account specific production and market factors in the U.S. fruit and vegetable sectors as part of their analysis, except for the Informa study. In particular, both the USDA and Michigan State studies emphasize the importance of barriers to entry when examining the mobility of production between crops, especially for fruits and vegetables. The Michigan State study summarizes the types of barriers to entry that could influence an expansion of specialty crop acres from program acres as (1) capital investment (e.g., equipment and machinery purchases, cultivation, irrigation needs, etc.); (2) rotational requirements (e.g., growing patterns and pest pressures); (3) market accessibility (e.g., difference between fresh and processed crops, marketing channels, contractual arrangements, etc.); and (4) labor and management requirements (e.g., labor-intensive versus capital-intensive production).

As already noted, the Informa study did not take into account the possible role of entry barriers to fruit and vegetable production. It also considered the possibility that program crops may be switched to permanent crops, such as orchard and tree crops that often require high planting expenditures and longer establishment periods. Consequently, the study reports sizeable economic effects to specialty crop producers from lifting the current planting restriction. However, the study's underlying approach and assumptions potentially raise some question about the reliability of its reported estimated quantitative effects.

The fact that fruit and vegetable production differs substantially from commodity crop production also might influence the likelihood of conversion. Compared to program crops, fruit and vegetable production often has different machinery and technology needs, typically higher costs (but also higher returns), additional labor and management requirements, and different types of purchasing

arrangements and marketing channels. In addition, substantial differences often exist within the fruit and vegetable sectors depending on whether crops are grown for the fresh market versus grown for processing. Most fresh produce is sold under arrangements with packers, distributors, and retailers; most fruits and vegetables for processing are grown under contract. Current market trends also might influence the likelihood of conversion. For example, Informa, Arizona State, and USDA predict large increases in potato production, despite recent declines in planted acreage due to lower market prices.

Given these production and market factors, making assumptions about the potential likelihood to convert from a program crop to a specialty crop is not straightforward. For this reason, most of the studies reviewed in this report (except for the Informa study) assume a greater likelihood of conversion to specialty crops that can be easily rotated year to year (e.g., vegetables, beans). These studies examine only crops that may be planted and harvested in a single year, thereby excluding permanent crops, such as nut and tree fruit crops, grapes, and perennial vegetables such as asparagus. These studies assume it will be unlikely that program crop producers would convert to crops that require lengthy cultivation before becoming commercially viable (e.g, orchard crops, berries). Also, to a varying degree, each of the studies uses historical data for farms that grow both program crops and specialty crops, and assumes that the areas that may be potentially affected by lifting the planting restrictions will be on cropland owned by farmers that historically have grown both program and specialty crops.

Other Comments and Considerations

Because the Informa study does not take into account the full range of market-based factors that may influence planting decisions of specialty crops, the market effects reported by the analysis may likely be overstated. In particular, the analysis likely overstates the number of new entrants into specialty crop production since it predicts large acreage increases in specialty crops on farms producing program crops only, with no history of specialty crops, based simply on a weighted percentage increase. The other four studies, however, could be understating the potential market effects of eliminating the planting restrictions since they each exclude consideration that program crop acres would be converted to permanent or perennial crops.

Finally, none of the studies specifically addresses current market demand and trends that may limit marketability of the specialty crops converted from program crops. Only the Arizona State University study projected its analysis over an eight-year period in order to capture market adjustment over time in response to changing market prices and supply; it found that the effects diminish greatly after the first year.

None of the studies explicitly differentiated between fresh and processed fruits and vegetables, and so they do not directly address the potential effects of partially lifting the planting restrictions as proposed under H.R. 1371/S. 1188. As proposed under these bills, relaxing the planting restriction would only apply to producers that grow for canning and freezing, and would not apply to plantings of fresh market fruits and vegetables.

Table 1. Comparison of Studies of Removing Planting Restrictions for Fruits and Vegetables

	USDA Economic Research Service	Michigan State University	Arizona State University	Texas A&M University	Informa Economics
Scope	National	Regional (Michigan)	National (205 counties)	Regional (area in Texas)	National
Crops	8 product groupings	6 commodities	8 commodities	8 commodities	25 commodities
Key Assumption(s)	Most crops have high barriers to entry; focuses on certain growing areas.	Most crops have high barriers to entry; focuses on certain growing areas.	Annual crops only. Permanent, perennial crops not examined.	Easily rotated annual crops only. Permanent orchard crops not examined.	All fruit, nut, vegetables examined, including annual and permanent.
General Analysis Approach	Analysis of county-level maps (production/acres); analysis of computed ratios of base acreage shares (by commodity).	Assessed likelihood of conversion based on a ranking of criteria on barriers to entry and financial inducements.	Market simulation model under two scenarios of program crop acre conversion over 2008-2015 period.	Stochastic simulation model to empirically estimate the per-acre income distributions for alternative crops.	Cross-subsidy (wealth) effects and market impacts (revenue loss) using available data and simplifying assumptions.
Input Data	County-level production and acreage data (2002) from USDA and Census of Agriculture.	Primary survey and interview information; production data (2002); crop payments, market revenue, and cost data.	County-level production and value data (2002), and other econometric and market input data.	Annual per-unit prices, yields, harvested acres (1992-2004); weekly prices (1998-2004); crop program data; crop costs.	Program payment/acres, planted acres (2002), state production/value (2002-2004), reported demand elasticities.
Results	Limited impacts certain areas: dry beans (ND), potatoes, processing veg.	Limited impacts certain areas: dry beans, squash, processed tomatoes.	Market effects greatest for potatoes, onions, and eventually broccoli.	Increased acres watermelon and cabbage.	+1.03 million acres (10% increase) all crops, mostly new entrants.
Revenue effect on current growers	Not applicable	Not applicable	$1.7-$2.4 billion in 2008. Less than $0.3-$0.7 billion in 2009-15.	Not applicable	$4 billion/year total $0.8 billion cross-subsidy $3.1 billion market effect
Potential Strengths	Uses detailed county-level data to assess affected counties and crops; addresses entry barriers.	Addresses barriers to entry and conversion likelihood; uses survey information.	Models interaction across range of crops. Multiyear market and revenue effects.	Addresses risk and uncertainty; uses detailed price/cost input data; interaction across crops.	National in scope. Provides monetary estimate.
Potential Shortcomings	Selected crops only. Does not quantify price/revenue impacts; does not address market demand/trends.	Regional, select annual crops only. Does not quantify price/revenue impacts or address market demand/trends.	Select annual crops only. Assumes flat rates of acreage conversion. Does not address entry barriers, costs, demand.	Regional, select annual crops only. Does not quantify price/revenue impacts or address market demand/trends.	Does not address market factors, barriers to entry, conversion likelihood, fresh vs. processing, and market demand/trends, etc.

Source: Compiled by CRS.

Appendix A: USDA's Economic Research Service[3]

Scope: National (identification of potentially affected counties).
Crops: 8 product groupings: citrus, strawberries, grapes, principal fresh and processing vegetables, apples, potatoes, and dry edible beans.
States: All U.S. counties (where further expansion of fruits and vegetables may be limited by lack of land or by planting restrictions on base acres, and where the relative land availability for fruits and vegetables could change the most).

Approach:
- Identifies U.S. counties that may be affected by lifting the planting restrictions based on a series of county-level maps showing the geographic intersection of crop production and base acreage, illustrating competition for land between program and specialty crops.
- Identifies fruits and vegetables that could be limited by base acreage restrictions based on an analysis of computed ratios that measure the share of base acreage in areas producing selected fruits and vegetables, weighted by state shares of planted acreage.
- Includes a detailed case study for dry beans, which could be the most affected.

Input Data: County-level production and acreage data (2002).

Assumptions: Considers production and economic barriers to expanded specialty crop production: (1) diversity of fruit and vegetable production, (2) market considerations; (3) costs considerations; (4) per-acre net returns and costs; and (5) seasonality.

Estimated Effects:
- USDA's report concludes that market effects of eliminating planting restrictions are likely to be limited and confined to specific regions and commodities. However, impacts could be significant for individual producers, commodities, and regions.
  - *Affected counties:* Counties where further expansion of fruit and vegetables may be limited by lack of total land or by planting restrictions on base acres are in eastern ND, southern MN, central WI, northern IL, western MI, western NY, eastern coastal plains (SC, GA), southern ID, central WA, and also CA and FL. Counties where the relative availability of land for fruits and vegetables could change the most are located in ND, CA, WI, MN, MI. Impacts are considered less likely in Florida, given limited base acres.
  - *Affected commodities:* Dry edible beans, vegetables for processing, and potatoes could be most affected by lifting planting restrictions (based on a calculated share of more than 50%). Apples/fresh vegetables have a calculated share of >40%.
- Program crop producers are likely to benefit since they can realize additional revenue from harvesting fruit and vegetables, while still receiving benefits for program crops, depending on expected net returns, startup costs, and potential market conditions.
- Program crop farmers are more likely to switch to less capital-intensive crops, such as dry beans or processing vegetables, rather than fresh produce with higher growing costs.

Considerations/Comments:
- *Potential Strengths:* Uses detailed county data to identify counties/commodities most likely to be affected. Addresses barriers to entry/mobility to convert to specialty crops.
- *Potential Shortcomings:* Examines selected crops only. Does not quantify price or revenue impacts. Does not specifically address production interaction effects among crops or market demand and trends for specialty crops.

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[3] U.S. Department of Agriculture, Economic Research Service, *Eliminating Fruit and Vegetable Planting Restrictions: How Would Markets Be Affected?* ERR-30, November 2006, at [http://www.ers.usda.gov/publications/err30/].

Appendix B: Michigan State University[4]

Scope: Regional (Michigan State) for select crops.
Crops: 6 commodities: Dry beans, pickling cucumbers, processing tomatoes, fresh market tomatoes, squash, and blueberries.

Approach: Conducted field interviews to select commodities and counties where the potential effects of lifting the planting restrictions might occur. Assessed the likelihood of conversion from program crops to specialty crops using a ranking system (Low, Medium, High) across five criteria, including barriers to entry for selected specialty crop production and financial inducements to Direct and counter-cyclical Program (DCP) growers.

- *Barriers to Entry:* Factors affecting entry and mobility of production include capital investment, rotational requirements, market access, and labor and management needs.
- *Financial Inducement:* Measured by the ratio of DCP crop benefit per acre and net returns per acre for select specialty crops.

Input Data: County-level production and acreage data, including:

- *Barriers to Entry:* Primary survey/interview information on business activity, size, investment in machinery and equipment, production practices (e.g., harvesting, irrigation), contracts, farm management, labor and markets) from Michigan-based food processors, farmers, extension agents, financial advisors, fresh produce shipper-distributors, and commodity representatives.
- *Financial Inducement:* DCP crop payments and market revenue per acre minus variable costs per acre (corn, wheat, soybeans, barley, oats), versus specialty crop revenue minus contract violation penalty and variable acre costs for select specialty crops.

Assumptions:

- Commodities with high expected barriers to entry were excluded (orchard crops or crops with a lag time before becoming commercially viable, highly specialized or costly crops, and some processing crops where it takes time to generate a return on investment).
- Counties likely to be affected are those with the most vegetable production (given the likelihood for potential in terms of soil and climate to increase specialty crop production) and counties with current high acreage of both program and specialty crops, as well as land with a history of producing both, although currently not growing both.

Estimated Effects:

- Commodities with the highest likelihood of conversion are dry beans, with some likelihood of conversion for squash and processed tomatoes.
- For most other crops, lifting planting restrictions would result in small (or no) positive incentives for DCP crop producers to grow specialty crops, and therefore likely low number of new entrants. Barriers to entry are likely to limit or prohibit crop conversion.
- Results identify Michigan's 12 largest vegetable producing and program crop counties.

Considerations/Comments:

- *Potential Strengths:* Addresses barriers to entry and likelihood of conversion to specialty crop acres. Conducts a thorough selection of potentially affected commodities and counties, using interview and survey information.
- *Potential Shortcomings:* Regional in scope and examines select annual crops only. Does not quantify price or revenue impacts. Does not specifically address production interaction effects among crops or market demand and trends for specialty crops.

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[4] S. Thornsbury, L. Martinez, and D. Schweikhardt, *Michigan: A State at the Intersection of the Debate over Full Planting Flexibility*, Michigan State University, January 2007, at [http://www.ers.usda.gov/publications/ccr29/ccr29.pdf].

Appendix C: Arizona State University[5]

Scope: National (county-level) for select crops.

Crops: 8 fresh commodities: broccoli, cantaloupe, fresh carrots, onions, head lettuce, potatoes, tomatoes, watermelon. (Initially, these commodities along with sweet corn and sweet potatoes were identified as potentially affected by lifting planting restrictions; however, the available model does not support analysis of sweet corn and sweet potatoes, and these two crops were excluded.)

States: 205 counties located in AZ, CA, OR, ID, WA, CO, TX, LA, MS, GA, NC, NJ, NY, PA, MI, MN, WI, ND, and MA, among other states. These counties were identified as areas where specialty crop and program commodities potentially compete for the same land (about 72% of harvested acres for selected crops).

Approach: Market simulation model developed by the National Food and Agricultural Policy Project (NFAPP). Examines two scenarios assuming 1% of program crop acreage (about 182,000 acres) and 5% of program crop acreage (about 910,000 acres) converts to fresh produce production. Market impacts projected over an eight-year period (2008-2015). The study provided no information on its underlying model, making it difficult to evaluate.

Input Data: County-level production and value data (2002).

Assumptions:

- Analysis included only crops that could be planted and harvested in a single year, and excluded permanent crops, such as nut and tree fruit crops, grapes, and perennial vegetables, such as asparagus. Sweet corn and sweet potatoes also were not examined because NFAPP available model does not support analysis of these two crops.
- New specialty crop acreage for each scenario is allocated according to current cropping patterns within each county starting in 2008 (an exogenous shock imposed on the model to force change). Production is expected to adjust over time to expected returns.

Estimated Effects: Two scenario results

- *Scenario A (1% acre conversion):* New acreage across all commodities is estimated to result in total industry revenue losses of $1.3 billion (2008). Losses to incumbent specialty crop producers are projected to be greater at $1.7 billion. As specialty crop producers adjust to lower prices, industry revenue losses are projected to be $120 million by 2015. Short-term value losses are projected to be greatest for potatoes and onions. In the long-term, value losses are projected to be greatest for broccoli.
- *Scenario B (5% acre conversion):* New acres for 5 commodities is projected to result in industry revenue losses of $1.7 billion (2008) (excludes watermelon, onion, potatoes). Losses to incumbent specialty crop producers are projected at $2.4 billion. Industry revenue losses are projected at $204 million (2015), as producers adjust to lower prices.

Considerations/Comments:

- *Potential Strengths:* Identifies crops that could likely be affected by lifting planting restrictions. Uses a simulation model to examine interaction effects for a range of crops over an eight-year period (2008-2015). Estimates price and quantity changes and revenue loss.
- *Potential Shortcomings:* Examines a subset of the identified potential range of affected crops. Assumes a flat 1% and 5% rate of acreage conversion. Reported results are expressed in terms of market change and not acreage changes (making comparison across studies difficult). Does not specifically address market demand and trends.

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[5] P. M. Patterson and T. J. Richards, *Farm Bill Flex Acre Provisions and Fruit, Vegetable, and Nut Production*, Arizona State University, July 2006, at [http://cissc.calpoly.edu/farmbill/FarmBillFlexAcreProvisionsAndFruit2.pdf].

Appendix D: Texas A&M University[6]

Scope: Regional (Lower Rio Grande Valley, Texas) for select crops.
Crops: Green cabbage, cantaloupe, corn and sorghum for grain, upland cotton, honeydew, spring onions, and watermelon.

Approach: Stochastic simulation model (one that allows probabilities for different outcomes) to empirically estimate the per-acre income distributions for alternative crops (comparing scenarios with and without planting restrictions on corn, cotton, and sorghum base acreage). Simulated probability distributions of net income under each scenario for 2006 as an indicator of risk and profitability.

Input Data: (for the Lower Rio Grande Valley, Texas)
- Annual per-unit prices, yields, and harvested acreage per crop (1992-2004).
- Weekly (during season) prices for each crop (1998-2004).
- Other annual U.S. crop program data, including prices (1970-2004), loan rates, target prices, and direct payment rates (used with other production data to estimate Direct and counter-cyclical Program (DCP) payments per are for 2006).
- Itemized crop budget cost data.

Assumptions:
- Absent planting restrictions, DCP payments will influence production and land use decisions.
- Analysis excluded permanent crops, such as citrus, and only examined crops that could be rotated easily on a year-to-year basis.

Estimated Effects: (for the Lower Rio Grande Valley, Texas)
- If planting restrictions are lifted, acreage increases are predicted for watermelon and cabbage based on expected risk-adjusted net returns.
- Accounting for risk and variability: (1) among risk-preferring producers, watermelon is preferred over cotton (cotton base), and cabbage is preferred over corn (corn and cotton base); (2) among risk-neutral producers, watermelon is preferred over cotton, and cabbage is preferred over grain sorghum (cotton base); and (3) among risk-averse producers, watermelon is preferred over all crops (cotton base).
- Program commodities with government payments are preferred over the risks to planting onions, cantaloupe, or honeydew.

Considerations/Comments:
- *Potential Strengths:* Addresses risk and uncertainty in planting decisions. Uses detailed price and cost input data in its estimation.
- *Potential Shortcomings:* Regional in scope and examines select annual crops only. Does not specifically address likely downward price impact of increased specialty crop supplies, or market demand and trends that may limit marketability of the specialty crops converted from program crops.

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[6] R. J. Fumasi, J. W. Richardson, and J. L. Outlaw, "Lifting the Fruit and Vegetable Cropping Restriction: Potential Impacts on Cropping Preference in the Lower Rio Grande Valley, Texas," Texas A&M University, Agricultural and Food Policy Center, Selected Paper prepared for the Southern Agricultural Economics Association Annual Meetings, Orlando, Florida, Feb. 5-8, 2006, at [http://agecon.lib.umn.edu/cgi-bin/pdf_view.pl?paperid=19484&ftype=.pdf].

Appendix E: Informa Economics[7]

Scope: National, for nearly all fruits, vegetables, and tree nuts.

Crops: 25 commodities (more than 90% of total specialty crop acreage), including potatoes, peas, pears, sweet corn, snap peas, apples, onions, berries, cherries, pumpkins, cabbage, cucumbers, asparagus, squash, carrots, lettuce, cantaloupe, watermelon, peaches, grapes, broccoli, citrus, tree nuts, tomatoes, and plums.

States: Focuses on 15 states (CA, WA, ID, WI, OR, MN, MI, NY, CO, AZ, GA, TX, ND, IL, and PA), excluding Florida where there are few farms with specialty crop acreage that also grow program crops.

Approach/Assumptions: The two components of the analysis are:

- **Cross-subsidization Effects.** Measures the potential to cross-subsidize specialty crop production among program crop producers who receive Direct and counter-cyclical Program (DCP) benefits. Assumes the presence of a "wealth effect" and reduced planting risk that may indirectly affect production decisions.
  - Calculates average annual fixed direct payments ($23.49 per eligible acre)
  - Calculates three-year average counter-cyclical payments ($10.07 per eligible acre)
  - Adjusts average DCP benefits by calculated state "weights" (ratio of average per-acre commodity program subsidy to the share of each state's specialty crop acres).
  - Multiplies the weighted average combined DCP benefit ($76.04/acre) by total U.S. fruit, nut, and vegetable acres in 2002 (10.6 million acres).
- **Market Impact Effects.** Assuming planting restrictions are lifted, measures the potential revenue reduction of existing specialty crop producers (assuming increases in specialty crop acreage and production, and subsequent price reduction).
  - Increased specialty crop acreage is estimated on two farm categories: (1) farms producing program crops only, with no history of specialty crops (i.e., new entrants), and (2) farms that produce both specialty and program crops. For category (1) acreage, increases are estimated from calculated state "weights" (ratio of specialty crop acreage to total program acreage) from data on farms with only specialty or program crops, and farms with both. For category (2) acreage, increases are estimated assuming a flat 5% increase.
  - Acreage increases by state are allocated to 25 specialty crop groupings by state.
  - For the 25 specialty crop groupings, price and revenue reductions are determined using the calculated acreage increase and an assumed price response of -1.11.[8]

Input Data/Calculations:

- **Cross-subsidization Effects**
  - *Direct payments:* Payment acres, annual direct payment, and calculated average direct payment per acre for 8 commodity groupings (corn, wheat, other feed grains, rice, cotton, peanuts, soybeans, other oilseeds), averaged across all groupings.
  - *Counter-cyclical payments:* Actual payments per acre, averaged over a three-year period (2002-2004) for 7 commodity groupings (corn, wheat, other feed grains, rice, cotton, peanuts, soybeans), averaged across all groupings.
  - Fruit, nut, and vegetable acres, total U.S. and by 15 top-producing states (2002).

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[7] Informa Economics, *An Analysis of the Effect of Removing the Planting Restrictions on Program Crop Base*, February 2007, prepared for United Fresh Produce Association and other specialty crop organizations, available at [http://www.competitiveagriculture.org/images/FinalReport2007.pdf].

[8] A price response of -1.11 means that the price of the product declines 1.11% for every 1% change in the quantity supplied. Price responses (price flexibilities) are approximated as the inverse of the assumed price elasticity (-0.9).

Market Impact Effects

- USDA data tabulation (2002), U.S. and by state, planted acres on farms with (1) specialty crops only, (2) program crops only, and (3) specialty and program crops.
- U.S. and state production and production value data (2002-2004).
- Price response estimate is based on reported demand elasticities for 10 individual crops (potatoes, lettuce, tomatoes, onions, celery, cabbage, carrots, a grouping of other vegetables, apples, and grapefruit) from three different studies by USDA and Georgia College.

Estimated Effects:

- **Total Financial Effect:** Estimated combined financial effects to existing specialty crop producers is estimated at $4 billion/year, made up of two components:
- **Cross-subsidization Effects:** $806 million/year to compensate for subsidies that would continue to growers with base acres who could use subsidies to compete (unfairly).
- **Market Impact Effects:** $3.1 billion/year (lost revenue) to existing F&V growers.
  - U.S.: An increase of 1.03 million acres of specialty crop acres (10% increase). This increase represents less than 1% of all program crop acres.
  - Largest acreage increases in specialty crops are at farms producing program crops only, with no history of specialty crops (i.e., new entrants).
  - CA: Greatest acre increase (230,000 acres or +6%), mostly from rice and cotton.
  - ID, CO: Greatest percent acre increase (nearly 30%); most ID gains are for potatoes.
  - Crops with >10% acre increases: potatoes, peas, pears, sweet corn, snap peas, apples, onions, berries, cherries, pumpkins, cabbage, cucumbers, asparagus, squash.

Considerations/Comments:

- *Potential Strengths:* Estimates price and quantity changes and revenue loss.
- *Potential Shortcomings:*
  - **Cross-subsidization Effects.** Effects are likely overstated since the analysis assumes a weighted average combined DCP benefit ($76.04/acre) across all U.S. fruit, nut, and vegetable acres in 2002 (10.6 million acres), although many of these operations may already be growing both specialty and program crops (and already may be receiving DCP benefits). In addition, counter-cyclical payments are based on 2002-2004 data and not on lower baseline estimates applicable to the 2007 farm bill. Overall, this analysis does not consider other market-based factors that may influence planting decisions.
  - **Market Impact Effects.** This analysis likely overstates the number of new entrants since it concludes large acreage increases in specialty crops at farms producing program crops only, with no history of specialty crops (i.e., new entrants), based simply on a weighted percentage increase, without consideration of other market-based factors that influence planting decisions including:
    (1) *barriers to entry,* such as differing machinery and technology needs, typically higher production costs and more intensive labor and management requirements for specialty crops, and differing marketing arrangements/access to market channels;
    (2) *likelihood for conversion;* specifically, it applies same level of likelihood to converting to crops that can be easily rotated year-to-year (e.g., vegetables, beans) and crops that often require lengthy cultivation for development before becoming commercially viable (e.g, orchard crops, berries);
    (3) *differences between fresh market versus for processing,* given that most fresh produce is sold under arrangements with packers, distributors, and retailers; most crops for processing are grown under contract; and
    (4) *consideration of current market trends;* specifically, it predicts large increases in potato production, despite recent declines in planted acreage, but does not consider potential effects on dry beans, which could be most affected without the restriction.