Divvying Up the Pie:
U.S. Adults' Preferences for USDA Expenditures

Alba J. Collart, Shea G. Ishee, and Keith H. Coble

The U.S. Department of Agriculture (USDA) spends roughly U.S.$140 billion yearly in public funds on farm, nutrition, conservation, and other programs, yet scarce research has elicited the preferences of the U.S. public regarding USDA spending. We survey a representative sample of U.S. adults to examine preferences for USDA spending and find respondents would spend less on nutrition, about the same on farm programs, and more on conservation and other programs. However, respondents' allocation toward nutrition increases after receiving information on the USDA's 2018 budget. These results provide insights into the state and malleability of public support for policy options.

Key words: agricultural policy, farm bill, food policy, fractional multinomial logit

Introduction

Each year, the U.S. Congress makes funding decisions for the U.S. Department of Agriculture (USDA) via the appropriations process involving on average US$140 billion. These decisions affect millions of people through farm, nutrition, conservation, food safety, rural development, and other programs administered by the USDA. At the beginning of the appropriations process, the USDA prepares its proposed budget for the next fiscal year following federal guidelines on funding levels and priorities and submits it to the federal government. The U.S. Congress then exercises its authority to appropriate the USDA's funding before a final appropriations bill to fund the agency is signed. During each farm bill cycle, the USDA's priorities are discussed and redefined, and intense debates on funding needs unfold as various advocacy groups—such as farm organizations, environmental groups, and champions of nutrition programs—make their program authorization priorities known. Yet less present in the recurring debates are studies that elicit the preferences of the U.S. public, which includes voters and taxpayers, and that examine the influence of demographic and behavioral factors on the public's preferences for food and agricultural policy spending. That is, how much federal money does the U.S. public think should be allocated to the various USDA programs, and what factors influence their preferred allocations?

Views on whether public opinion affects Congress's policy making vary partly because policy-specific opinion data are scarce (Burstein, 2014). However, several studies have found that public opinion impacts public policy (Page and Shapiro, 1983; Glynn et al., 2018) and has the potential to improve compliance and feelings about taxes (Lamberton, Neve, and Norton, 2018). Public opinion can also affect presidential budgetary proposals in cases when the issues are familiar and of interest to the public, when re-election is imminent, and when a president experiences average approval

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rating (Canes-Wrone and Shotts, 2004). Despite studies showing the potential contribution of public opinion to policy making, there are few studies on the public's preferences for food and agricultural policy, and thus this type of input may be overlooked in the policy debates (Ellison, Lusk, and Briggeman, 2010; Caputo and Lusk, 2020).

Recent changes in the dynamics of advocacy groups also highlight the need for more insights on public preferences for policy options. While farm advocacy groups have formed a decades-long alliance with nutrition program supporters to maintain funding for favored programs of both groups (Wilde, 2016), various competing forces have arisen in more recent years to challenge the traditional agrarian voices for USDA programs, with at least three other major voices entering the discussions. The first category of influencers includes a long list of environmental and conservation groups that have engaged in strong advocacy for and against programs. Groups such as the Environmental Working Group generally oppose traditional farm programs and desire a shift toward funding more conservation and environmental services policies (Faber, 2018; Swift and Faber, 2018). The second category includes the smaller government/budget-cutting groups, who broadly advocate reducing federal spending and specifically advocate less nutrition and farm program spending (Smith, 2018). The third category includes the supporters of specialty or alternative agriculture including organic, local, and bioenergy crops, who call for increased funding and, in some instances, similar benefits as those received by traditional commodity agriculture (Johnson, 2017; Bracmort, 2019).

The central question we explore in this article is whether the mix of the USDA's funding allocations differs from those that the public would assign. We further investigate the effects of two information treatments and other individual attributes on respondents' preferred allocation. Specifically, does information on the USDA's programs and additional information on its proposed budget for 2018 significantly affect respondents' preferred allocation? And which factors—including sociodemographic characteristics, knowledge of agricultural policy, perceptions of fraud by the programs' beneficiaries, and the respondents' party affiliation—affect respondents' allocation?

Past studies have investigated farmers', agribusinesses', and general citizens' preferences for government spending on farm programs. Zulauf, Guither, and Henderson (1987) researched farmers' and agribusinesses' support for farm programs, while Guither et al. (1989) discussed support for farm programs that benefited small farms, large farms, or both. The two surveys captured farmers' and agribusinesses' preferences on farm program spending but did not capture the preferences of the general U.S. population. Variyam, Jordan, and Epperson (1990) investigated the role that demographics—including age, gender, income, education level, and political party affiliation—played on citizens' preferences for farm support, while Variyam and Jordan (1991) looked at how perceptions of farm sizes affect citizens' preferences for farm policy spending. The latter study found that individuals often associate small farms with being family farms and are thus more likely to support them through policy. More recently, Ellison, Lusk, and Briggeman (2010) used data from 299 participants located across three U.S. cities to analyze taxpayers' preferences for farm policy. They found that participants' perceptions of a farmer's income played a role in their decision to support farm policy, with the average participant seeking to increase farm support for small farms and decrease subsidies to large farms.

Other studies have focused on the general public's preferences for nutrition (Lusk, 2013) and conservation programs (Hellerstein and Nickerson, 2002; Hall, McVittie, and Moran, 2004). Hellerstein and Nickerson (2002) reported a survey conducted by the USDA's Economic Research Service (ERS) to explore public preferences for rural amenities and their relationship to farmland preservation. Their study concluded that state and local governments use farmland preservation programs to protect many rural amenities and that a trade-off exists between various amenities. Hall, McVittie, and Moran (2004) focused on multifunctional agriculture policy in a European context and examined the balance between traditional commodity support and payment to produce nonmarket goods and services demanded by the public.

Ellison and Lusk (2011) wrote perhaps the most relevant study for our research. Using an online survey, they elicited U.S. taxpayers' preferences simultaneously for six categories of USDA expenditures, with and without providing respondents information on the USDA's budget allocation for 2008. They found that respondents who did not receive the budget information assigned the highest funding allocation to food safety programs, followed by nutrition programs, while respondents who received the information assigned the highest allocation to nutrition programs, followed by food safety. Regardless of receiving information, respondents preferred to spend considerably less on nutrition or food assistance and more on food safety and inspection compared to the USDA's budget allocation in 2008. While their reported data analysis was a clever exercise that provided useful findings regarding U.S. taxpayers' preferences for USDA expenditures on all its programs, they did not explore the statistical significance of their information treatment nor employ regression methods to investigate the role of demographic and behavioral characteristics on taxpayer preferences for the programs.

Our research adds to the existing literature in many dimensions. First, we elicit public preferences for USDA expenditures shortly before Congress passed the 2018 Farm Bill, thereby reflecting the context of the most recent debate in the farm bill cycle. We examine the public's preferences simultaneously for four areas in particular—farm programs, conservation programs, nutrition programs, and other programs including rural development, food safety, research, marketing and regulatory, and departmental management—because the available funding allocated to these programs has in general been a near zero-sum game in recent years. In other words, we look broadly at the trade-offs that Congress will likely consider when discussing appropriation bills for USDA programs. Second, we use a fractional multinomial logit framework (Papke and Wooldridge, 2008; Mullahy, 2015) to model budget allocations and investigate whether giving respondents information describing the USDA's programs and depicting the USDA's 2018 budget request to Congress would significantly affect the public's preferences. This regression analysis sheds light on whether public preferences may adjust if the public is presented with these types of information and provides useful insights into the ability of stakeholders to move public sentiment. Third, unlike other studies, we investigate the role of demographic and behavioral factors on preferences for spending related to all programs. Notably, we examine the effect of perceptions of fraudulent behavior by the programs' beneficiaries on respondents' preferred funding allocation.

We generally find that the U.S. adult population may prefer to spend public funds differently from how the USDA allocated its spending in its funding request to Congress. Respondents would allocate less to nutrition programs and more to conservation and other programs, although their preferred allocation to nutrition assistance significantly increases after receiving information on the USDA's proposed budget. The preference we found most consistent with current spending is for farm programs, which may be striking as this is an area that newer advocacy groups have aggressively challenged. Though our results should not be interpreted as the funding distribution that would be socially optimal from an economic perspective, they cast light on the recent state of U.S. public opinion regarding USDA spending and can provide insights to policy makers, advocacy groups, researchers, and other stakeholders as they deliberate normative questions related to what funding levels ought to be. The results as a whole signal the potential popularity of increasing or decreasing broad funding efforts, they can help inform policy makers as they deliberate annual appropriations for the USDA, and they suggest the political–economic context of the most recent and future farm bill debates.

Methodology

Data and Survey Design

We collected our data through an online survey administered by a large market research company to a nationally representative sample of 465 U.S. adults (at least 18 years old). The survey invitation

included available incentives to potential respondents in the company's market research panels, which include cash and in-kind rewards (e.g., airline miles, gift cards, sweepstakes entrances, and vouchers). To avoid self-selection bias, the survey invitation did not include specific details about the USDA or the contents of the survey. The university's Institutional Review Board (IRB) approved the study in December 2017, and we surveyed in February 2018. Of the 465 responses collected, we removed six because of incomplete information.

In Table 1, we report the characteristics of respondents in our control and treatment groups as well as the pooled sample and contrast them with U.S. Census Bureau statistics for the U.S. population. We also report tests for the equality of each variable's mean in each group with the variable's mean in the U.S. population. As shown, the groups mirror our target population of U.S. adults in terms of gender, household size, and the middle age categories (ages 35–44 and 45–54). The groups reasonably represent our target population in terms of black and white race identity, U.S. region (West, Midwest, South, or Northeast), Republican or Democrat party affiliation, and yearly household incomes of less than $100,000. However, not all groups are representative of the population in terms of other dimensions including the number of children and the younger or older age categories (ages 18–34 or greater than 55 years). Relative to the population, a group may include more educated adults, fewer adults who identify as another race or multiple races, fewer adults who identify with an independent or another political party, and fewer adults with a yearly household income of $100,000 or more.

In the survey, the first section asked participants about their commitment to providing quality answers and questions programmed to meet our demographic quotas on age, gender, and race. Only respondents who checked that they committed to providing their best answers were able to continue to the next section. Respondents who selected that they would not or could not commit to providing their best answers exited the survey automatically. The second section contained an introduction and a ten-question true/false knowledge quiz designed to gauge respondents' initial expertise on U.S. food and agricultural policy, which included questions about the USDA's functions. In the introduction, respondents were asked to answer openly and truthfully and were told that the conclusions of this study will be shared with policy makers, community leaders, and interested citizens. Also, this section did not provide immediate feedback on right or wrong responses so that we could elicit the respondents' homegrown preferences for funding of U.S. food and agricultural policy in later sections. The third section asked respondents to indicate their preferred allocation of federal funds to USDA programs. The fourth and last section contained questions about the respondents' trust in the U.S. government, perceptions of fraud in USDA programs, and demographic and behavioral characteristics.

In the third section, the core question of the survey asked, "If the federal government had $100 in total to allocate among its programs, how much money would you like them to allocate to each of the following program categories?" Respondents could then slide a bar to the desired quantity for each of the program categories: Nutrition Assistance, Conservation and Forestry, Farm and Commodity, and Other Programs (Rural Development, Food Safety, Research, Marketing and Regulatory, and Departmental Management). The "Other Programs" category included all other USDA programs to mimic the 2018 USDA Budget Summary's pie chart depiction of funding distribution (U.S. Department of Agriculture, 2018, p. 2). We explicitly asked respondents to think of the number of dollars they allocated as the percentage of the USDA's total budget that they thought the government should allocate to those programs and programmed a restriction in the survey to ensure that their allocation would add up to $100. We intentionally did not allow respondents to increase or decrease total USDA spending to reflect the general situation in which policy makers writing the 2018 Farm Bill were largely expected to reallocate a USDA budget near a zero-sum. This proved to be true when the final Congressional Budget Office score for the 2018 Farm Bill projected no net change in spending over the 2019–2028 period. Thus, the exercise posed in the survey closely reflected the reality of the policy choice being made.

Table 1. Summary Statistics and Variable Definitions

Variable	Definition	Control	PROG Treatment	PROG+ BUD Treatment (means)	Pooled Sample	U.S. Pop.[a]
Age 18–24[b]	1 if age is 18 to 24 years; 0 otherwise	0.16	0.15	0.03***	0.12	0.13
Age 25–34[b]	1 if age is 25 to 34 years; 0 otherwise	0.28***	0.27***	0.20	0.25	0.18
Age 35–44[b]	1 if age is 35 to 44 years; 0 otherwise	0.19	0.15	0.15	0.16	0.16
Age 45–54[b]	1 if age is 45 to 54 years; 0 otherwise	0.14	0.15	0.18	0.15	0.17
Age 55+[b]	1 if older than 55 years of age; 0 otherwise	0.23***	0.28**	0.44**	0.32	0.36
Female[b]	1 if female; 0 otherwise	0.52	0.51	0.54	0.52	0.51
Male[b]	1 if male; 0 otherwise	0.48	0.49	0.46	0.48	0.49
White race identity	1 if identifies as white or Caucasian only; 0 otherwise	0.72	0.81***	0.77	0.76	0.73
Black race identity	1 if identifies as Black or African American only; 0 otherwise	0.14	0.15	0.15	0.15	0.13
Another or multiple race identity	1 if identifies as another race or multiple races; 0 otherwise	0.14	0.05***	0.08***	0.09	0.14
Associate[b]	1 if highest educational attainment is 2-year or associate degree; 0 otherwise	0.63***	0.61***	0.56***	0.60	0.72
Bachelor's[b]	1 if highest educational attainment is bachelor's degree; 0 otherwise	0.32***	0.29***	0.28***	0.30	0.18
Graduate[b]	1 if highest educational attainment is graduate school degree; 0 otherwise	0.06**	0.09	0.15**	0.10	0.10
Household size[c]	No. of persons per household	2.48	2.56	2.31	2.40	2.40
Children[c]	No. of <18 year-old-persons per household	0.44	0.63*	0.38**	0.50	0.50
Income $34,999 or less	1 if yearly household income before taxes is $34,999 or less; 0 otherwise	0.40**	0.33	0.30	0.34	0.31
Income $35,000–$74,999	1 if yearly household income before taxes is $35,000 to $74,999, 0 otherwise	0.33	0.39**	0.35	0.36	0.31
Income $75,000–$99,999	1 if yearly household income before taxes is $75,000 to $99,999, 0 otherwise	0.12	0.14	0.23***	0.16	0.12
Income $100,000 or more	1 if yearly household income before taxes is $100,000 or more; 0 otherwise	0.15***	0.14***	0.12***	0.14	0.26

Table 1. – continued from previous page

Variable	Definition	Control	PROG Treatment	PROG+ BUD Treatment (means)	Pooled Sample	U.S. Pop.[a]
Republican	1 if identifies with Republican party; 0 otherwise	0.33**	0.32*	0.29	0.31	0.26
Democrat	1 if identifies with Democratic party; 0 otherwise	0.35*	0.37**	0.32	0.35	0.30
Independent or another party	1 if identifies with an independent or another party; 0 otherwise	0.32***	0.31***	0.40	0.34	0.44
South[c]	1 if ZIP code is in the South; 0 otherwise	0.39	0.33*	0.34	0.35	0.38
West[c]	1 if ZIP code is in the West; 0 otherwise	0.22	0.23	0.23	0.23	0.24
Midwest[c]	1 if ZIP code is in the Midwest; 0 otherwise	0.20	0.25	0.18	0.21	0.21
Northeast[c]	1 if ZIP code is in the Northeast; 0 otherwise	0.19	0.19	0.25**	0.21	0.17
Farming family or friends	1 if a family member or friend farms for a living; 0 otherwise	0.23	0.24	0.20	0.22	
Knowledge of agricultural policy	No. of questions (out of 10) answered correctly in knowledge quiz; 0 otherwise	6.88	6.77	6.94	6.86	
Trusts the U.S. government	1 if strongly or somewhat agrees with "I have trust in the United States government"; 0 otherwise	0.41	0.39	0.40	0.40	
Perceived fraud % in nutrition	% respondent believes claimed fraudulently or misused by nutrition programs' beneficiaries	0.11	0.12	0.14	0.12	
Perceived fraud % in conservation	% respondent believes claimed fraudulently or misused by conservation programs' beneficiaries	0.10	0.09	0.09	0.09	
Perceived fraud % in farm programs	% respondent believes claimed fraudulently or misused by farm programs' beneficiaries	0.10	0.11	0.11	0.10	
Perceived fraud % in other programs	% respondent believes claimed fraudulently or misused by other USDA programs' beneficiaries	0.11	0.11	0.10	0.11	
No. of obs.		155	150	154	459	

Notes: Single, double, and triple asterisks (*,**,***) indicate rejection of the null hypothesis at the 10%, 5%, and 1% significance level, respectively, for a one-tailed t-test. Under the null, a variable's mean in a given group is equal to that variable's mean in the U.S. population.
[a] *Source:* 2013–2017 American Community Survey (ACS) 5-Year Estimates, American FactFinder, and Gallup party affiliation poll for 2018.
[b] U.S. statistics for population ≥ 18 years old.
[c] U.S. statistics calculated as variable's total population divided by total housing units.
[d] U.S. statistics estimated by the U.S. Census Bureau population clock for 2018.

Treatments

We randomly assigned each survey respondent to one of three groups to identify whether and how information on the USDA's programs and its proposed budget to Congress affects respondents' preferred funding distribution. In the first treatment (PROG), respondents received information describing all USDA programs before answering the allocation question (the program information shown to participants is provided in Appendix A). In the second treatment (PROG+BUD), respondents received the same information describing all USDA programs and additional information on the allocation of the USDA's 2018 budget immediately thereafter. The budget information consisted of an explanation of the 2018 USDA Budget Summary's pie chart depiction of funding distribution (U.S. Department of Agriculture, 2018, p. 2) including a sentence that emphasized the agency's total expenditure estimate of US\$140 billion for the 2018 fiscal year (information on the USDA's 2018 budget shown to participants is provided in Appendix B). In the control group, respondents received no additional information; they answered the same survey as those in the other two groups but did not receive information about the USDA's programs or its proposed budget before answering the allocation question.

Econometric Model

We estimate a nonlinear Fractional Multinomial Logit Model to identify the effects of the information treatments and respondents' attributes on the funding shares allocated to farm programs, nutrition, conservation, and other programs, where the shares may take boundary values between 0 and 1. This model, initially proposed by Papke and Wooldridge (1996) for the case of a univariate fractional dependent variable and extended by Papke and Wooldridge (2008) and Mullahy (2015) for the multivariate case, is a combination of the fractional logit model and the multinomial logit model. It uses the observed shares in place of the binary indicators that would normally populate a multinomial logit likelihood function (Mullahy, 2015) and has been used in the literature to model a wide range of topics that involve proportions as dependent variables (Sivakumar and Bhat, 2002; Ye and Pendyala, 2005; Koch, 2010; Allen, 2014; Mullahy, 2015). The model can be specified as

$$(1) \qquad E\left(y_{ij}|\boldsymbol{x}_i\right) \in (0,1) \text{ for } j = 1, \ldots, J,$$

$$(2) \qquad \sum_{j=1}^{J} E\left(y_{ij}|\boldsymbol{x}_i\right) = 1,$$

$$(3) \qquad E\left(y_{ij}|\boldsymbol{x}_i\right) = G(\boldsymbol{x}_i\boldsymbol{\beta}_j) = \frac{\exp(\boldsymbol{x}_i\boldsymbol{\beta}_j)}{\sum\limits_{m=1}^{J} \exp\left(\boldsymbol{x}_i\boldsymbol{\beta}_m\right)} \text{ for } j = 1, \ldots, J,$$

$$(4) \qquad E\left(y_{ij}|\boldsymbol{x}_i\right) = \frac{\exp(\boldsymbol{x}_i\boldsymbol{\beta}_j)}{1 + \sum\limits_{m=2}^{J} \exp\left(\boldsymbol{x}_i\boldsymbol{\beta}_m\right)} \text{ for } j = 2, \ldots, J,$$

$$(5) \qquad E\left(y_{ij}|\boldsymbol{x}_i\right) = \frac{1}{1 + \sum\limits_{m=2}^{J} \exp\left(\boldsymbol{x}_i\boldsymbol{\beta}_m\right)} \text{ for } j = 1,$$

where the share y_{ij} assigned by individual i to category j may take a value between 0 and 1, including the boundary values (equation 1), and the sum of shares across all J categories must add up to 1 (equation 2). Equation (3) is the main model specification, but its estimation requires some normalization, such as setting the coefficients of the first equation to 0 ($\beta_1 = 0$). Equations (4) and (5) denote the conditional expectations for the categories for which the parameters β are estimated
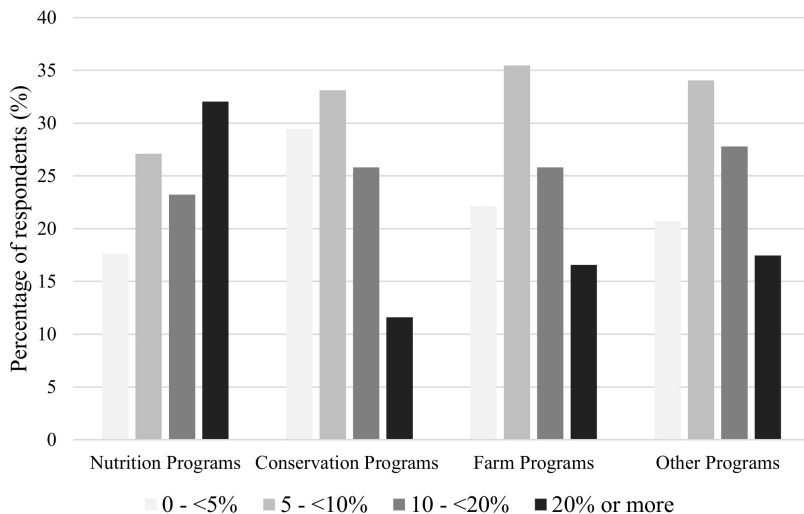
Figure 1. Respondents' Beliefs about Funds Claimed Fraudulently or Misused by USDA Programs' Beneficiaries

and for the omitted category, respectively. We specify U.S. adults' allocation of funding shares to USDA programs as

$$(6) \qquad\qquad y_{ij} = \boldsymbol{x}_i \boldsymbol{\beta}_j + e_{ij},$$

where the dependent variable y_{ij} denotes the share of funding allocated by respondent i to the program category j managed by the USDA (i.e., Farm Programs, Nutrition Assistance, Conservation and Forestry, or Other Programs), and $\boldsymbol{x}_i$ is a vector of individual-specific attributes including age, gender, race, education, household size, number of children per household, income, farming background, U.S. region, political party, knowledge of U.S. agricultural policy, trust in the U.S. government, percentage of funds perceived by respondents to be claimed fraudulently by beneficiaries of each program, and categorical variables for our information treatments. In addition, $\boldsymbol{\beta}_j$ are the program-specific parameters for program j and e_{ij} represents a random error term. As defined in Table 1, female is a binary variable equal to 1 if the respondent is female and 0 otherwise, trust in the U.S. government is a binary variable equal to 1 if the respondent strongly or somewhat agrees with the statement "I have trust in the United States government" and 0 otherwise, and farming background is a binary variable equal to 1 if the respondent's family member or friend farms for a living and 0 otherwise. We treat knowledge of agricultural policy, household size, and the number of children as continuous variables, and we include categorical variables for age, race, education, income, U.S. regions, and political party categories. As shown in Figure 1, respondents could select a percentage range of funds that they perceived to be claimed fraudulently or misused by the beneficiaries of each program (0%–<5%, 5%–<10%, 10%–<20%, or 20% or more). Using midvalues, we include four variables that are also treated as continuous and correspond to the percentage perceived to be claimed fraudulently for each program category. Our usable sample size is slightly reduced by 1 observation in the econometric model regression because of missing data. To run the fractional multinomial logit model, we use Stata SE 14 and the module *fmlogit* using quasi-maximum likelihood estimation.

Results and Discussion

We find that the average preferences reported by all participants differ from the USDA's recent budgetary priorities (Figures 2 and 3). Relative to the USDA's proposed budget allocation for 2018,
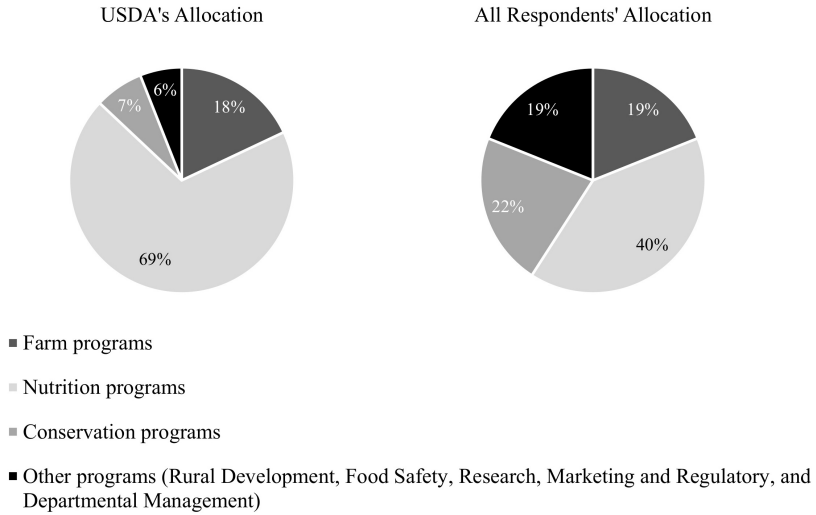
USDA's Allocation   All Respondents' Allocation

- ■ Farm programs
- ■ Nutrition programs
- ■ Conservation programs
- ■ Other programs (Rural Development, Food Safety, Research, Marketing and Regulatory, and Departmental Management)

Figure 2. USDA Budget Allocation for 2018 versus Respondents' Preferred Allocation
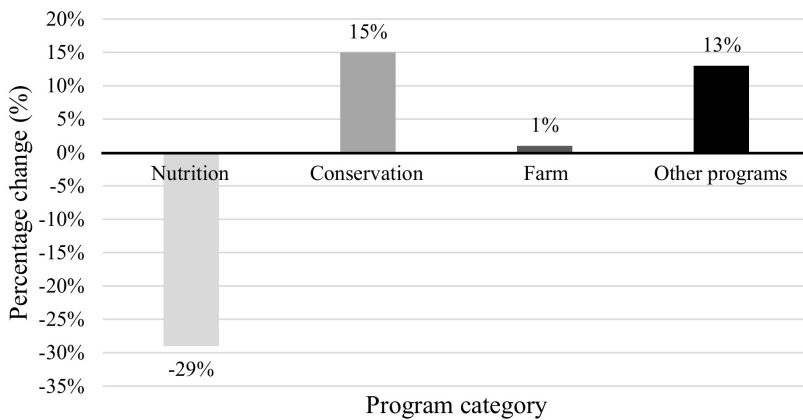

Figure 3. Respondents' Desired Funding Percentage Change Relative to the USDA'S 2018 Budget

respondents allocated less to nutrition assistance programs (−29%), more to conservation (+15%), roughly the same to farm programs (+1%), and more to other programs (+13%). Interestingly, respondents preferred a more equal distribution of USDA program funds. This response pattern reflects a more equal distribution of funds among the four program categories and may follow a choice heuristic known as naïve diversification bias (Simonson, 1990; Read and Loewenstein, 1995; Benartzi and Thaler, 2001). That is, when faced with making a simultaneous choice among several options, people may opt to choose more evenly and diversify more relative to when making the same choices sequentially.

If we break down respondents' preferences by treatment group (Figure 4), it seems that the control group and the group that received information describing all USDA programs before the allocation question (PROG treatment) have preferences that are similar to each other but different from those of the group that received the same information on USDA programs and additional information depicting the allocation of the USDA's 2018 budget immediately thereafter
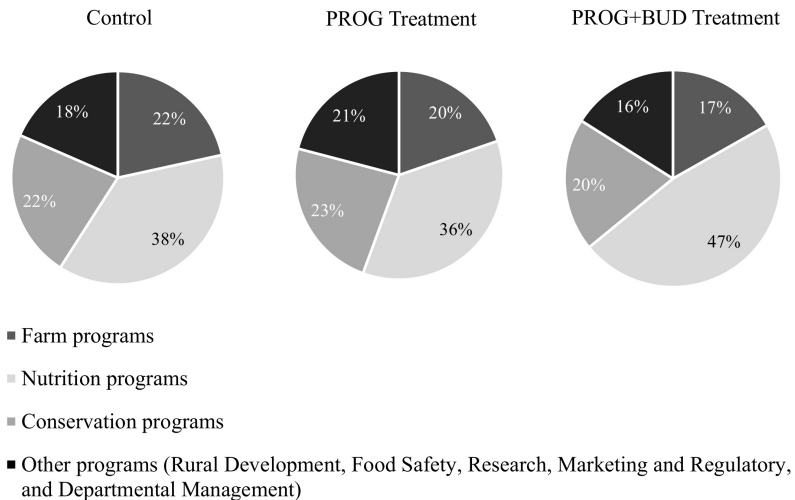
Figure 4. Respondents' Preferences for the USDA'S Funding Allocation by Treatment Group

(PROG+BUD treatment). Respondents in the PROG+BUD treatment preferred to allocate 9%–11% more to nutrition assistance programs relative to those in the control group and PROG treatment, respectively. We explore the statistical significance of these information treatments as well as the effect of demographic and behavioral factors using a fractional multinomial logit model. We report the regression model estimates in Table 2 and show the associated marginal effects, on which we focus the discussion of our results, in Table 3.

As shown in Table 3, there are no statistical differences between the mean allocations of the control and the PROG treatment (omitted base), but there are statistically significant differences between the mean allocations of the PROG + BUD and the PROG treatments for all program categories. This result means that information describing all USDA programs did not affect respondents' allocations but information depicting the USDA's budget allocation for 2018 did. Relative to respondents who did not receive information about the budget, respondents who received the additional information allocated more to nutrition programs (+11.0%), less to farm programs (−3.4%), less to conservation programs (−3.3%), and less to other programs (−4.3%). Since the USDA's annual total outlays have averaged about $140 billion in the past decade, these changes would translate into an increase to nutrition programs of $15.4 billion (+11.0%), and decreases to farm, conservation, and other programs of $4.76 billion (−3.4%), $4.62 billion (−3.3%), and $6.02 billion (−4.3%), respectively. Still, average preferences reported by respondents in the PROG + BUD treatment differ from the USDA's recent budgetary priorities in the same pattern that those of all respondents do. Relative to the USDA's 2018 budget allocation, respondents in the PROG + BUD treatment allocated less to nutrition programs (−22%), more to conservation (+13%), roughly the same to farm programs (−1%), and more to other programs (+10%).

The potential reasons underpinning respondents' preferences for program spending are complex. Our general finding that U.S. adults would spend less on nutrition compared with the USDA's budget allocation for 2018 (69%) but would significantly increase their allocation after receiving information on the USDA's spending levels is consistent with Ellison and Lusk's (2011) findings. While the USDA allocated 60.4% of its budget to food assistance in 2008, they found that respondents would increase their mean spending on this category from $20.54 out of every $100 (or 20.5%) to $28.43 out of every $100 (or 28.4%) after receiving budget information. In both studies, the aforementioned naïve diversification bias may explain the overall lower allocations to nutrition, and it is not possible to determine whether there are specific nutrition programs that might be relatively less popular than others because all nutrition programs are aggregated in one category.

Table 2. Fractional Multinomial Logit Estimation Results

Regressor	Nutrition	Conservation	Other Programs
Control	−0.085	−0.163	−0.242**
	(0.122)	(0.108)	(0.123)
PROG+BUD treatment	0.450***	0.028	−0.054
	(0.111)	(0.098)	(0.116)
Age 18–24	−0.034	0.132	0.254
	(0.185)	(0.152)	(0.194)
Age 25–34	−0.077	0.194*	0.060
	(0.130)	(0.117)	(0.137)
Age 35–44	−0.127	0.209	−0.017
	(0.160)	(0.134)	(0.182)
Age 45–54	−0.009	0.082	−0.087
	(0.146)	(0.150)	(0.144)
Female	0.204**	0.065	0.037
	(0.099)	(0.088)	(0.109)
White race identity	−0.142	−0.078	−0.143
	(0.149)	(0.126)	(0.162)
Another or multiple race identity	−0.103	−0.055	−0.293
	(0.202)	(0.185)	(0.219)
Bachelor's	0.054	−0.003	0.104
	(0.115)	(0.090)	(0.111)
Graduate	0.124	0.085	−0.118
	(0.168)	(0.134)	(0.169)
Household size (persons per household)	−0.046	−0.124***	−0.019
	(0.052)	(0.043)	(0.058)
Children (<18 year-old-persons per household)	0.034	0.125*	−0.035
	(0.078)	(0.069)	(0.081)
Income $34,999 or less	0.580***	0.160	0.064
	(0.164)	(0.129)	(0.186)
Income $35,000–$74,999	0.328**	−0.070	0.102
	(0.153)	(0.125)	(0.171)
Income $75,000–$99,999	0.449**	0.062	0.027
	(0.178)	(0.123)	(0.168)
Democrat	0.415***	0.119	−0.057
	(0.120)	(0.102)	(0.122)
Independent or another party	0.128	0.051	−0.074
	(0.125)	(0.108)	(0.134)
West	−0.062	−0.156	0.024
	(0.131)	(0.113)	(0.140)
Midwest	−0.094	−0.188	0.021
	(0.137)	(0.135)	(0.141)

Table 2. – continued from previous page

Regressor	Nutrition	Conservation	Other Programs
Northeast	0.057	0.029	−0.016
	(0.130)	(0.117)	(0.136)
Farming family or friends	0.109	0.035	−0.058
	(0.129)	(0.113)	(0.127)
Knowledge of agricultural policy	0.004	−0.017	0.023
	(0.028)	(0.027)	(0.030)
Trusts the U.S. government	0.104	−0.014	−0.078
	(0.099)	(0.082)	(0.099)
Perceived fraud % in nutrition	−1.826**	−1.353**	−1.157
	(0.912)	(0.677)	(0.874)
Perceived fraud % in conservation	1.490	1.439	−0.778
	(1.223)	(1.092)	(1.136)
Perceived fraud % in farm programs	0.420	1.980*	0.636
	(1.293)	(1.192)	(1.236)
Perceived fraud % in other programs	−0.032	−0.395	1.380
	(1.093)	(0.887)	(1.165)
Constant	0.137	0.283	0.045
	(0.333)	(0.308)	(0.426)
Pooled observations	458		
Log pseudo-likelihood	-599.36		

Notes: Regressand is the funding share for each program category. Numbers in parentheses are robust standard errors. Single, double, and triple asterisks (*,**,***) indicate statistical significance at the 10%, 5%, and 1% level. Farm programs is the baseline category. Categorical variables for PROG treatment, age 55 or more, male, Black race identity, associate degree, income $100,000 or more, Republican, and South are omitted bases.

However, Caputo and Lusk (2020) found in a recent survey that U.S. consumers have the lowest level of support for public health policies options related to fat, calorie, and soda taxes, while a previous study of public opinion by Lusk (2013) suggested support for the Supplemental Nutrition Assistance Program (SNAP) specifically, with 60.6% of his survey respondents opposing a $39 billion cut to SNAP benefits over 10 years. Our result indicating that knowledge of the USDA's funding levels increases willingness to fund nutrition programs could also suggest that the average U.S. adult may not be well informed of the USDA's role in nutrition assistance.

Public opinion on the share of expenditures allocated to farm programs is largely consistent with the USDA's budget allocation. Even though the percentage of the U.S. population that lives on a farm is declining (Dimitri, Effland, and Conklin, 2005), studies showing that farm subsidy benefits may be concentrated on large crop farms (McFadden and Hoppe, 2017), and bipartisan lobbying efforts by environmental groups and institutions such as the American Enterprise Institute aiming to decrease spending in farm programs, we do not find strong declines far beyond the USDA's actual funding levels in the public support for farm programs. Instead, we find that after receiving budget information respondents tend to adjust their allocations closer to the USDA's funding levels for farm support relative to when they do not receive this information. Respondents in Ellison and Lusk's (2011) study reported an allocation to farm programs of $17.94 out of every $100 spent (or 17.9%) after receiving budget information, a share closer to the USDA's allocation of 22% in 2008. In our study, respondents report an allocation to farm programs of 17% after receiving budget information, a share also closer to the USDA's most recent allocation of 18% in 2018. Ellison, Lusk, and Briggeman (2010) shed light on why we may be observing steady public support for farm

programs. Despite the public believing that farmers are financially well-off and even overestimating farmers' incomes at levels higher than their own household's income, respondents in their study expressed support for farm subsidies (particularly for small family farms) because of a perception that this support helps ensure a secure U.S. food supply.

The strong support for conservation programs suggests that the average U.S. adult would like to see significantly more funding for activities found in the conservation title (Title II) of the farm bill. Even if respondents seem to have adjusted their desired conservation funding level downward after receiving additional information on the USDA's 2018 budget, respondents' spending level is about three times the USDA's actual allocation for the fiscal year 2018. This public support for increased spending aligns with USDA spending trends over the past few decades, as the agency's share of spending on conservation programs has been increasing over time. Our analysis does not distinguish between specific conservation programs, but recent farm bill debates have included discussions about funding levels for programs such as the Conservation Reserve Program (CRP) and the working lands program. Recently, there have also been notable compromises involving two advocacy groups that may be perceived as opposed. In general, farm groups have made major efforts to support "farm safety net" programs while conservation and environmental groups have championed Title II programs. Yet recent initiatives such as conservation compliance for crop insurance benefits have required compromises from both groups. While it ultimately depends on who engages directly in the policy debates, our results suggest that future efforts to increase spending in conservation programs may be popular.

Results also suggest increased support for the Other Programs category, which included research and other subcategories such as food safety, rural development, departmental programs, and marketing and regulatory programs. Our study groups these programs into one category following the 2018 USDA Budget Summary's pie chart depiction of funding distribution (U.S. Department of Agriculture, 2018, p. 2) which we used in our information treatment, and we find a trend in public support for this aggregated category similar to that for conservation. Respondents tend to express support for increased spending and adjust down their desired funding level after receiving budget information, with informed respondents' spending levels still being higher than the USDA's actual allocation. In contrast, Ellison and Lusk (2011) presented respondents with three subprograms belonging to the "all other" category: food safety and inspection, research and education, and rural development, and found that respondents reported a collective allocation to these programs of $50.59 out of every $100 spent (or 50.6%) and decreased their allocation to $42.03 out of every $100 spent (or 42.0%) after receiving budget information, with both shares being well above the USDA's allocation of 9.3% to other programs in 2008 and food safety standing out as the most important category overall. In our study, respondents report an allocation to all other programs of 21% and decrease their allocation to 16% after receiving budget information, a share also higher than USDA's 2018 allocation of 6%.

As shown in Table 3, sociodemographic and behavioral characteristics such as age, gender, number of persons per household, number of children (<18 years old) per household, income, party affiliation, and perceptions of fraud by a program's beneficiaries are also factors that significantly affect respondents' preferred allocation. Respondents aged 25–44 years old allocate more to conservation (between +3.8% and +4.8%) relative to respondents aged 55 years or more, while females allocate more to nutrition (+4.1%) and less to farm programs (−2.0%) relative to males.

In terms of household size, increasing the number of persons by 1 (adult or child) is associated with decreasing the allocation to conservation programs by 1.6%. If the household size increases by one child, however, this increase is associated with an increase in the allocation to conservation programs by 2.0%. Income and political affiliation also play a significant role in the allocation of funds, particularly to nutrition and farm programs. In general, all respondents with an income lower than six figures allocate more to nutrition relative to respondents with an income of $100,000 or more. Respondents in the middle-income range ($35,000–$74,999) allocate more to nutrition

Table 3. Fractional Multinomial Logit Marginal Effects (*dy/dx*)

Regressor	Farm	Nutrition	Conservation	Other Programs
Control	0.022	0.012	−0.011	−0.023
	(0.015)	(0.024)	(0.015)	(0.017)
PROG+BUD treatment	−0.034**	0.110***	−0.033**	−0.043***
	(0.014)	(0.022)	(0.014)	(0.016)
Age 18–24	−0.012	−0.039	0.015	0.035
	(0.022)	(0.037)	(0.022)	(0.029)
Age 25–34	−0.004	−0.040	0.038**	0.007
	(0.016)	(0.026)	(0.017)	(0.020)
Age 35–44	0.002	−0.048	0.048***	−0.002
	(0.020)	(0.032)	(0.017)	(0.026)
Age 45–54	0.000	−0.003	0.018	−0.016
	(0.019)	(0.028)	(0.022)	(0.020)
Female	−0.020*	0.041**	−0.008	−0.012
	(0.012)	(0.020)	(0.013)	(0.016)
White race identity	0.019	−0.017	0.005	−0.008
	(0.019)	(0.029)	(0.017)	(0.023)
Another or multiple race identity	0.021	0.002	0.012	−0.034
	(0.024)	(0.043)	(0.027)	(0.034)
Bachelor's	−0.008	0.006	−0.010	0.012
	(0.013)	(0.023)	(0.013)	(0.017)
Graduate	−0.009	0.031	0.008	−0.030
	(0.021)	(0.034)	(0.017)	(0.022)
Household size (persons per	0.010	0.001	−0.016***	0.006
household)	(0.006)	(0.011)	(0.006)	(0.008)
Children (<18 year-old-persons per	−0.007	0.000	0.020**	−0.013
household)	(0.010)	(0.016)	(0.009)	(0.012)
Income $34,999 or less	−0.054***	0.121***	−0.027	−0.040
	(0.020)	(0.032)	(0.018)	(0.027)
Income $35,000–$74,999	−0.026	0.078***	−0.045***	−0.006
	(0.019)	(0.029)	(0.017)	(0.023)
Income $75,000–$99,999	−0.039*	0.100***	−0.030	−0.032
	(0.021)	(0.036)	(0.019)	(0.024)
Democrat	−0.035**	0.094***	−0.014	−0.044**
	(0.015)	(0.024)	(0.014)	(0.018)
Independent or another party	−0.009	0.032	0.000	−0.023
	(0.015)	(0.026)	(0.016)	(0.019)
West	0.011	−0.003	−0.022	0.015
	(0.016)	(0.026)	(0.016)	(0.020)
Midwest	0.015	−0.007	−0.025	0.018
	(0.017)	(0.027)	(0.019)	(0.019)

Table 3. – continued from previous page

Regressor	Farm	Nutrition	Conservation	Other Programs
Northeast	−0.005	0.012	0.001	−0.008
	(0.016)	(0.025)	(0.016)	(0.019)
Farming family or friends	−0.008	0.027	−0.001	−0.018
	(0.016)	(0.025)	(0.014)	(0.019)
Knowledge of agricultural policy	0.000	0.001	−0.004	0.004
	(0.004)	(0.006)	(0.004)	(0.004)
Trusts the U.S. government	−0.005	0.032	−0.008	−0.019
	(0.012)	(0.020)	(0.012)	(0.014)
Perceived fraud % in nutrition	0.240**	−0.234	−0.023	0.017
	(0.106)	(0.187)	(0.101)	(0.123)
Perceived fraud % in conservation	−0.149	0.288	0.146	−0.285*
	(0.153)	(0.224)	(0.134)	(0.163)
Perceived fraud % in farm programs	−0.139	−0.122	0.277**	−0.016
	(0.168)	(0.228)	(0.140)	(0.165)
Perceived fraud % in other programs	−0.030	−0.075	−0.121	0.225
	(0.133)	(0.214)	(0.130)	(0.163)
Pooled observations	458			

Notes: Regressand is the funding share for each program category. Numbers in parentheses are standard errors. Single, double, and triple asterisks (*,**,***) indicate statistical significance at the 10%, 5%, and 1% level. All regressors at their mean value.

(+7.8%) and less to conservation (−4.5%), while respondents in the low-income range ($34,999 or less) and those who earn $75,000–$99,999 allocate more to nutrition (+12.1% and +10.0%, respectively) and less to farm programs (−5.4% and −3.9%, respectively), relative to respondents with an income of six figures and above. Similarly, Democrats prefer to allocate more to nutrition (9.4%), less to farm programs (−3.5%), and less to other programs (−4.4%), relative to Republicans.

We find that perceptions of fraud by a program's beneficiaries did not make respondents decrease their allocation toward that category significantly, but instead made them increase or decrease their allocation toward another. For instance, a 1% increase in the percentage of funds respondents believed to be claimed fraudulently by the beneficiaries of nutrition programs is associated with a 2.4% increase in the share allocated to farm programs, and a 1% increase in the percentage of funds respondents believed to be claimed fraudulently by the beneficiaries of farm programs led to a 2.7% increase in the share allocated to conservation programs. Similarly, a 1% increase in the percentage of funds respondents believed to be claimed fraudulently by the beneficiaries of conservation programs led to a 2.8% decrease in the share allocated to other programs.

While farm policy debates are often believed to reflect regional differences among the public, we find no significant effects of a region in our econometric model. Nor do we find other demographic and behavioral characteristics like race, educational attainment, farming background, knowledge of U.S. agricultural policy, and trust in the U.S. government to have a significant effect on U.S. adults' preferred allocation of USDA total funding.

Summary and Conclusions

Studies eliciting the preferences of the general U.S. public for food and agricultural policy are scarce and thus may be overlooked in the recurring debates about funding priorities for the USDA. We survey a nationally representative sample of the U.S. adult population and find that

respondents would allocate USDA spending differently from how the USDA allocated its spending in its funding request to Congress for the fiscal year 2018. In particular, respondents would spend significantly less on nutrition assistance, about the same on farm programs, and more on conservation and other programs relative to the USDA's 2018 budget allocation. However, when respondents receive additional information on the USDA's funding request for 2018, their allocation toward nutrition assistance programs increases while that for the other three program categories decreases. Moreover, we find that sociodemographic and behavioral characteristics including age, gender, number of persons per household, number of children (<18 years old) per household, income, party affiliation, and perceptions of fraud by a program's beneficiaries are factors that significantly affect respondents' preferred allocation.

Though these results do not necessarily reflect a funding distribution that would be socially optimal from an economic standpoint, they provide further insights into U.S. public opinion regarding the allocation of federal funds to USDA programs, which can help inform policy makers, advocacy groups, researchers, and other stakeholders as they work to determine what the funding levels are ought to be. These results suggest the political-economic context of the most recent and future farm bill debates and the potential popularity of increasing or decreasing broad funding efforts and can help inform policy makers in the U.S. Congress as they determine USDA appropriations annually.

There are additional research questions that could warrant further study. By forcing respondents to reallocate funds, we do not allow them to shrink or expand the pie. For example, some respondents may prefer not to allocate the whole $100 to the various program categories while others may prefer to allocate more than $100. Asking survey participants if they would spend more or less than $100 could give researchers further insights on public preferences for instances when the USDA's budget may shrink or expand. Moreover, we find that respondents in the PROG + BUD group prefer to increase nutrition assistance funding but decrease funding for conservation and forestry and other programs but cannot identify whether specific subprograms might be relatively less popular than others. Accounting for respondent fatigue, a useful follow-up study could entail breaking down each of the broad program categories to understand the subcategories that drive respondents' desire to increase or decrease spending in USDA programs.

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Appendix A: Information Describing Programs by the USDA

Programs by the U.S. Department of Agriculture (USDA)

Farm and Commodity Programs: They support expanded economic and trade opportunities for agricultural producers through commodity and income support, export promotion, farm credit, risk management, and disaster assistance. They include crop insurance, direct and guaranteed loans for farmers, and the Agriculture Risk Coverage (ARC) and Price Loss Coverage (PLC) programs.

Nutrition Assistance Programs: They increase food security and reduce hunger by providing children, senior citizens, and low-income people access to food, a healthful diet, and nutrition education. USDA funds 15 nutrition assistance programs which include the Supplemental Nutrition Assistance Program (SNAP), the National School Lunch Program (NSLP) program, and the Special Nutrition Program for Women, Infants, and Children (WIC).

Conservation and Forestry Programs: They promote the conservation and sustainable use of natural resources on the Nation's private lands and sustain production of the goods and services that the public demands of the national forests and grasslands. They include the Conservation Reserve Program (CRP) and the Environmental Quality Incentive Program (EQIP), and forestry programs responsible for wildland fire management.

All Other Programs (Research, Marketing and Regulatory, Rural Development, Food Safety, and Departmental Programs): They support agricultural research and education, promote the domestic and international marketing of U.S. agricultural products, enforce regulations that protect the agricultural sector from plant and animal health threats, provide loans for rural housing and rural electric improvements, are responsible for a safe and properly labeled and packaged food supply, and support USDA's departmental activities such as cyber security, among others.
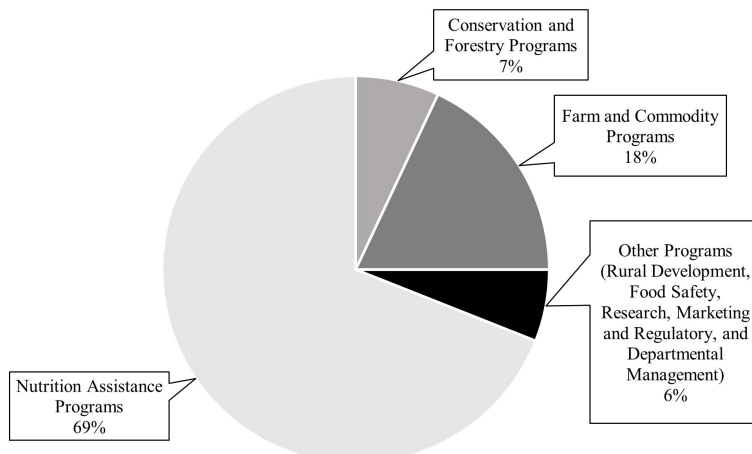
You will be able to continue to the next page momentarily. In the meantime, please take a moment to review the information presented. Once you are done reviewing, please proceed.

Appendix B: Information Depicting the USDA's Budget for 2018

U.S. Department of Agriculture (USDA) Estimated Expenditures for 2018

The graph below illustrates the distribution of the USDA's estimated expenditures for 2018, which total US\$ 140 billion. Please take a moment to review how the USDA plans to allocate their funding to the different programs they manage.

Once you are done reviewing, please proceed.

Conservation and Forestry Programs
7%

Farm and Commodity Programs
18%

Other Programs (Rural Development, Food Safety, Research, Marketing and Regulatory, and Departmental Management)
6%

Nutrition Assistance Programs
69%

Source: USDA Budget Summary, Fiscal Year 2018.