November 2001 • NREL/SR-510-31247

Subcontractor Report

Bioethanol Fuel Production Concept Study

Topline Report

Marketing Horizons, Inc.
St. Louis, Missouri

National Renewable Energy Laboratory

1617 Cole Boulevard
Golden, Colorado 80401-3393

NREL is a U.S. Department of Energy Laboratory
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Contract No. DE-AC36-99-GO10337

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NREL Technical Monitor: Howard Brown

Prepared under Subcontract No. ACE-1-31061-01

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INTRODUCTION

Background:

- The U.S. Department of Energy (DOE) is in the process of developing technologies for converting plant matter other than feed stock, e.g., corn stover, into biofuels. Bioethanol is the fuel type of interest for this research project. This is being pursued as a cost effective, environmentally friendly alternative fuel source for transportation fuels and fuel additives. Cooperation of farmers in supplying large quantities of corn stover is required for the successful accomplishment of the program objectives.

Purpose:

- The overall purpose of this research was to determine how to persuade farmers and other agricultural influentials to support the program.

- Specific issues addressed in the research were:

  - Determine what the farming community thinks of Ethanol as a fuel source, and specifically, bioethanol produced from corn stover

  - Assess the image of the U.S. Department of Energy as a participant in the biofuels program

  - Evaluate the decision process utilized by the farm community regarding the assessment of and participation in the bioethanol program

  - Measure interest of farmers in providing corn stover, including the means and motivation to harvest

  - Determine the perceived impact of potential barriers to participation, such as erosion, available harvesting technology, time and cost to harvest, and changing cultural attitudes toward residue benefits

  - Assess potential benefits, such as, harvesting corn stover as a source of revenue and contributing to the production of an environmentally friendly fuel source.

Methodology:

A total of 400 corn growers were interviewed in the following states:

Illinois	68
Indiana	35
Iowa	73
Kansas	20
Michigan	13
Minnesota	43
Missouri	17
Nebraska	52
Ohio	21
South Dakota	25
Texas	11
Wisconsin	22

The interviews were conducted by the professional interviewing staff of Marketing Horizons, Inc. between July 17 and August 1, 2001.

Participants were screened based on the following recruitment criteria:

Actively involved in farming

Responsible for making the decisions in their farming operation

Planted at least 300 acres of corn in 2001

Between the ages of 25 and 65.

A copy of the questionnaire is included in the Appendix of this report.

KEY FINDINGS

Corn Acreage

- Corn growers who participated in the survey had an average of 653 corn acres. Fifty-five percent had 300 to 500 acres, 22 percent had 501 to 750 acres, and 23 percent had 751 acres or more.

Alternative Fuels

- When prompted, more than three out of four corn growers perceive that the following groups are involved in the research and development of alternative fuels: National Corn Growers Association (95%), State Corn Growers Associations (88%), universities (88%), and U.S. Department of Agriculture (75%). Two out of three respondents believed the U.S. Department of Energy (67%) is involved while only 24 percent perceive any involvement by oil companies.

- On an unaided basis, 19 percent of the growers participating said they believed that the American Soybean Association is involved in the research and development of alternative fuels.

  - Nearly all growers believe that each of these groups, including oil companies, should be promoting Ethanol consumption. And, 86 percent indicated that check-off dollars should be used to promote Ethanol consumption.

  - While only 25 percent of respondents are aware of The National Renewable Energy Laboratory, 44 percent are aware of the U.S. Department of Energy's BioFuels Program.

Ethanol Produced From Grain

- Nearly all corn growers perceive that the Ethanol program, where Ethanol is produced from grain, is at least somewhat beneficial to them (68%, very beneficial; 22%, somewhat beneficial). They also perceive this program to benefit the environment (60% very beneficial; 31%, somewhat beneficial), elevators and grain producers (55% very beneficial; 31%, somewhat beneficial), and U.S. society in general (50%, very beneficial; 36%, somewhat beneficial).

- More than half of the respondents perceive that the Ethanol program is not at all beneficial to oil companies (65%) and petroleum refiners (52%).

- More than two out of three respondents said that the major benefit resulting from the production and use of Ethanol is cleaner air/less pollution (68%). Other benefits they perceive are an increased demand for corn (38%), independence from foreign oil (34%), and help for the farm economy (34%).

- Seven out of ten corn growers did not report any disadvantages to the production and use of Ethanol. The few respondents who mentioned any disadvantages said it was too expensive (5%), it requires high capital to build the factories that produce it (5%), and it takes away from the food supply (4%).

Reaction To Statements Regarding Ethanol

- Most growers were likely to agree with the statements regarding benefits to the grower, the country, and the environment:

	Strongly Agree	Somewhat Agree
I have no reservations about selling grain for the production of Ethanol	86%	6%
Using Ethanol is very beneficial to the environment	62%	31%
Producing Ethanol can significantly reduce our dependence on foreign oil	60%	26%
Using Ethanol produced from grain results in higher corn prices for the grower	43%	38%
The production of Ethanol will increase greatly over the next few years	41%	42%

Growers were likely to disagree with these statements regarding public information about Ethanol:

	Strongly Disagree	Somewhat Disagree
The public is well informed about the benefits of using Ethanol as a fuel blend	26%	57%
Publicity for the promotion of Ethanol has been adequate	21%	49%

Nearly all corn growers disagreed with the statement:

	Strongly Disagree	Somewhat Disagree
Producing Ethanol from grain is undesirable because it takes away from the food supply	83%	11%

Corn Stover

- In 2001, three out of ten corn growers expect to harvest at least some of their corn stover (29%).
  - On average, these growers will harvest about one-third of their stover (35%). Most of the growers (62%) who intend to harvest some corn stover reported they will remove 30 percent or less while only 13 percent expect to harvest all of their stover.
  - Corn growers who expect to harvest their stover most often said they will bale it (55%) or chop/cut it (11%).
  - Growers harvesting their stover most often use their it for animal feed (62%), while fewer use it for bedding (36%), and silage (15%).

- More than one-half of the growers who do not plan to harvest any corn stover in 2001 said they have no use for it (53%). Other reasons for not harvesting stover are soil concerns (35%-net) which include reducing soil fertility (18%), concern about soil tilth (14%), and concern about erosion (11%). Only four percent do not harvest stover because they do not have the equipment.

The Production Of Ethanol From Corn Stover

- When growers were given information about a proposed alternative fuel program, Ethanol being produced from corn stover, nearly six out of ten had an initial positive reaction to the overall program (30%, very positive; 29%, somewhat positive).

- Three fourths of the growers surveyed would be likely to sell at least some corn stover for the production of Ethanol if it could be harvested at a reasonable profit (74%).

- In order to harvest stover, growers would require an average minimum payment of $42.70 per ton. However, 56 percent of the respondents were unable to provide a minimum payment amount when asked.

  - Growers who do not plan to harvest any stover in 2001 would require a higher minimum payment for their stover than were those planning to harvest ($44.30, $39.70 per ton, respectively). Those not planning to harvest were less likely to provide a minimum payment amount than were growers who were already planning to harvest some of their stover.

Growers Likely To Harvest Corn Stover For Ethanol Production

- The most frequently given reason for being likely to harvest stover for the production of Ethanol was to add income (70%). Other reasons mentioned by fewer respondents were independence from foreign oil (8%), another use for corn (7%), and no need for corn stover on the farm (5%).

- The primary problems associated with harvesting stover among this group of corn growers likely to harvest stover for the production of Ethanol are a mix of labor/harvesting and soil concerns. Labor/harvesting concerns that were mentioned most frequently were: no way to transport (20%), too much work/labor/time (18%), do not have the equipment (16%), and too expensive to harvest (5%). Soil concerns included losing nutrients/fertilizer (17%), and soil erosion (16%).

- Most growers would harvest at least **some** of their corn stover from **some** of their fields (84%). On average, they would want to leave slightly more than a third, (37%) of the stover on the ground.

- After being given information about the proposed program to produce Ethanol from corn stover, growers who would be at least somewhat likely to harvest their stover for Ethanol production increased the percent of stover they would likely harvest by 57 percentage points, on average over what they had previously planned to harvest.

  - Growers who currently do not intend to harvest any stover in 2001 said, after being given the Ethanol production from stover program information, they would harvest, on average, 62 percent of their stover to sell for Ethanol production.

Growers Not Likely To Harvest Corn Stover For Ethanol Production

- Corn growers who said they would not be likely to harvest at least some of their corn stover for the production of Ethanol mentioned soil and feed concerns as their reason. These included losing nutrients/fertilizer (35%), fear of soil erosion (34%), use corn stover for silage (7%), and use corn stover to graze cattle (6%). Other reasons were that there was not enough money in it (12%), do not have the equipment (5%), no way to transport it (4%), and too much work/labor/time (3%).

  - Six out of ten growers (59%) who are not likely to sell corn stover for Ethanol production did not perceive any advantages to this concept. The few advantages this group mentioned most frequently were it would be a source of income (16%) and would cut costs on feed and bedding (15%).

Reaction To Statements Regarding The Harvest Of Corn Stover

Erosion Concerns

- While 47 percent of corn growers at least somewhat agreed with the statement, *I would have serious erosion problems if I harvested some of my corn stover* (17% strongly agree; 30% somewhat agree), 75 percent at least somewhat agreed that *although some residue is required to protect the soil from erosion, some residue can be safely removed* (33% strongly agree; 42% somewhat agree).

Impact On Soil

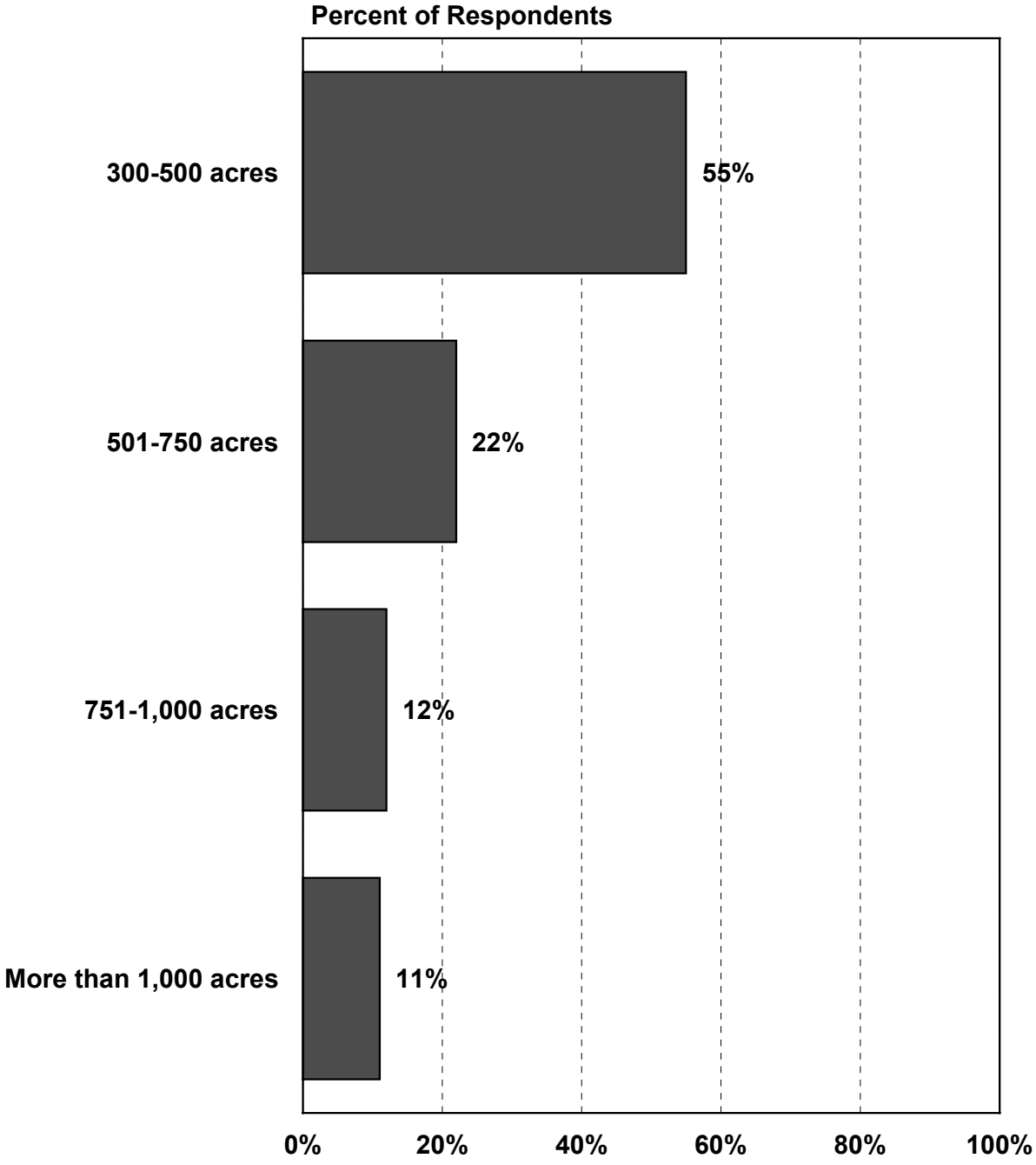
- Seventy-one percent at least somewhat agreed that *I would have to apply more fertilizer if I harvest some of my corn stover* (42%, strongly agree; 29%, somewhat agree).

- Growers are equally divided in their agreement with the statement, *I would benefit from removing some of the corn stover because it would allow earlier soil warming* (50%, at least somewhat agree; 49%, at least somewhat disagree).

  - Growers in the northern tier states (Michigan, Minnesota, South Dakota, Wisconsin) are significantly more likely to at least somewhat agree with the statement, *I would benefit from removing some of the corn stover because it would allow earlier soil warming* than were growers in the other states surveyed (59%, at least somewhat agree; 47%, at least somewhat agree, respectively).

2001 Corn Acres

(Base=All Respondents, n=400)

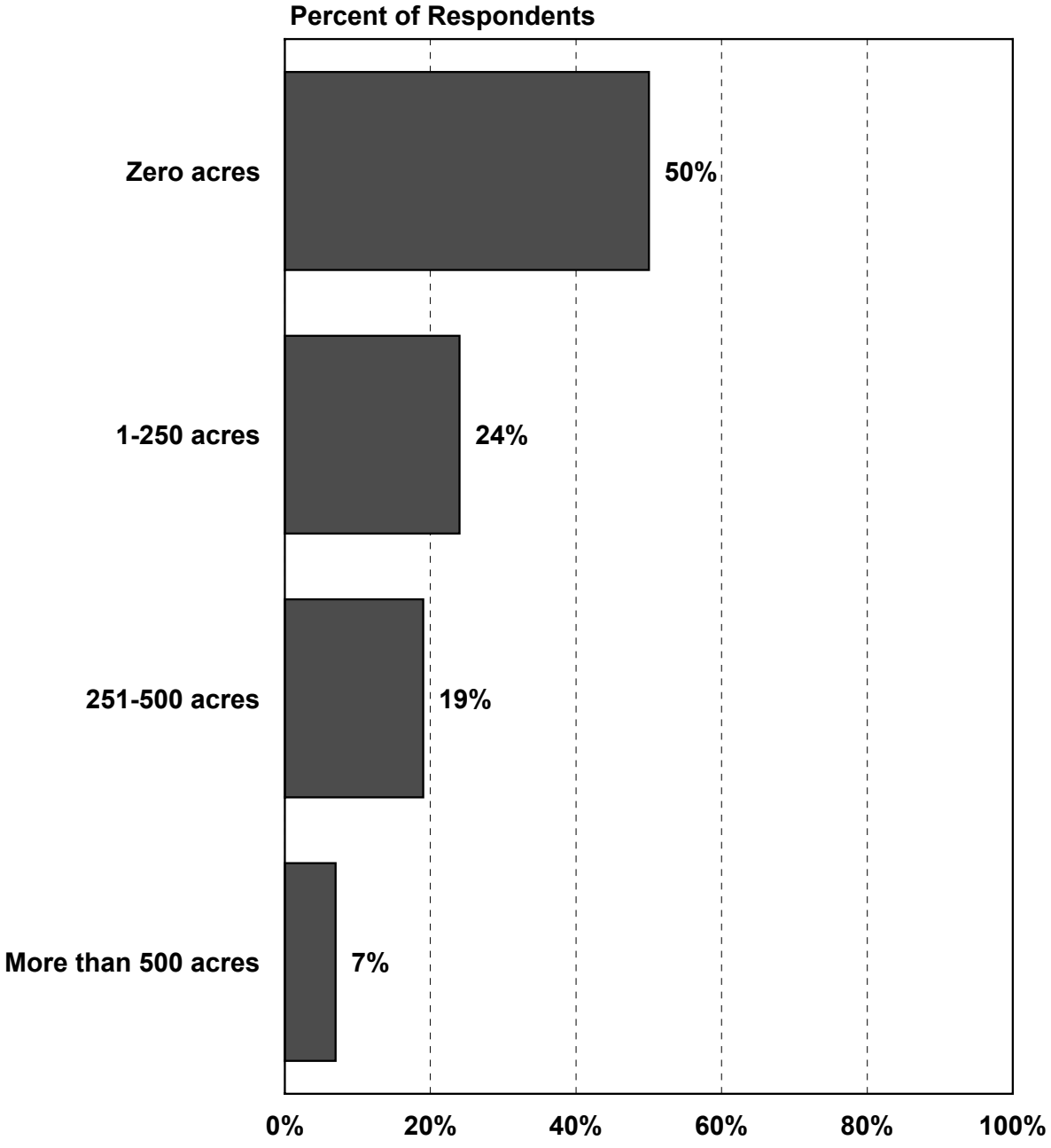


Average 2001 corn acres: 653

Q.C How many acres of corn did you plant this year in 2001?

2001 GMO Corn Acres

(Base=All Respondents, n=400)



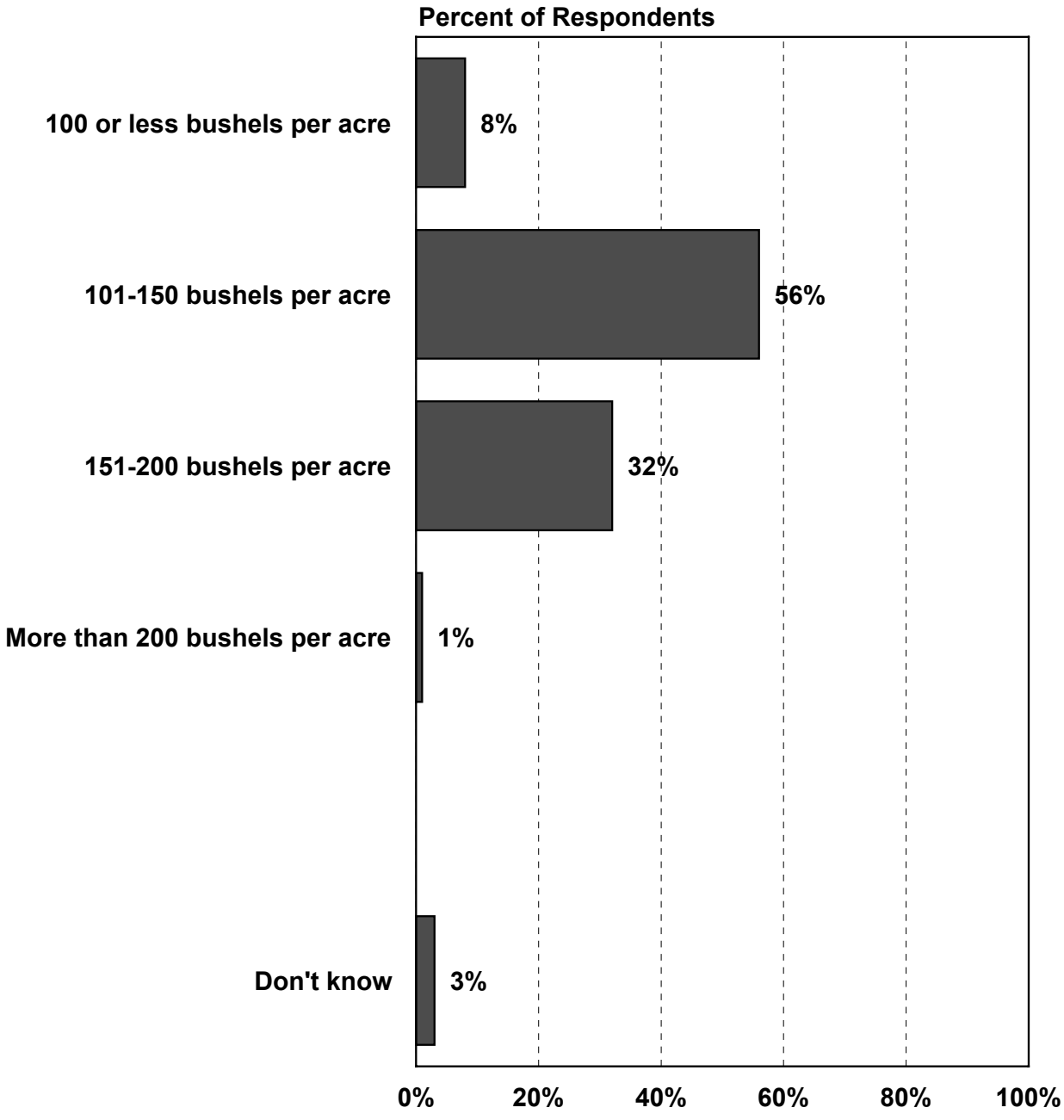
Average 2001 GMO corn acres: 172

Percent of total corn acres planted in GMO corn in 2001: 26%

Q.D How many of your [Q.C acres] of corn are GMO corn?

2001 Corn Yield Per Acre

(Base=All Respondents, n=400)

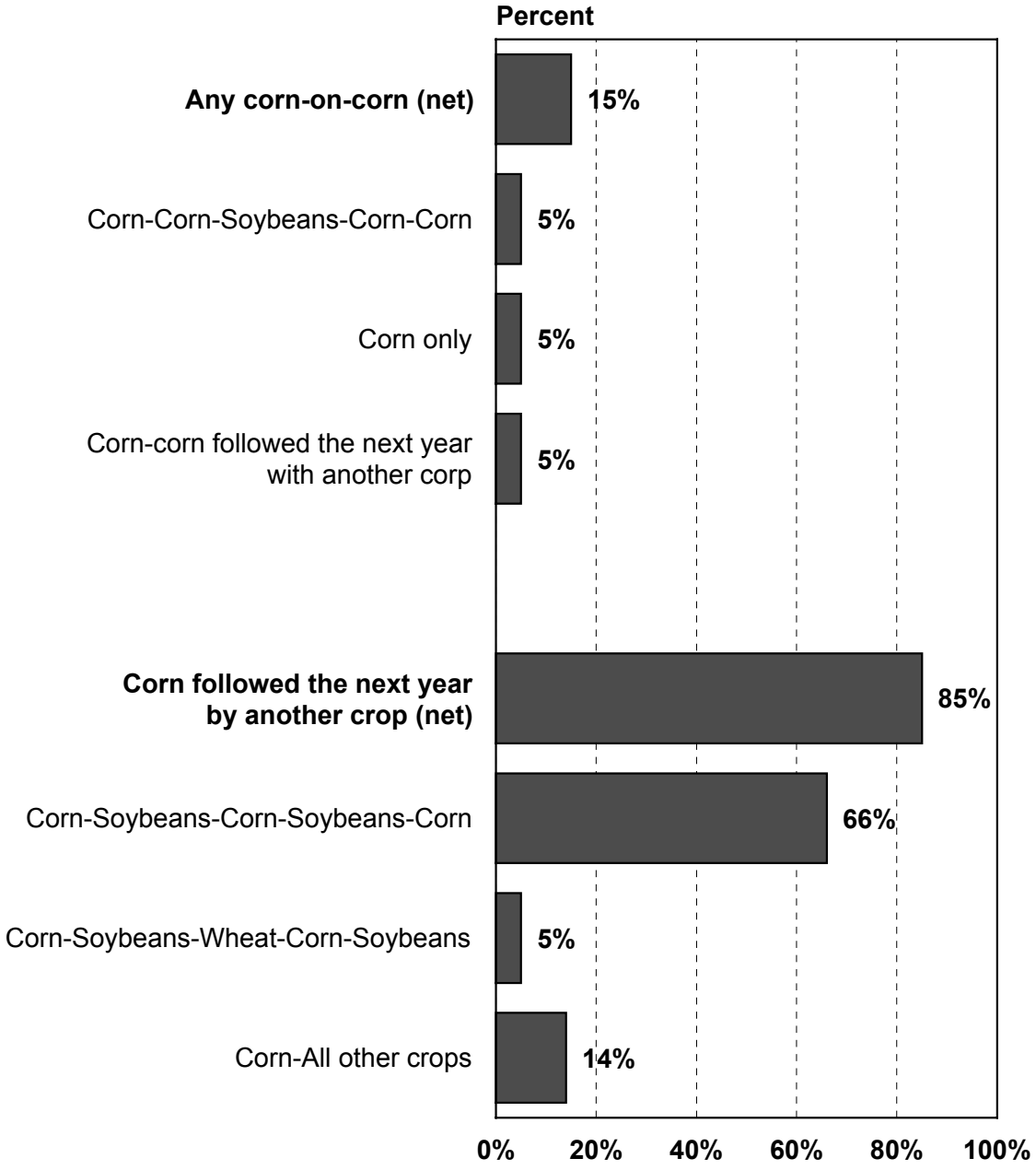


Average corn yield per acre: <u>145 bushels</u>

Q.E What is your average corn yield per acre for your operation?

Typical Crop Rotation

(Base=All Respondents, n=400)

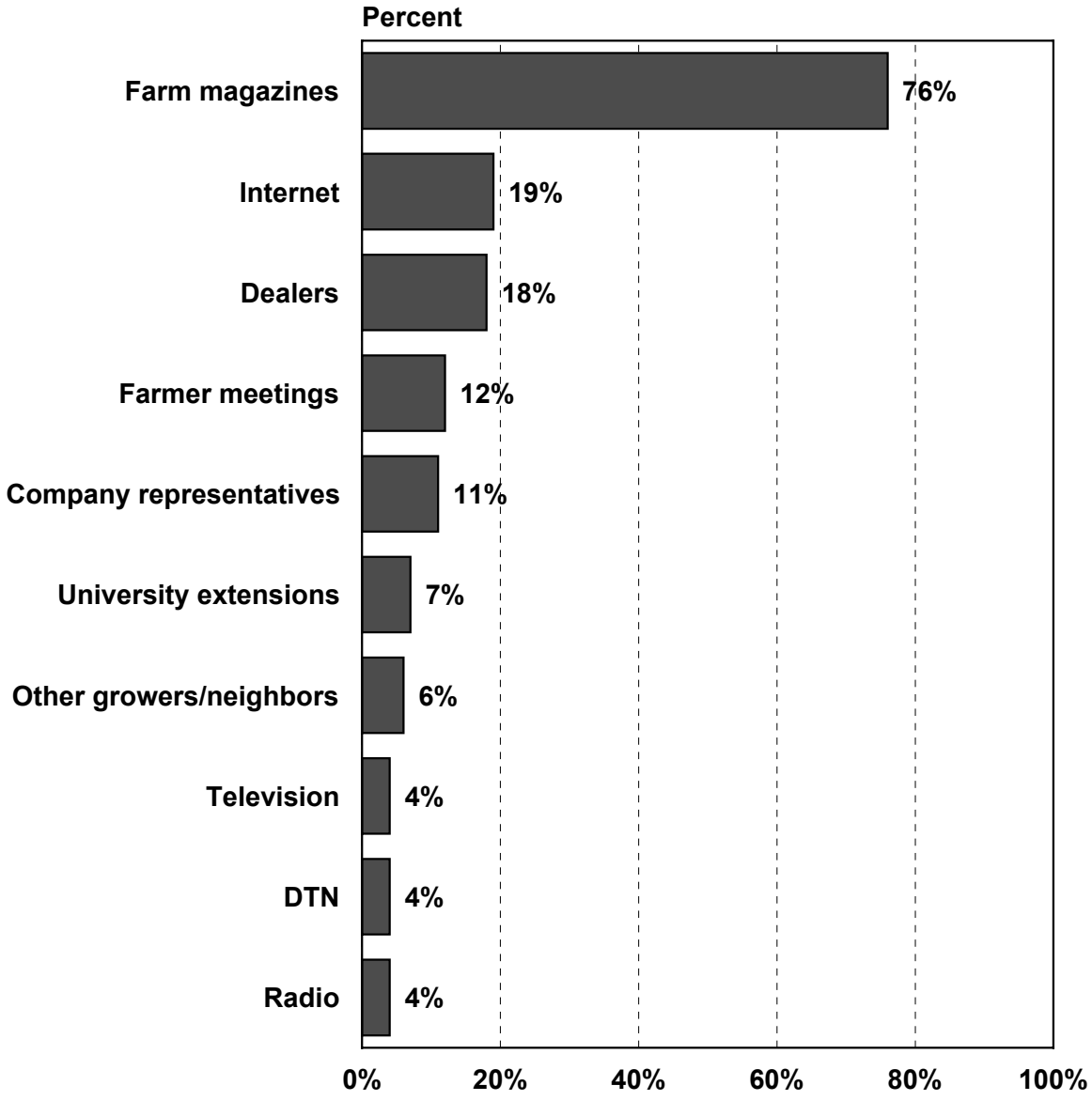


Q.F How would you describe your typical crop rotation?

Sources Of Information Utilized To Learn "What's New" In Crop Production Technology

(Base=All Respondents, n=400)

- Mentions of 4% or more -

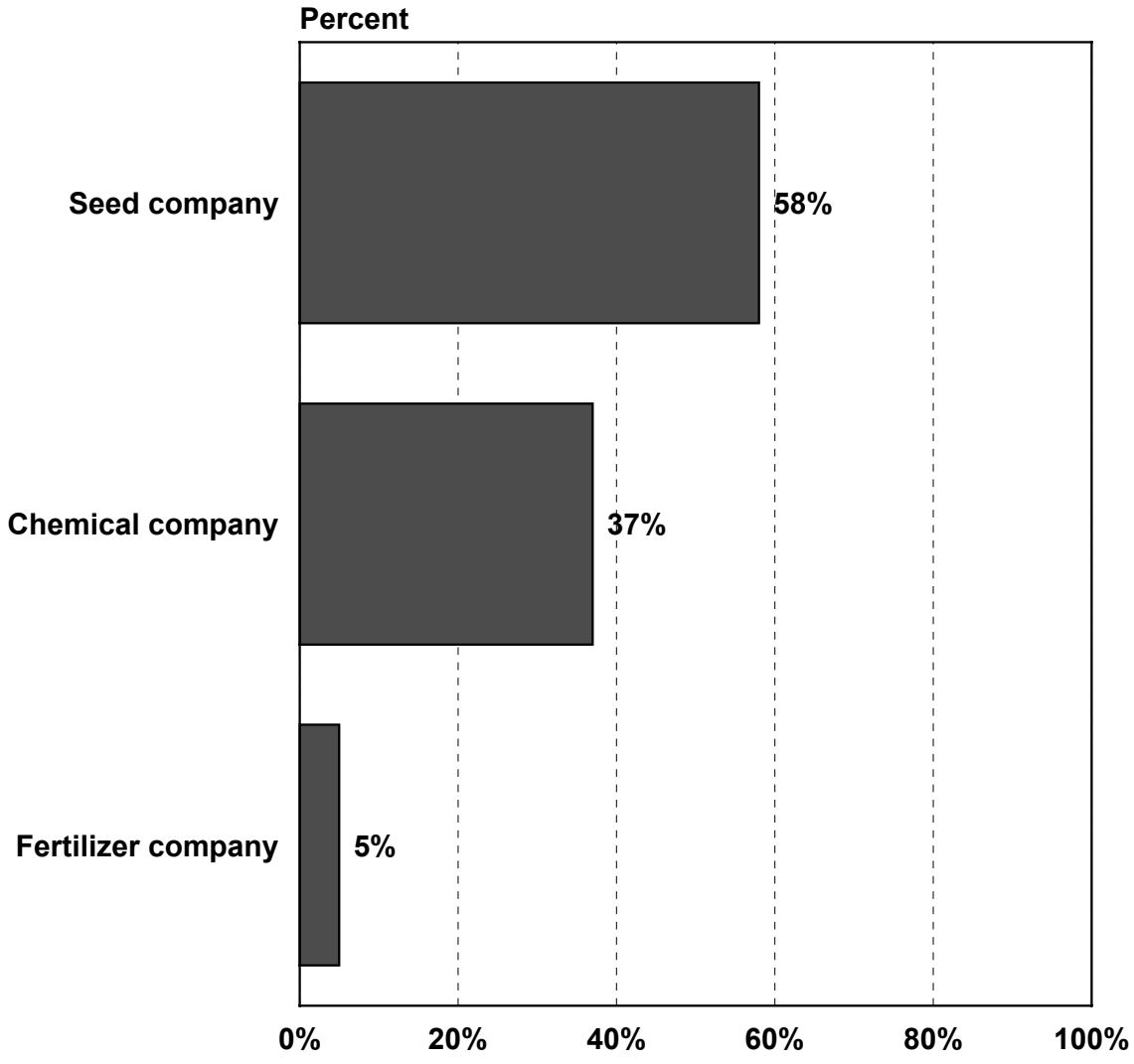


Q.1 What sources of information do you generally seek out to learn "what's new" in crop production technology?

Type Of Company Representative Utilized To Learn "What's New" In Crop Production Technology

(Base=Respondents who mentioned company representatives as a source of information, n=43)

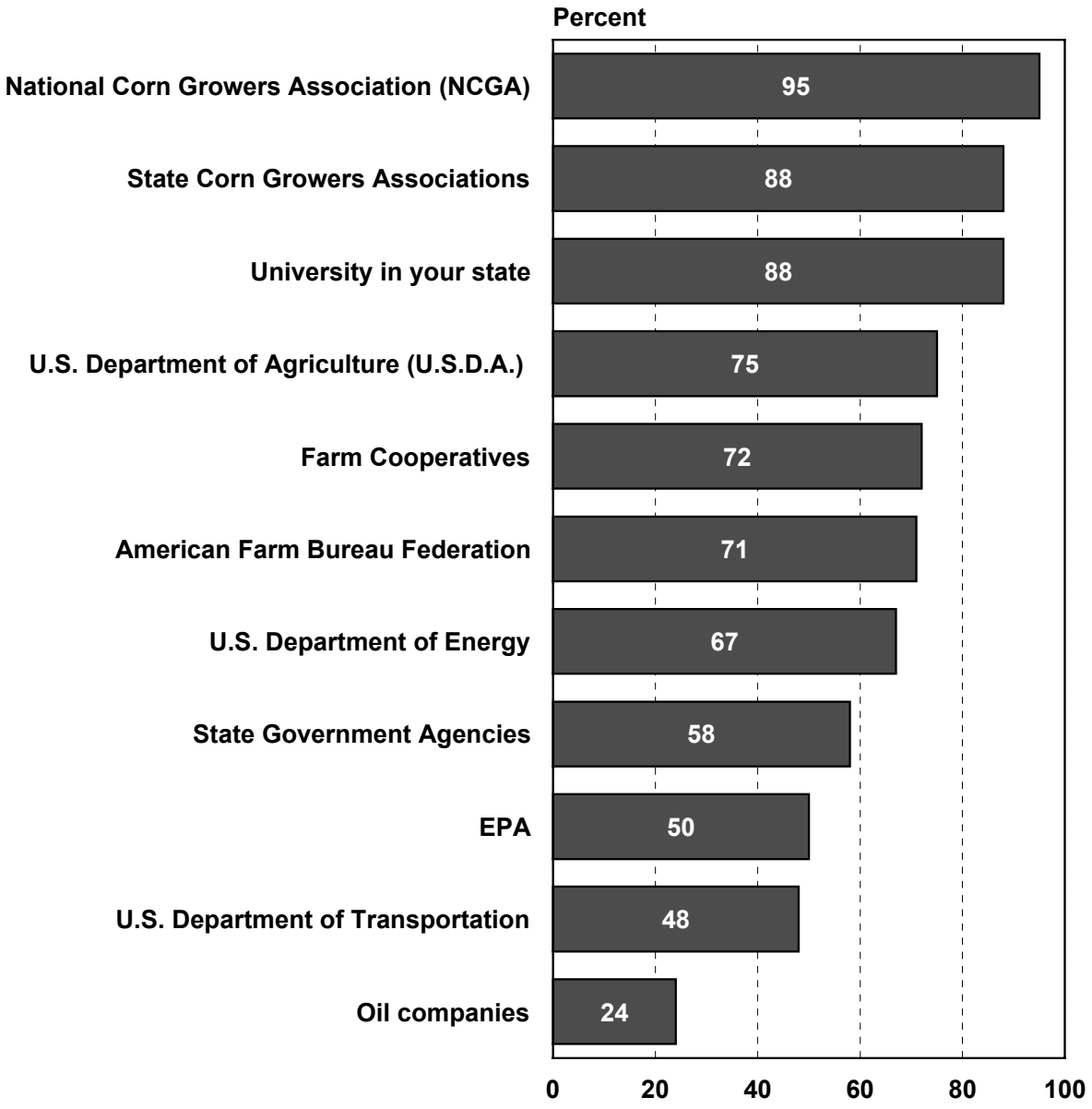
- All Mentions -



Q.1a Is the company representative for a(n):

Groups Perceived To Be Involved In Research And Development Of Alternative Fuels
- Aided Responses -

(Base=All Respondents, n=400)



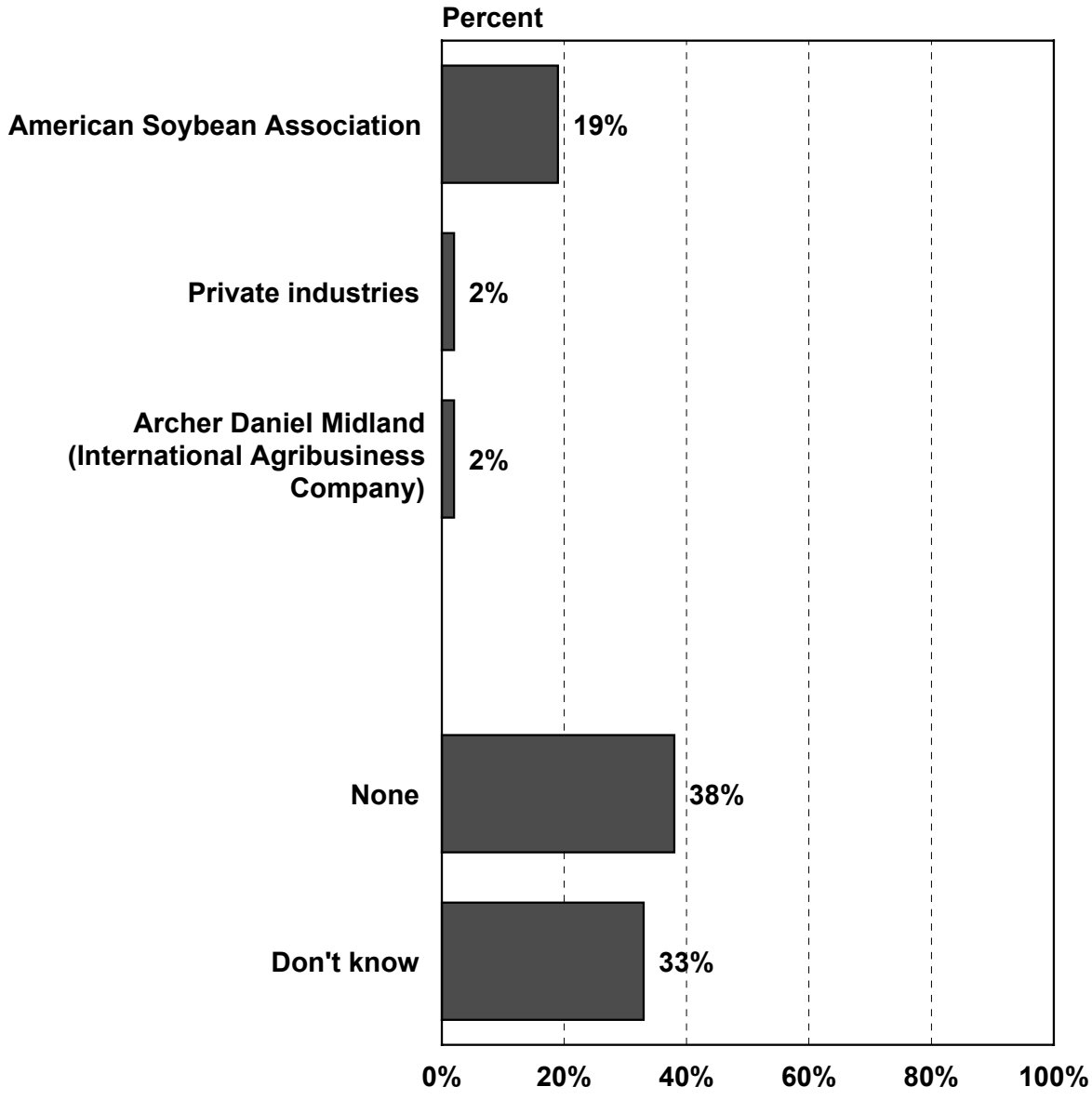
Q.2 Which of the following do you believe are involved in the research and development of alternative fuels?

Groups Perceived To Be Involved In Research And Development Of Alternative Fuels

- Unaided Responses -

(Base=All Respondents, n=400)

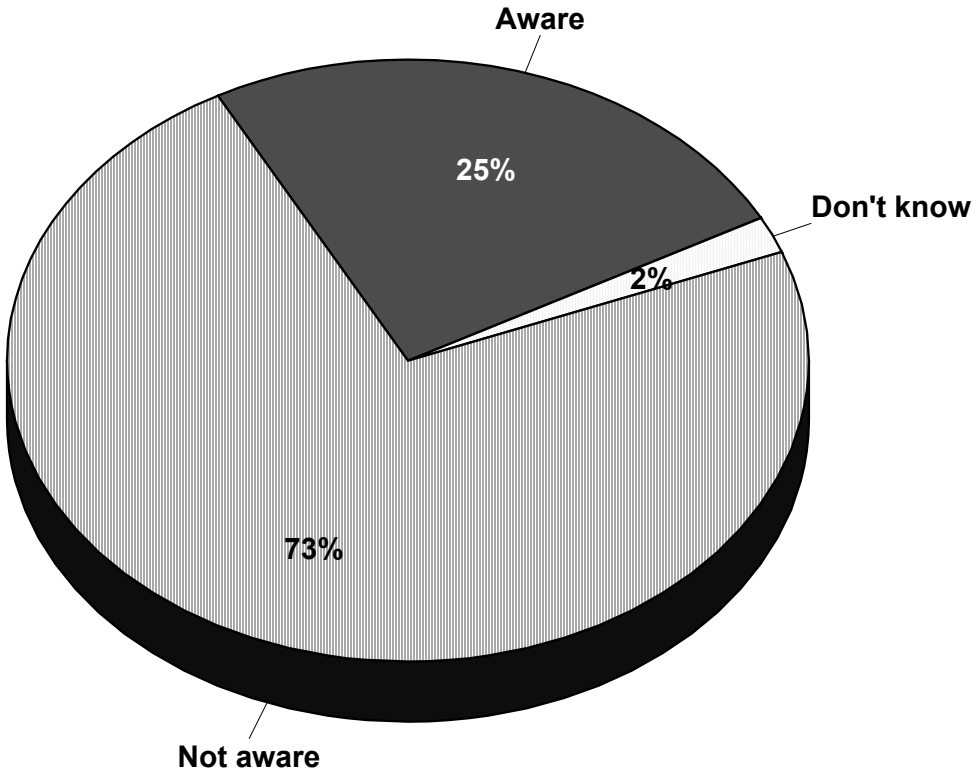
- Mentions of 2% or more -



Q.4 What other organizations or agencies do you believe are invovled in the research and development of alternative fuels?

Awareness Of The National Renewable Energy Laboratory

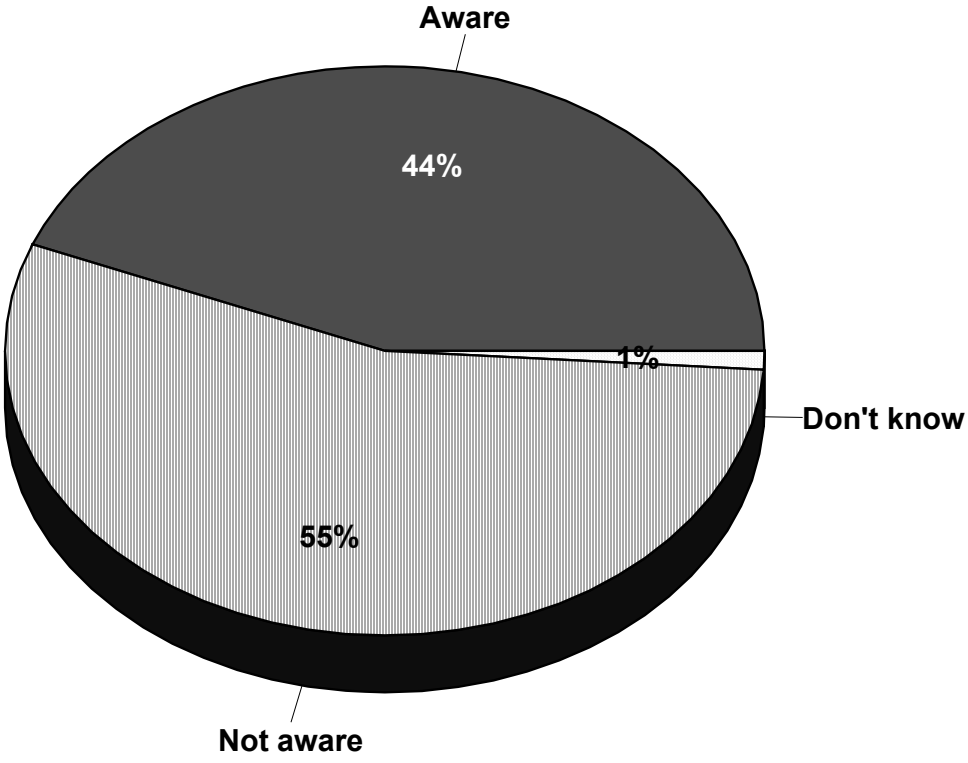
(Base=All Respondents, n=400)



Q.3 Are you aware of the National Renewable Energy Laboratory (NREL)?

Awareness Of The U.S. Department Of Energy's BioFuels Program

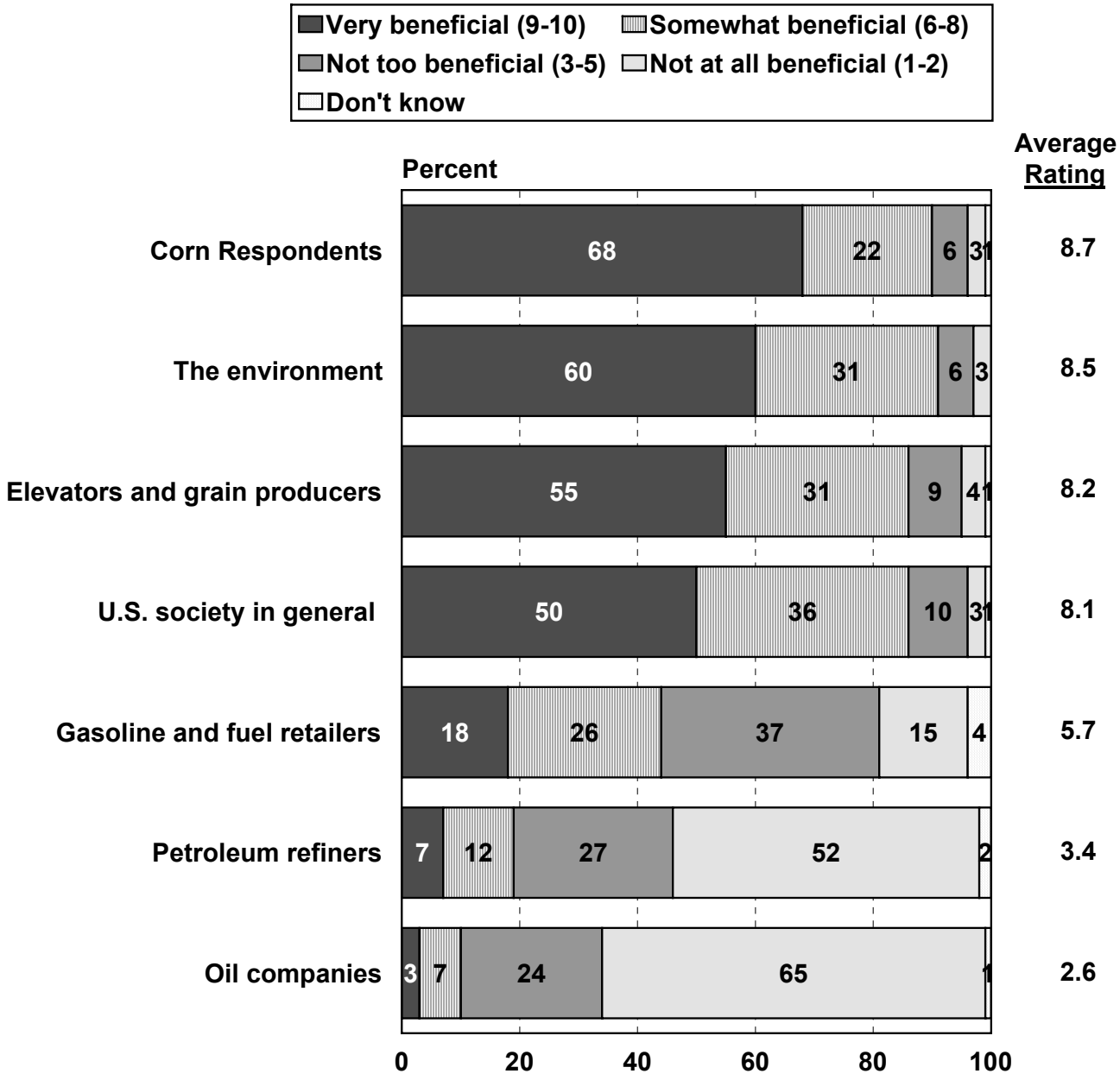
(Base=All Respondents, n=400)



Q.5 Have you heard of the U.S. Department of Energy's BioFuels Program?

Perceived Benefit Level Of The Ethanol Program To Specific Segments

(Base=All Respondents, n=400)

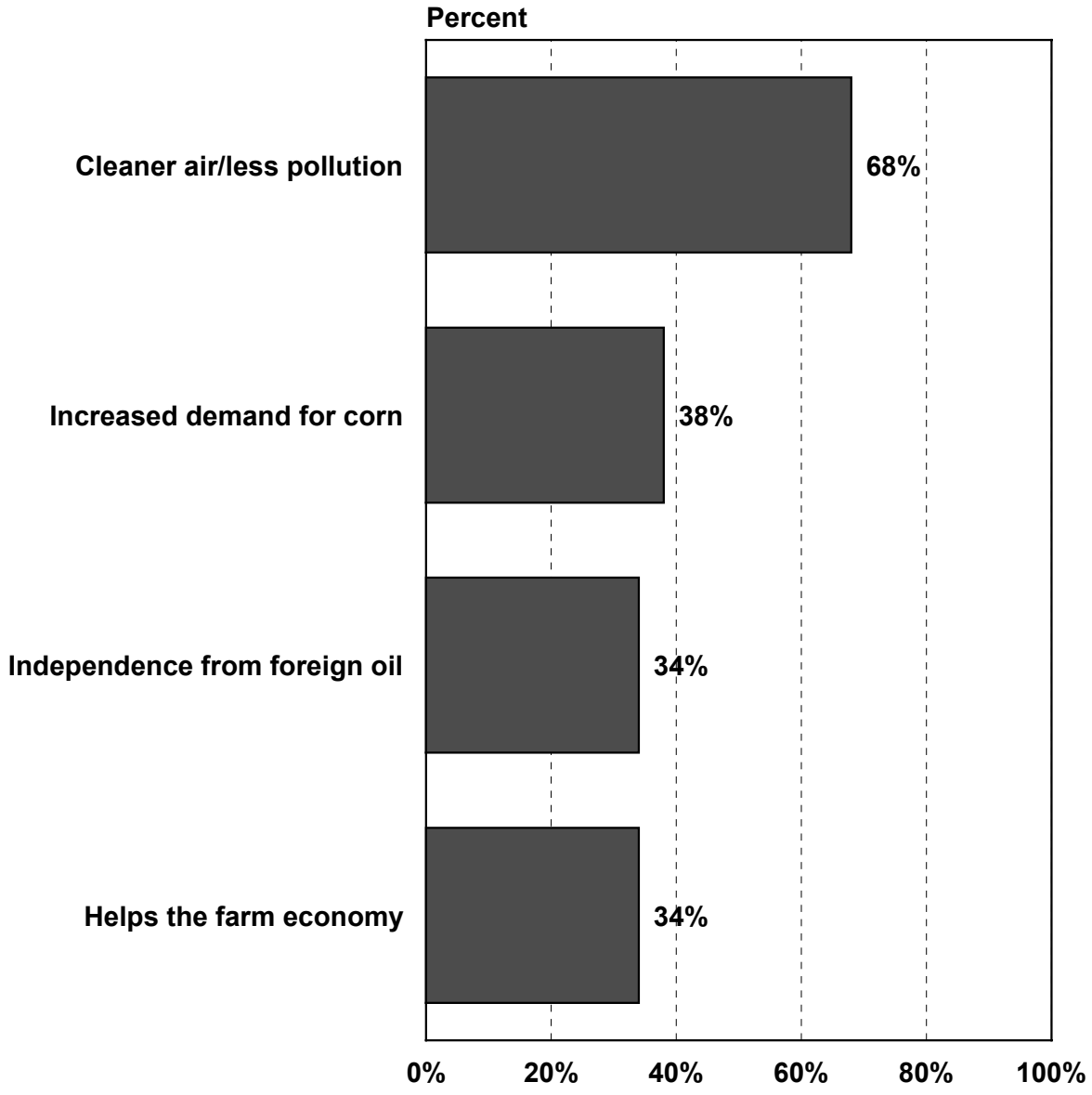


Q.6 Now please consider the Ethanol program where Ethanol is produced from grain. Using a scale of 1 to 10 where 1 is "not at all beneficial" and 10 is "very beneficial," how beneficial would you say the Ethanol program is to each of the following:

Major Benefits Resulting From The Production And Use Of Ethanol

(Base=All Respondents, n=400)

- Mentions of 4% or more -

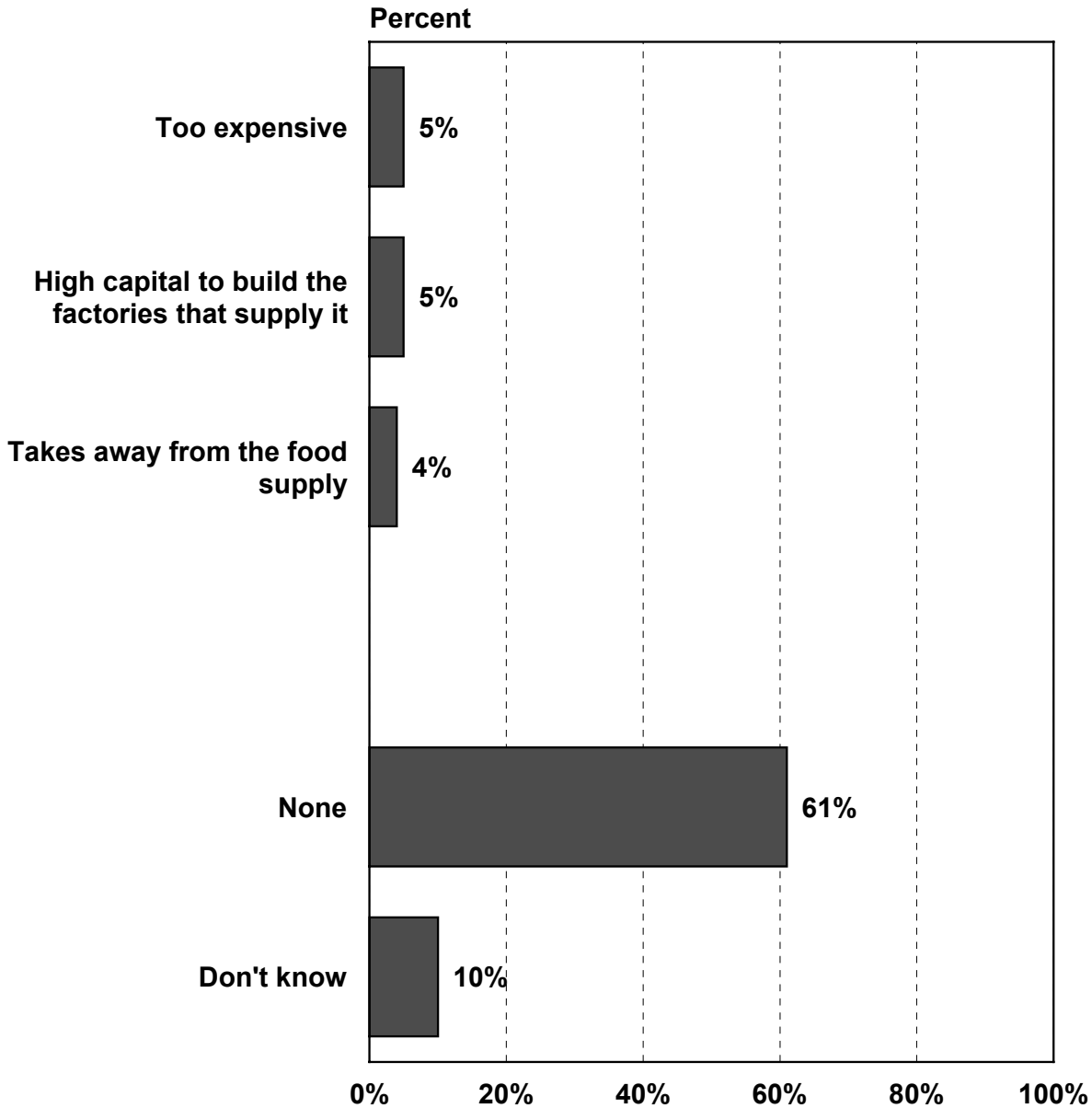


Q.7 What do you seed as the major benefits resulting from the production and use of Ethanol?

Disadvantages Of The Production And Use Of Ethanol

(Base=All Respondents, n=400)

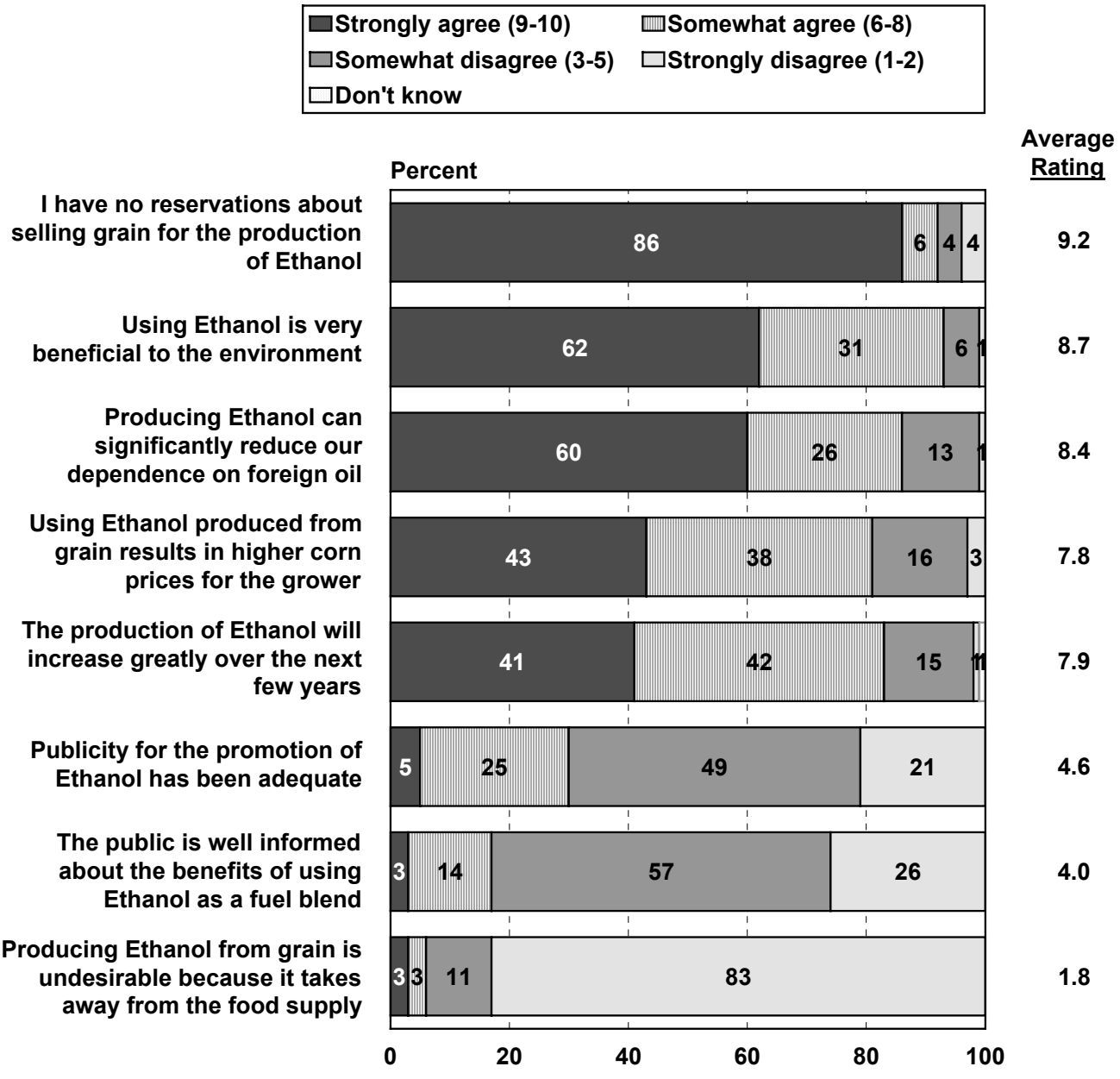
- Mentions of 4% or more -



Q.8 What do you feel are the disadvantages of the production and use of Ethanol?

Agreement With Statements Regarding Ethanol

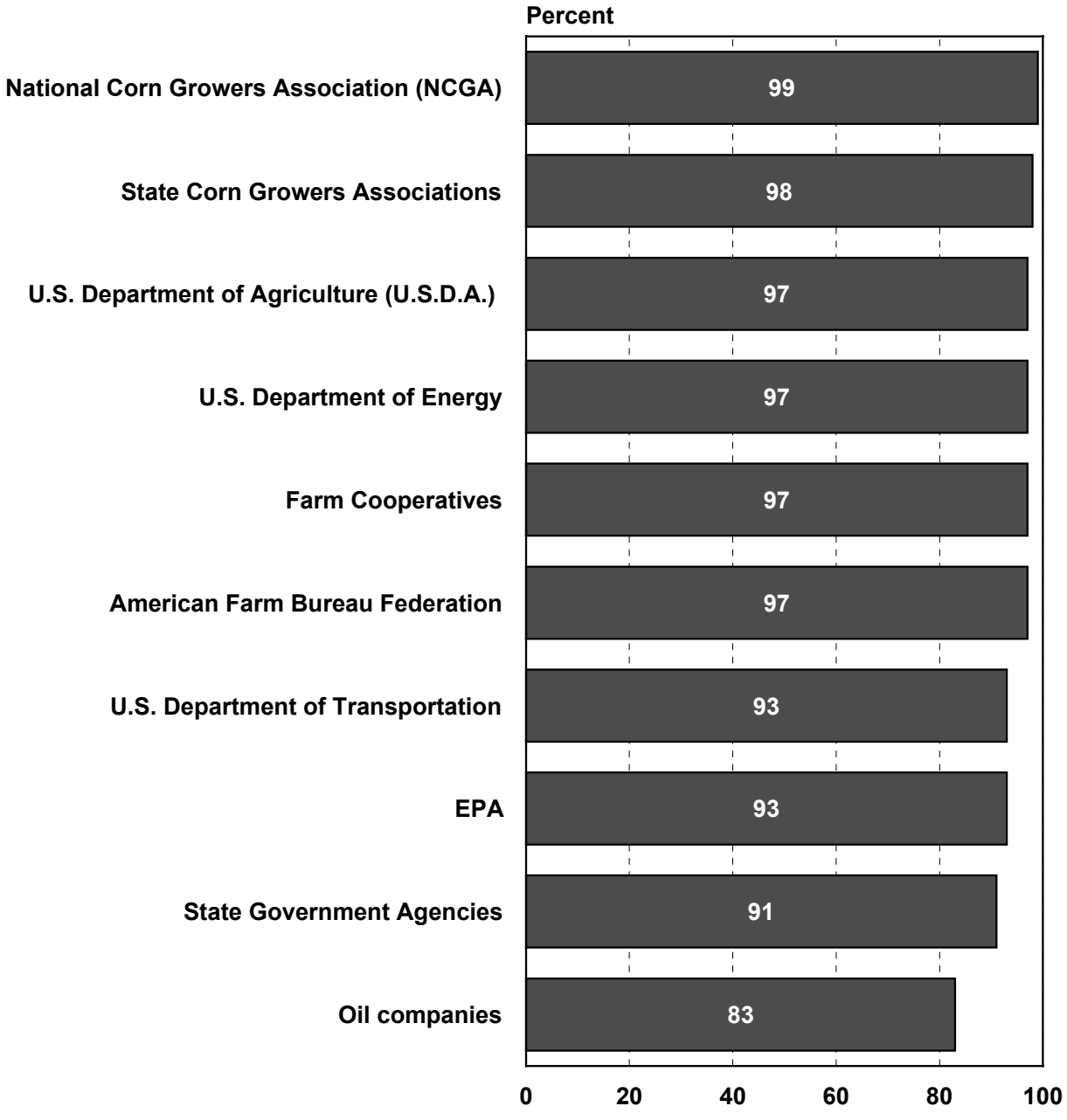
(Base=All Respondents, n=400)



Q.9 I would like to read you a few statements and get your reaction to each. Using a scale of 1 to 10 where 1 is "strongly disagree" and 10 is "strongly agree," how do you rate _____?

Groups That Should Be Promoting Ethanol Consumption

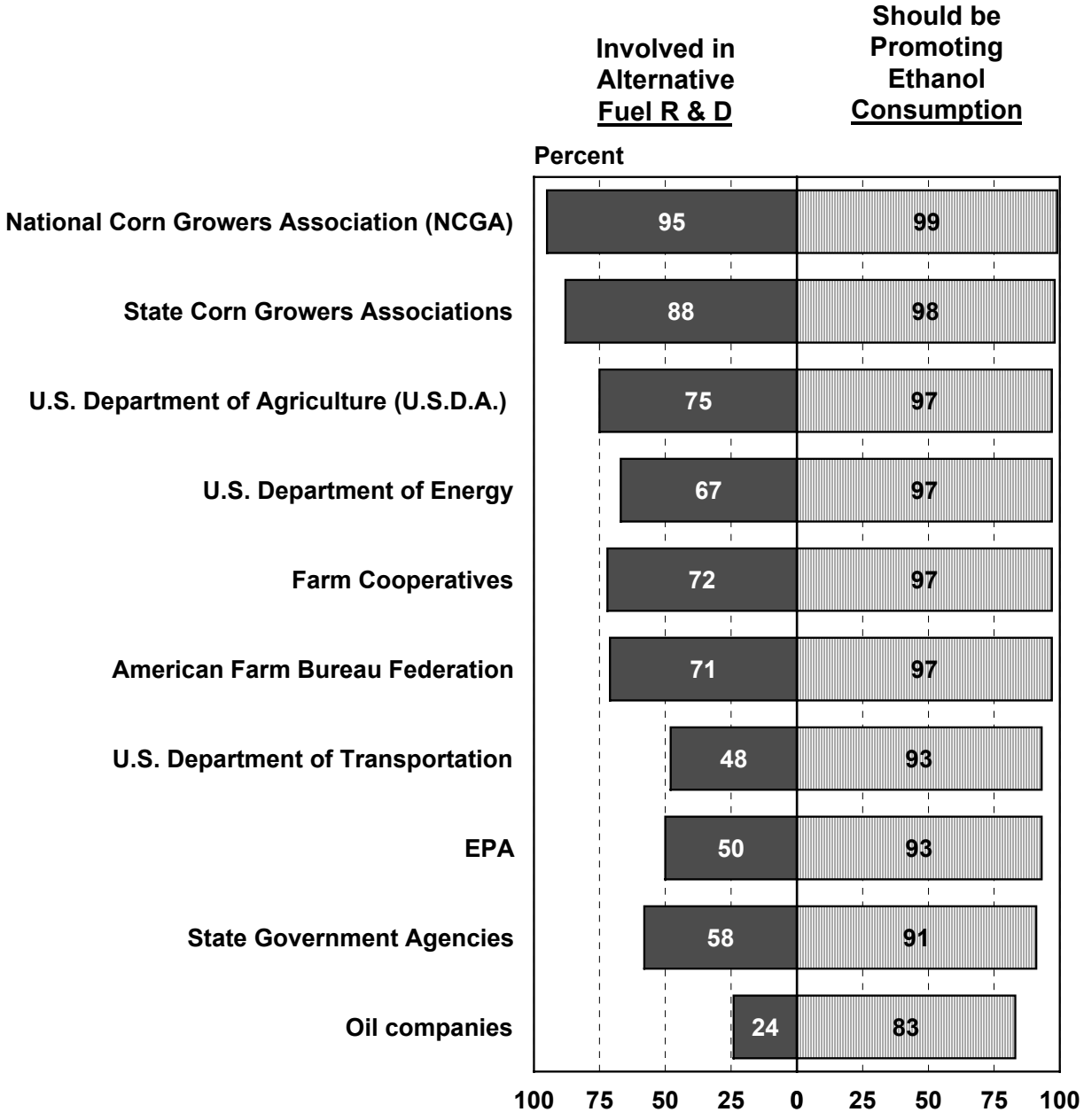
(Base=All Respondents, n=400)



Q.10 Which of the following should be promoting Ethanol consumption? Would you say the:

Groups Perceived To Be Involved In Alternative Fuel Research And Developement Versus Groups That Should Be Promoting Ethanol Consumption

(Base=All Respondents, n=400)

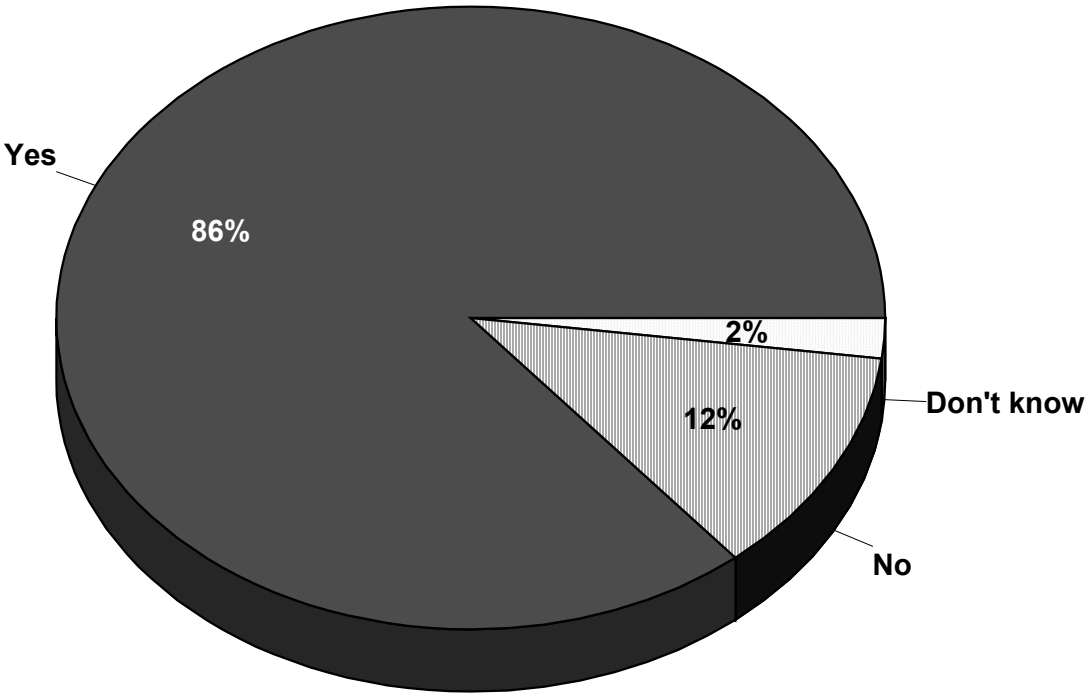


Q.2 Which of the following do you believe are involved in the research and development of alternative fuels?

Q.10 Which of the following should be promoting Ethanol consumption? Would you say the:

Incidence Of Agreeing That Check-Off Dollars Should Be Used To Promote Ethanol Consumption

(Base=All Respondents, n=400)

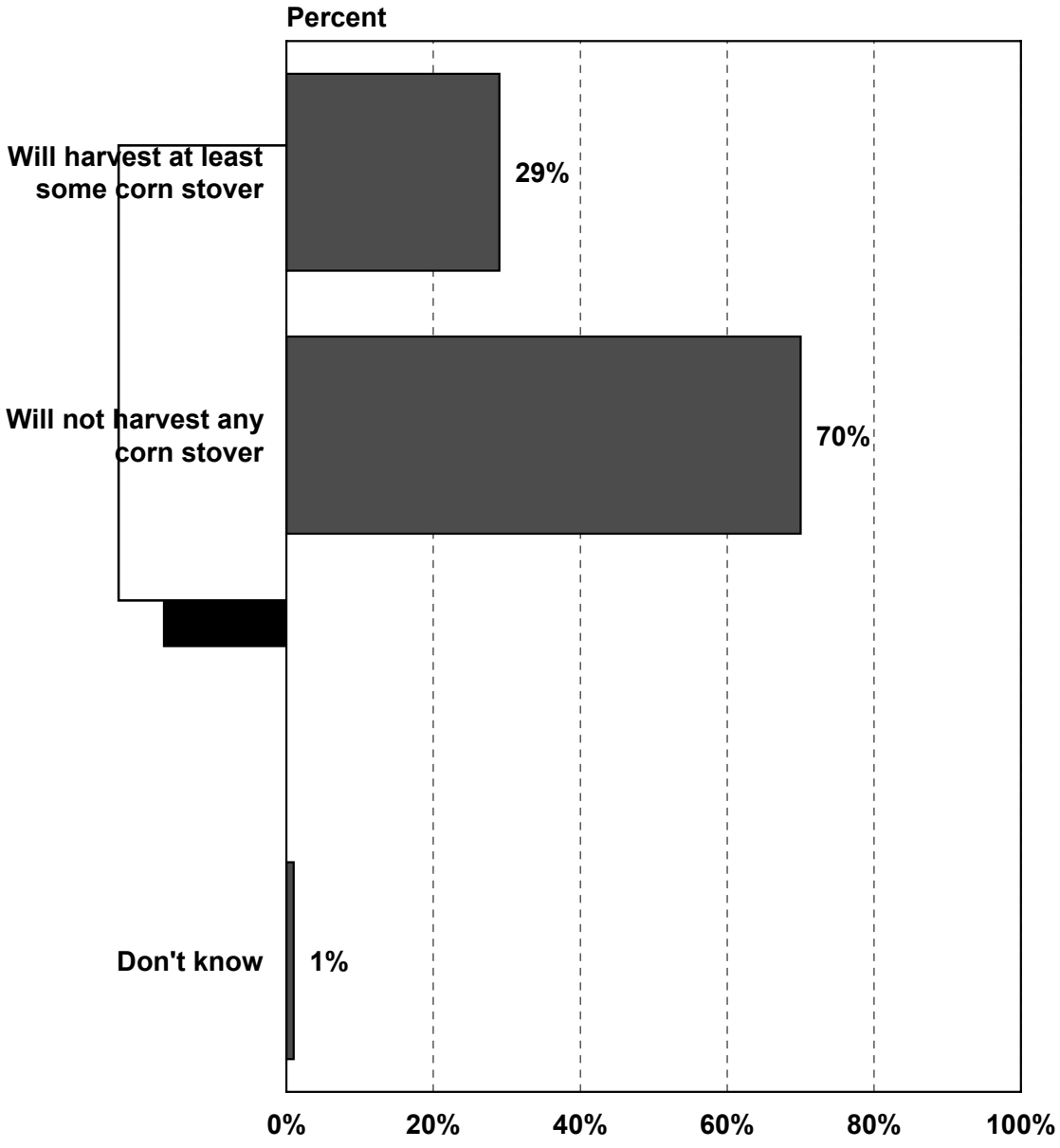


Q.11 Should check-off dollars be used to promote Ethanol consumption?

CORN STOVER SECTION

2001 Corn Stover Intentions

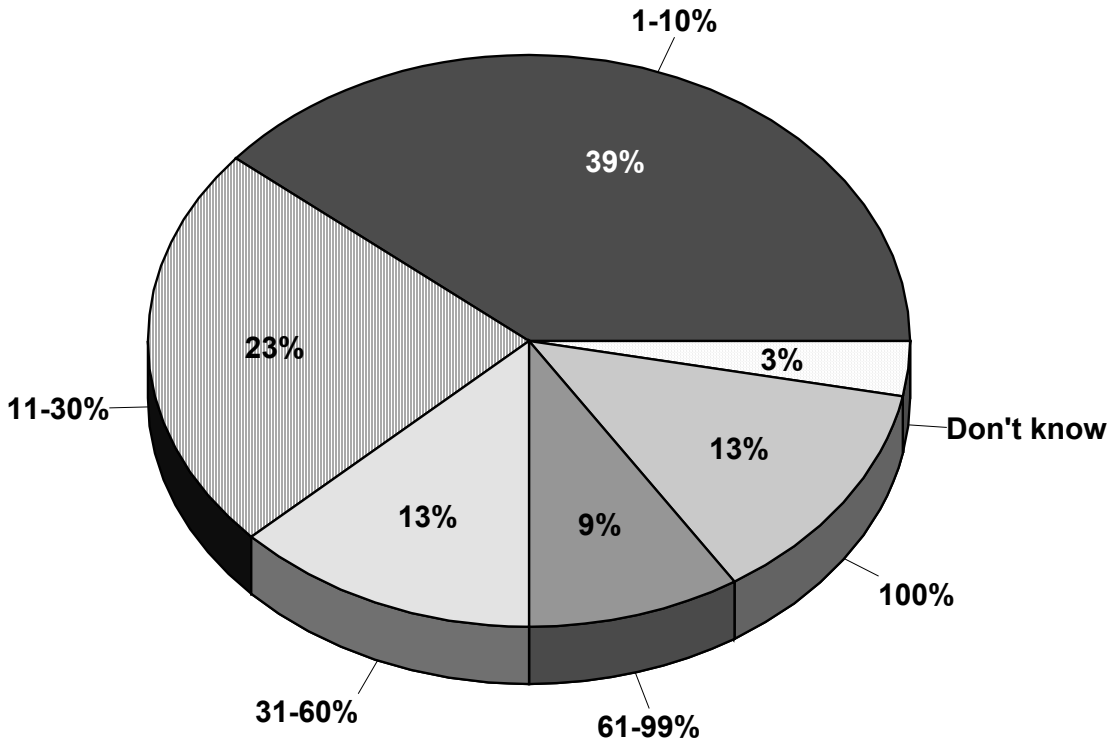
(Base=All Respondents, n=400)



Q.12 What do you plan to do with your corn stover this year in 2001? Do you plan to:

Percent Of Corn Stover Expected To Be Harvested In 2001

(Base=Respondents who plan to harvest at least some corn stover in 2001, n=115)

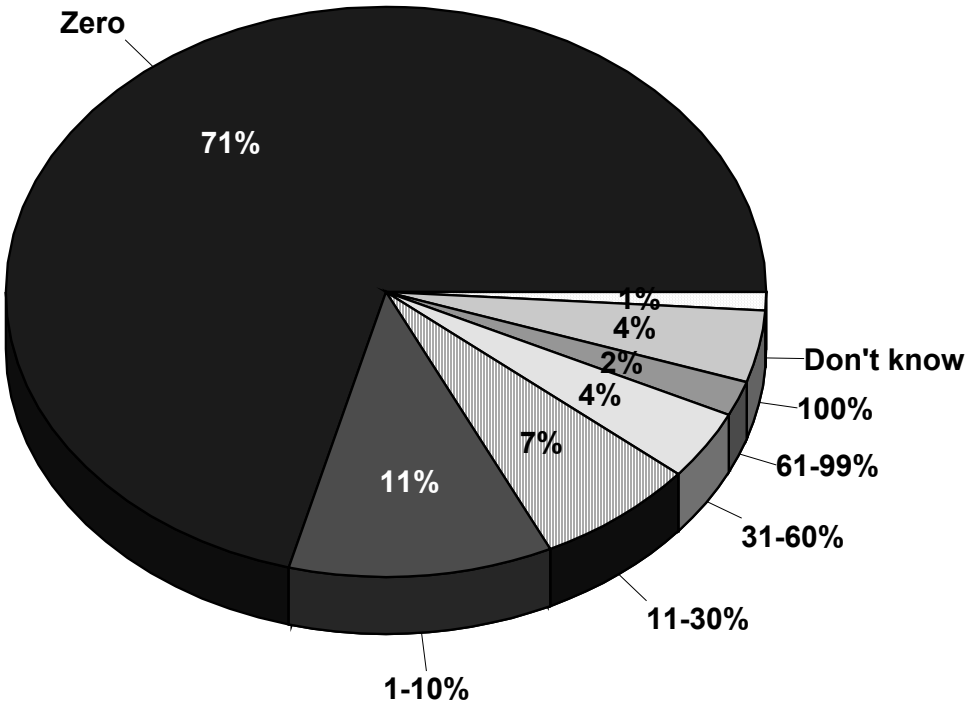


Average percent of corn stover expected to be harvested in 2001: 35%

Q.13 What percent of your corn stover do you plan to harvest?

Percent Of Corn Stover Expected To Be Harvested In 2001

(Base=All Respondents, n=400)



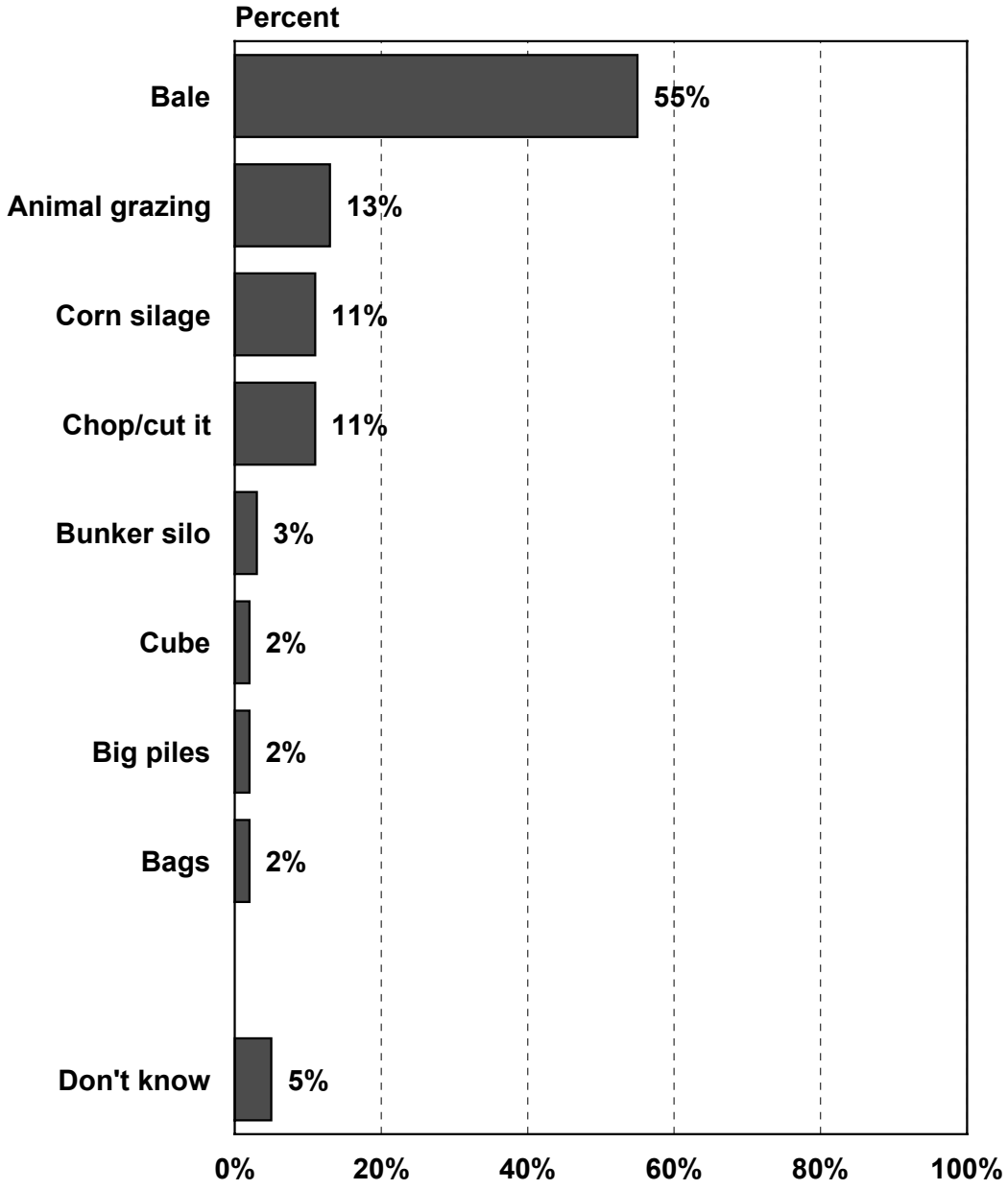
Average percent of corn stover expected to be harvested in 2001: 10%

Q.13 What percent of your corn stover do you plan to harvest?

Corn Stover Bundling Intentions

(Base=Respondents who plan to harvest at least some corn stover in 2001, n=115)

- All Mentions -

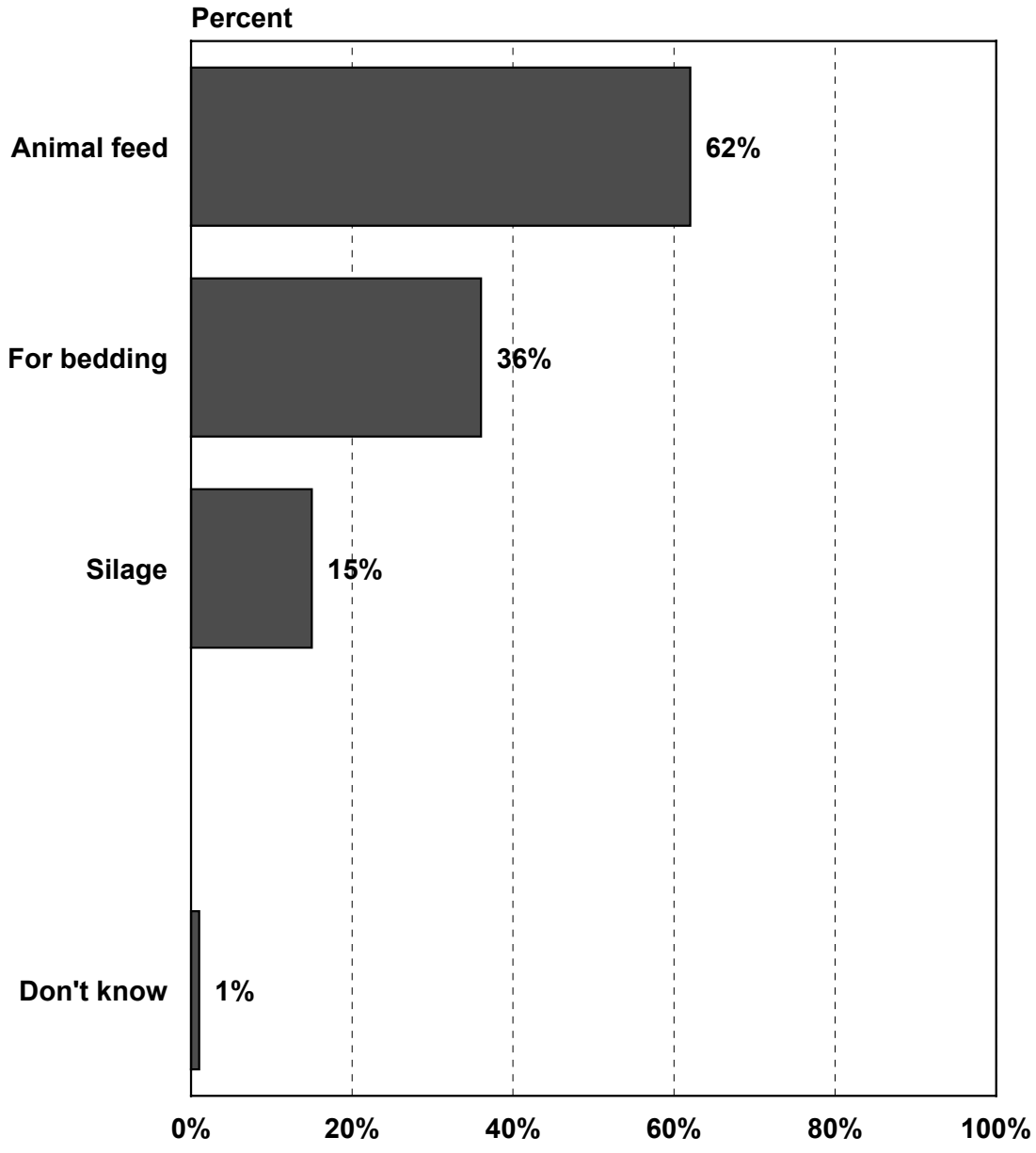


Q.14 How do you plan to bundle your stover after harvest?

Corn Stover Use Intentions

(Base=Respondents who plan to harvest at least some corn stover in 2001, n=115)

- All Mentions -

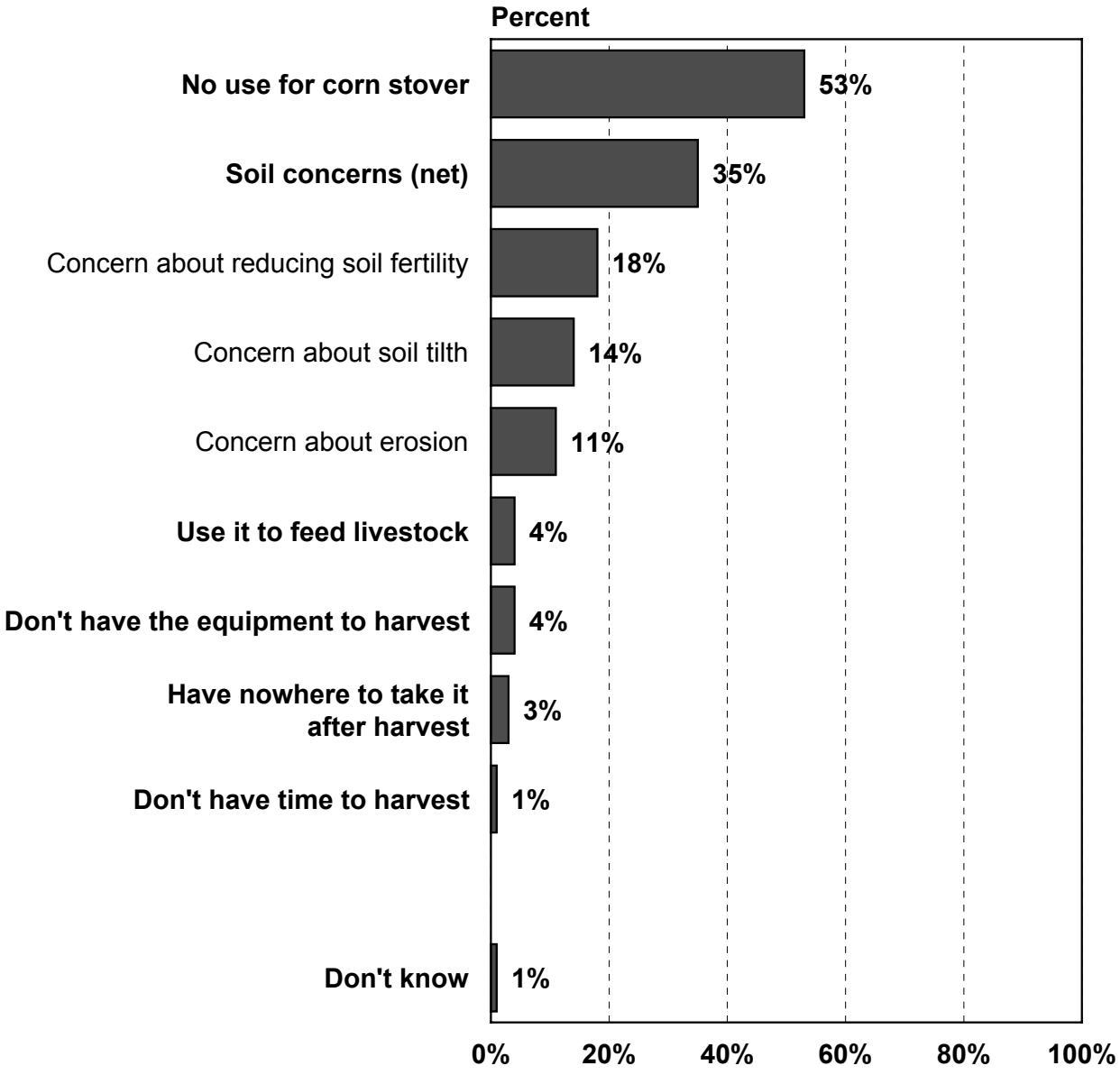


Q.15 How do you plan to use the corn stover that you harvest?

Reasons For Not Planning To Harvest Any Corn Stover In 2001

(Base=Respondents who do not plan to harvest any corn stover in 2001, n=285)

- All Mentions -



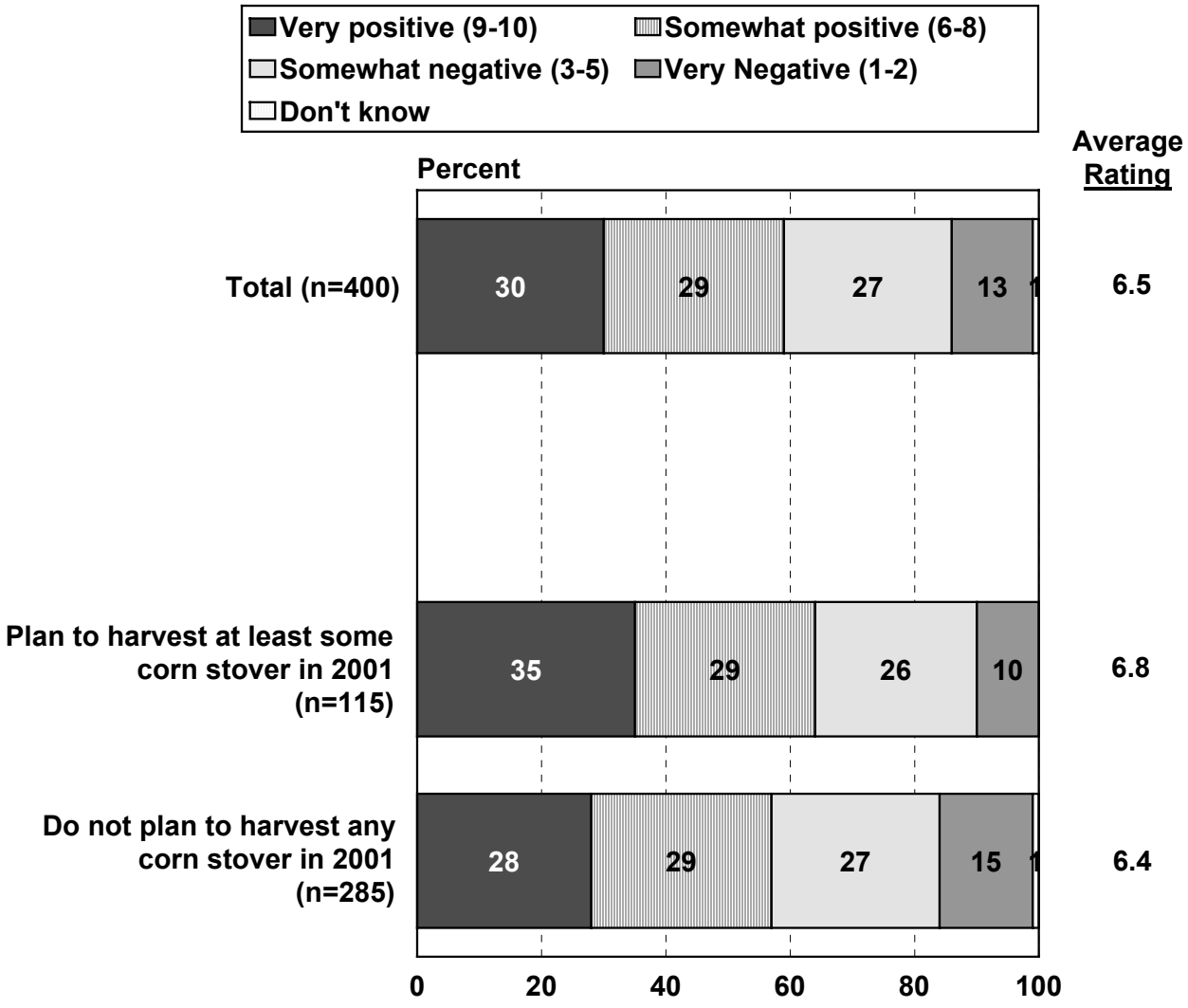
Q.16 Why don't you harvest any of your corn stover?

Initial Reaction Of Ethanol Production From Corn Stover

(Base=All Respondents)

Proposed Alternative Fuel Program:

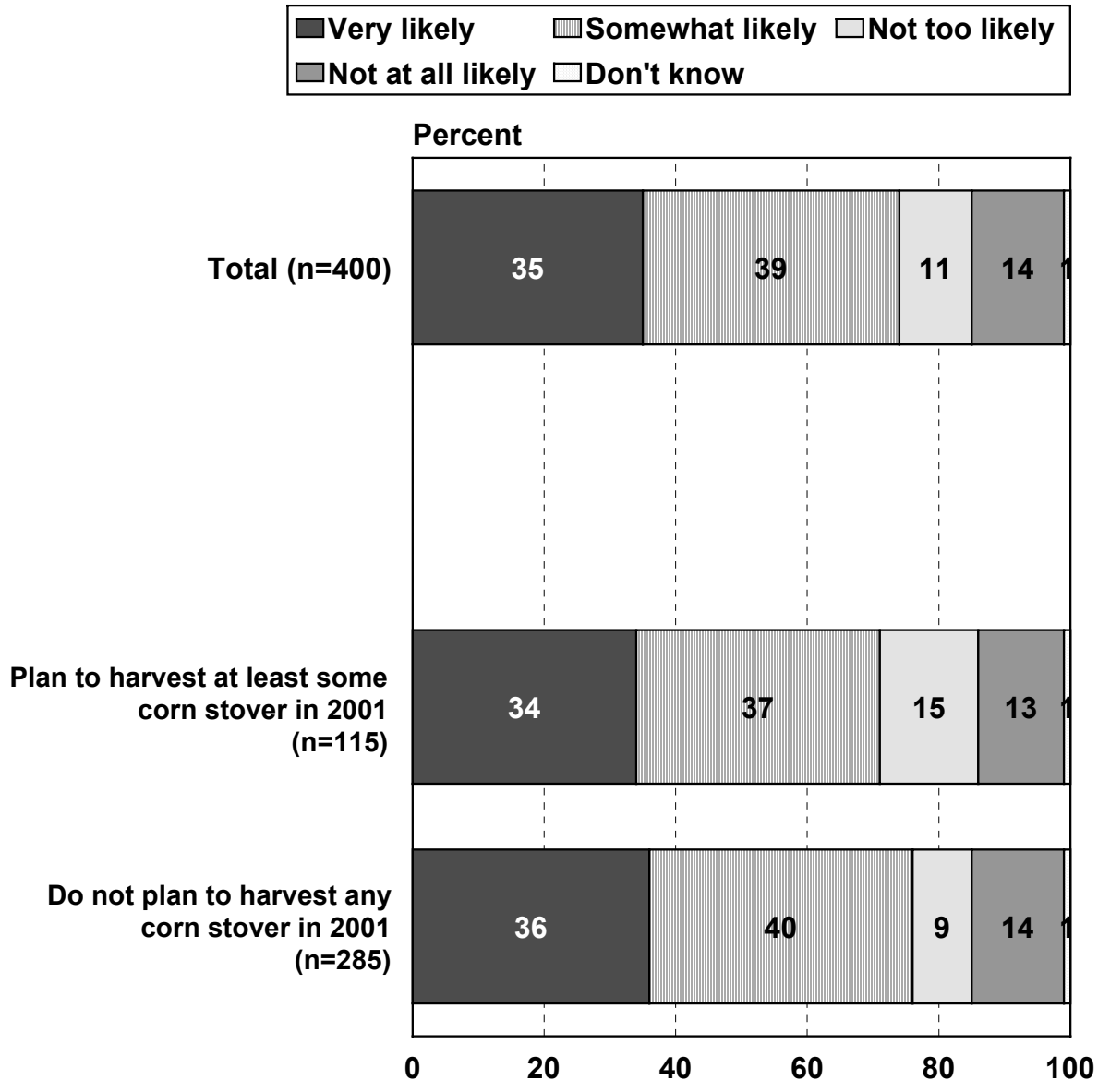
The U.S. Department of Energy, through its Biofuels Program, is in the process of developing the technology to produce alternative transportation fuels and fuel additives. The technology exists to make Ethanol from other plant materials, not just grains, or starches and sugars. One aspect of this program is to utilize corn stover for the production of bioethanol for transportation.



Q.17 What is your initial reaction to having this alternative fuel available? Using a scale of 1 to 10 where 1 is "very negative" and 10 is "very positive," how do you feel overall about the production of Ethanol from corn stover?

Likelihood Of Selling At Least Some Corn Stover For The Production Of Ethanol If Harvested At A Reasonable Profit

(Base=All Respondents)



Q.18 Knowing what you do about using corn stover for the production of bioethanol for transportation, and if corn stover could be harvested at a reasonable profit, how likely would you be to sell at least some of your corn stover for the production of Ethanol? Would you say you would be:

Reasons For Being Likely To Harvest At Least Some Corn Stover For The Production Of Ethanol

(Base = Respondents who would be "very/somewhat likely" to sell corn stover for Ethanol production)

- Mentions of 3% or more -

	Total (n=298)	Plan to harvest corn stover in 2001 (n=82)	Do not plan to harvest corn stover in 2001 (n=216)
Make money/added income	70%	77%	68%
Depends on the price	8%	9%	8%
Independence from foreign oil	8%	5%	9%
It is another use for corn	7%	4%	9%
No need for corn stover on farm	5%	4%	5%
Concerned about soil erosion*	3%	4%	2%

** Explains "somewhat likely" response*

Q.19 Why would you be very/somewhat likely to sell at least some of your stover for the production of Ethanol?

Problems Associated With Harvesting Corn Stover

(Base = Respondents who would be "very/somewhat likely" to sell corn stover for Ethanol production)

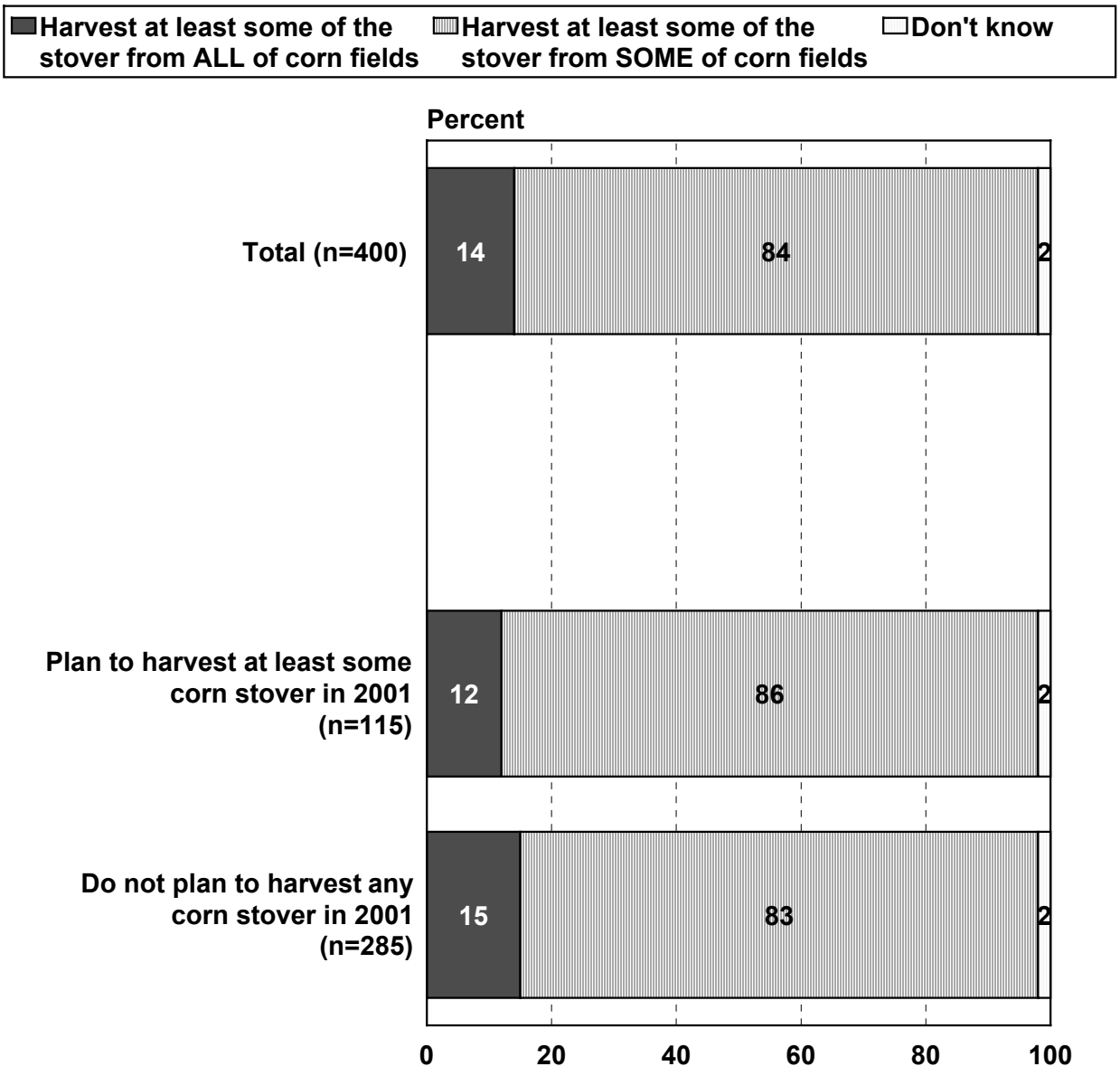
- Mentions of 3% or more -

	Total (n=298)	Plan to harvest corn stover in 2001 (n=82)	Do not plan to harvest corn stover in 2001 (n=216)
No way to transport	20%	21%	19%
Too much work/labor/time	18%	16%	19%
Lose nutrients/fertilizer	17%	11%	19%
Don't have the equipment	16%	13%	17%
Soil erosion	12%	9%	13%
Weather	9%	17%	6%
Too expensive to harvest	5%	5%	6%
No storage	3%	4%	3%
None	20%	23%	19%
Don't know	4%	4%	4%

Q.20 What, if any, problems do you associate with harvesting your stover?

Description Of How Corn Stover Would Be Harvested

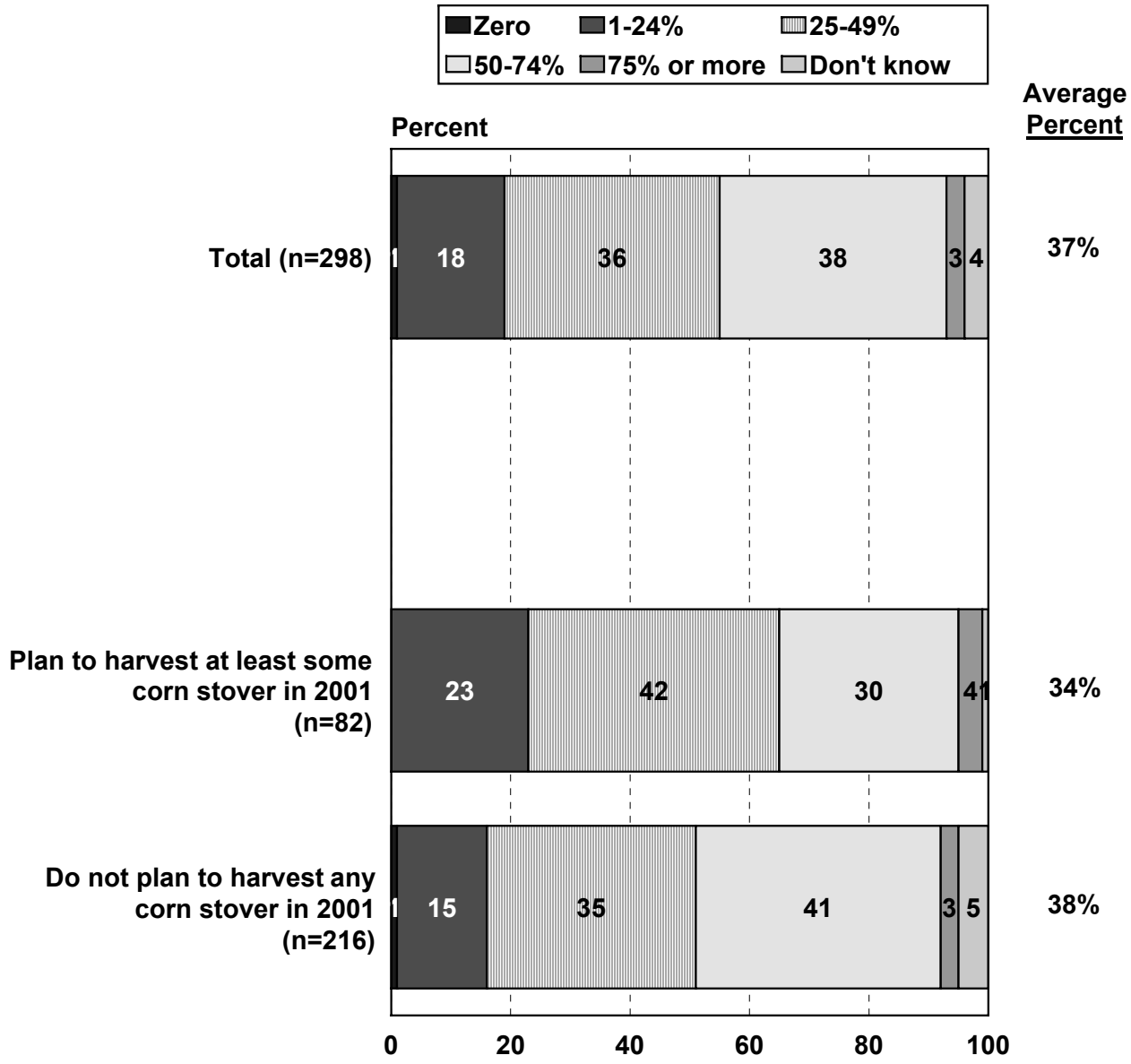
(Base=Respondents who would be "very/somewhat likely" to sell corn stover for Ethanol production, n=298)



Q.21 Which of the following best describes how you would harvest your corn stover? Would you be most likely to:

Percent Of Corn Stover Growers Would Leave On Fields

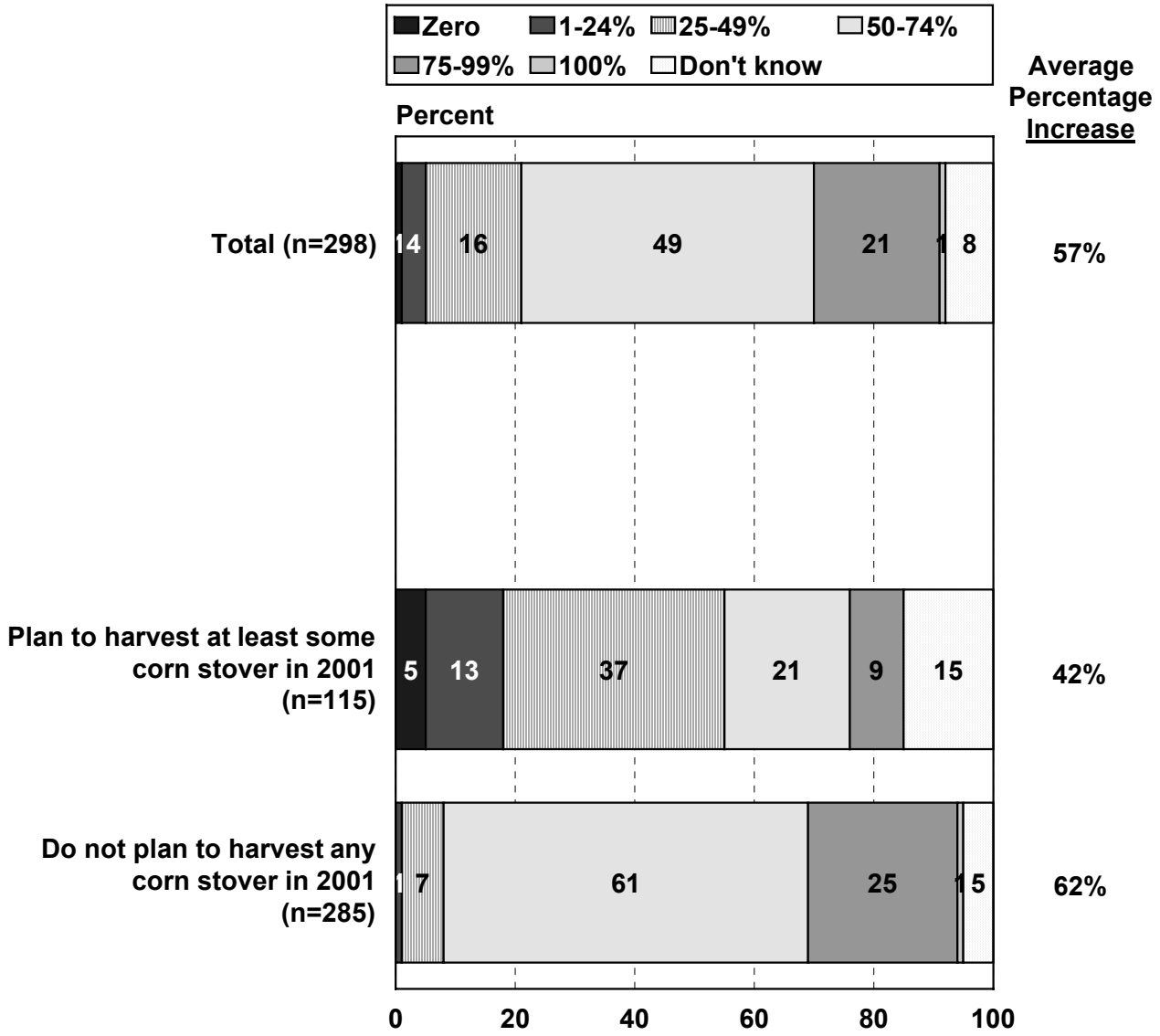
(Base=Respondents who would be "very/somewhat likely" to sell corn stover for Ethanol production)



Q.22 On those fields where you plan to harvest at least some of the stover, what percent of the stover would you want to leave on your fields?

Percentage Increase Of Corn Stover Expected To Be Harvested Due To The Production Of Ethanol From Corn Stover

(Base=Respondents who would be "very/somewhat likely" to sell corn stover for Ethanol production)



Q.13 What percent of your corn stover do you plan to harvest?
Q.22 On those fields where you plan to harvest at least some of the stover, what percent of the stover would you want to leave on your fields?

Reasons For Not Being Likely To Harvest At Least Some Corn Stover For The Production Of Ethanol

(Base = Respondents who would be "not too/not at all likely" to sell corn stover for Ethanol production)

- Mentions of 3% or more -

	Total (n=102)	Plan to harvest corn stover in 2001 (n=33)	Do not plan to harvest corn stover in 2001 (n=69)
Lose nutrients/fertilizer	35%	30%	38%
Fear of soil erosion	34%	27%	38%
Not enough money in it	12%	6%	14%
Use corn stover for silage	7%	18%	1%
Use corn stover to graze cattle	6%	9%	4%
Have a surplus of corn, wheat and soybeans	5%	3%	6%
Don't have the equipment	5%	3%	6%
No way to transport	4%	6%	3%
Too much work/labor/time	3%	3%	3%

Q.23 Why would you not be likely to harvest at least some of your corn stover for the production of Ethanol?

Advantages Associated With Harvesting Corn Stover

(Base = Respondents who would be "not too/not at all likely" to sell corn stover for Ethanol production)

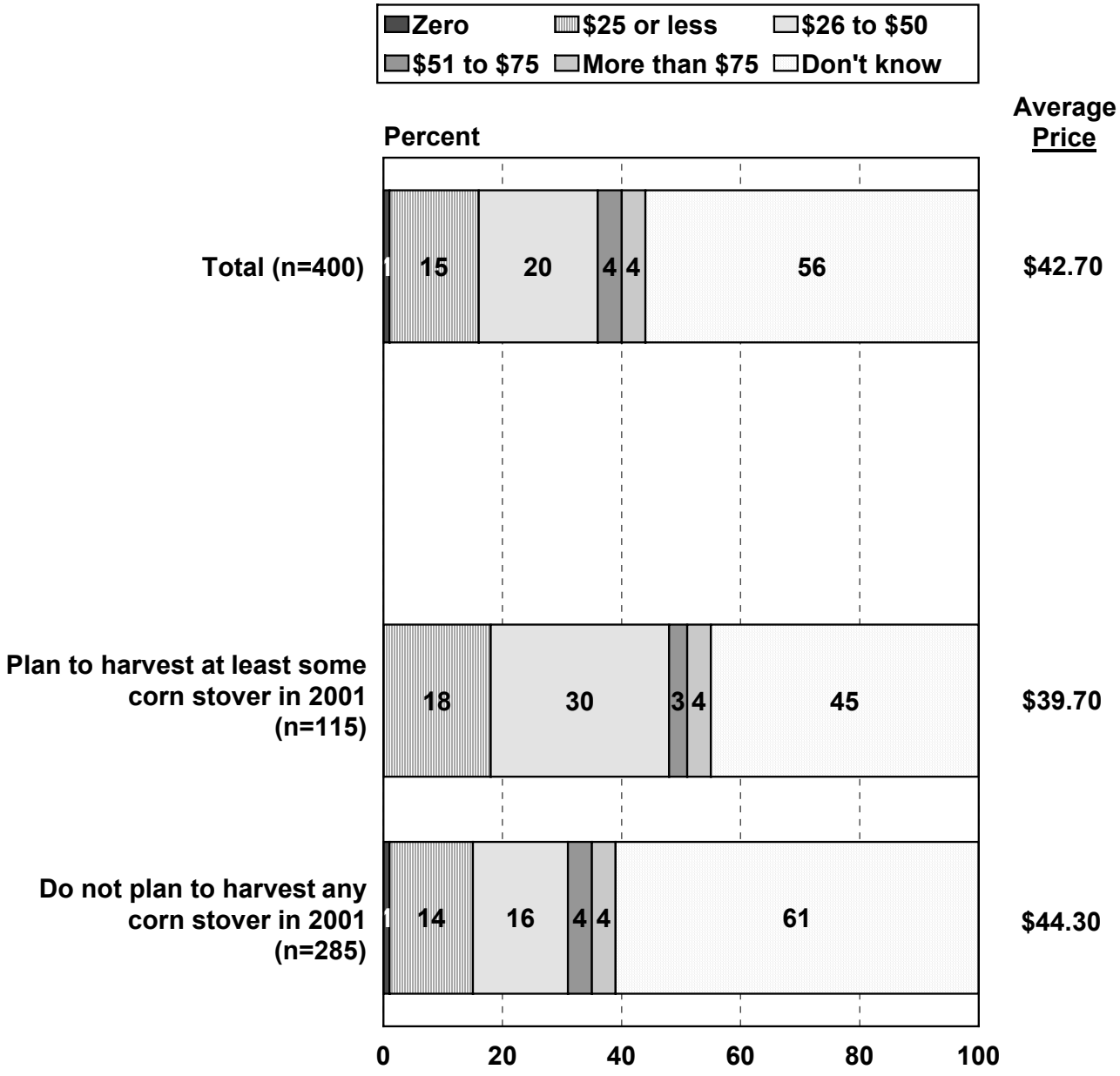
- Mentions of 3% or more -

	Total (n=102)	Plan to harvest corn stover in 2001 (n=33)	Do not plan to harvest corn stover in 2001 (n=69)
Source of income	16%	15%	16%
Cut costs on feed and bedding	15%	33%	6%
No "trash" on fields	4%	6%	3%
Eliminate disease and insect problems	3%	--	4%
None	53%	27%	65%
Don't know	6%	9%	4%

Q.24 What, if any, advantages do you associate with harvesting your stover?

Minimum Payment Per Ton Growers Would Require To Harvest Corn Stover

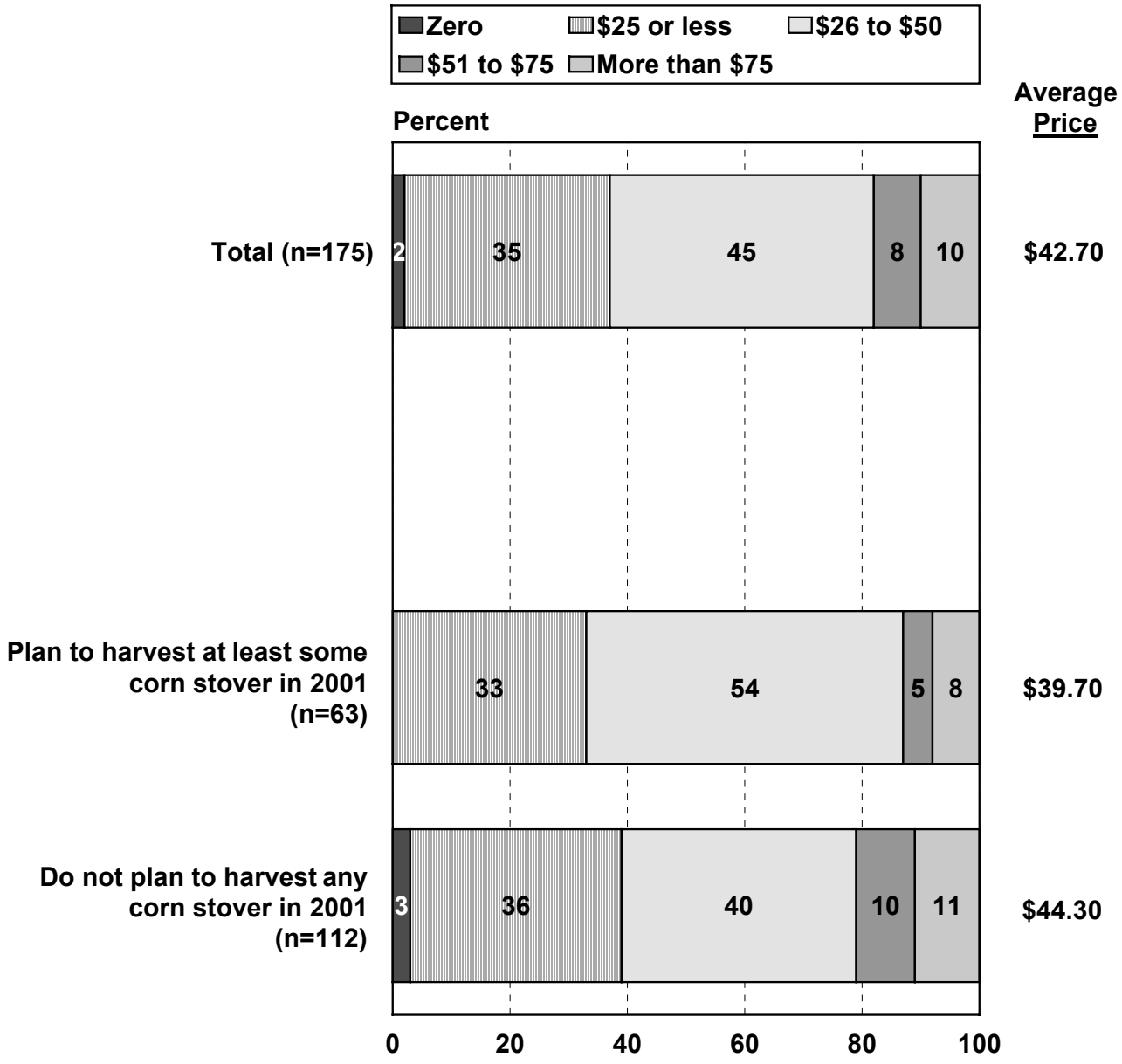
(Base=All Respondents)



Q.25 What is the minimum you would have to be paid per ton, in order to harvest your corn stover?

Minimum Payment Per Ton Growers Would Require To Harvest Corn Stover
- Excluding "Don't Know" Responses -

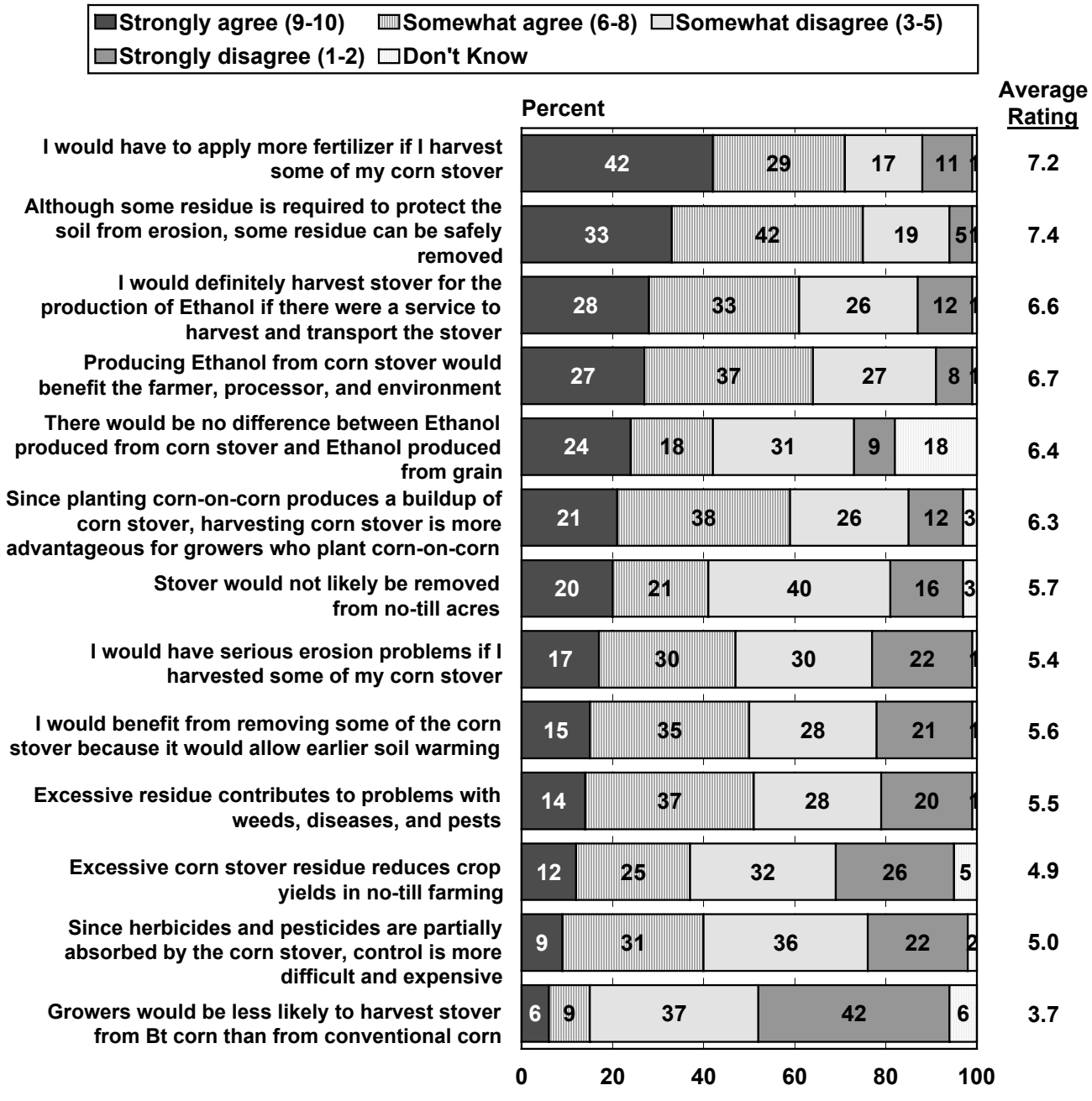
(Base=All Respondents)



Q.25 What is the minimum you would have to be paid per ton, in order to harvest your corn stover?

Level Of Agreement With Various Statements Regarding The Harvesting Of Corn Stover

(Base=All Respondents, n=400)

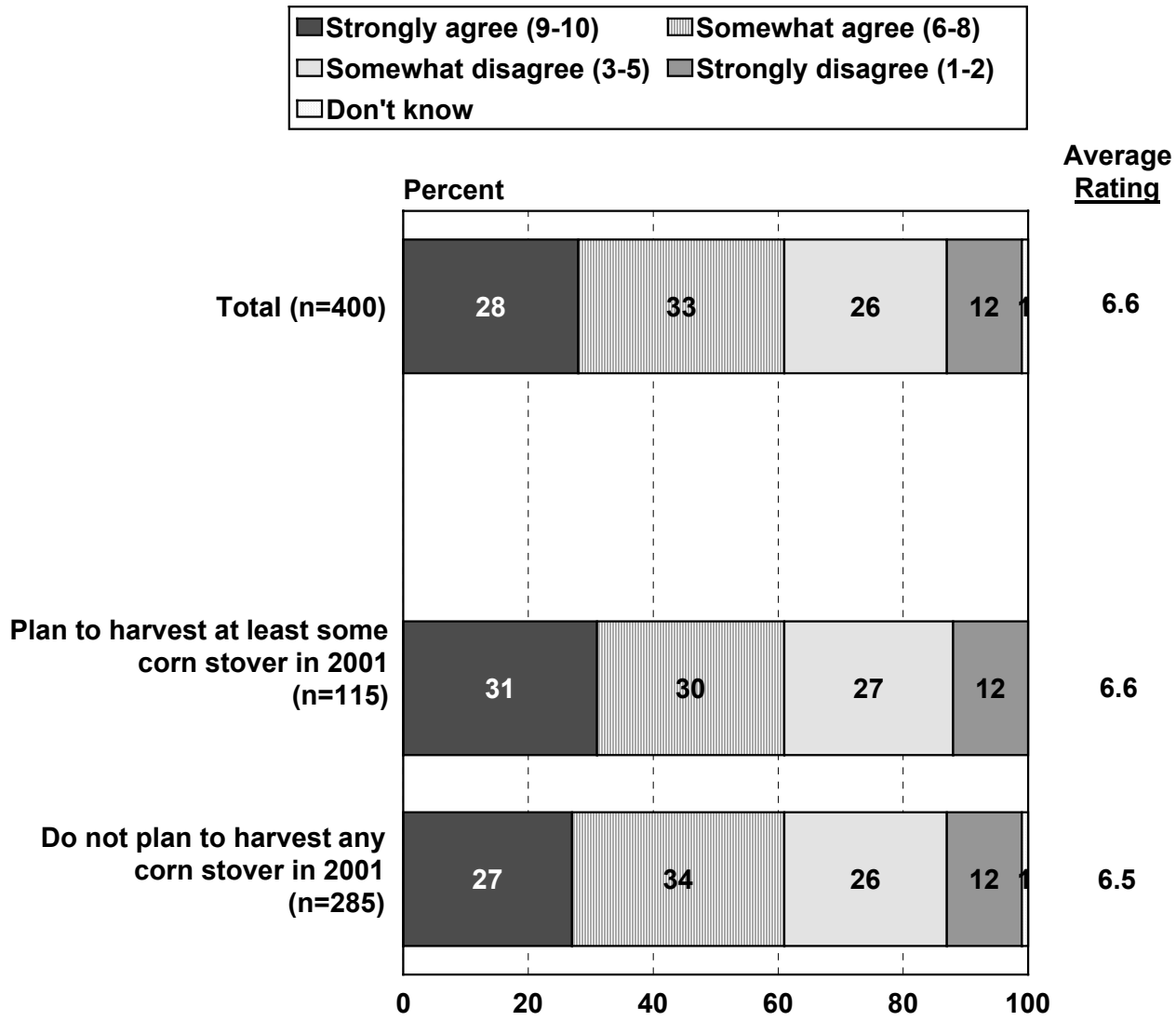


Q.26 Again, I would like to read you a few statements and get your reaction to each? Using a scale of 1 to 10 where 1 is "strongly disagree" and 10 is "strongly agree," how do you rate _____?

Level Of Agreement With Various Statements Regarding The Harvesting Of Corn Stover

- I Would Definitely Harvest Stover For The Production Of Ethanol If There Were A Service To Harvest And Transport The Stover -

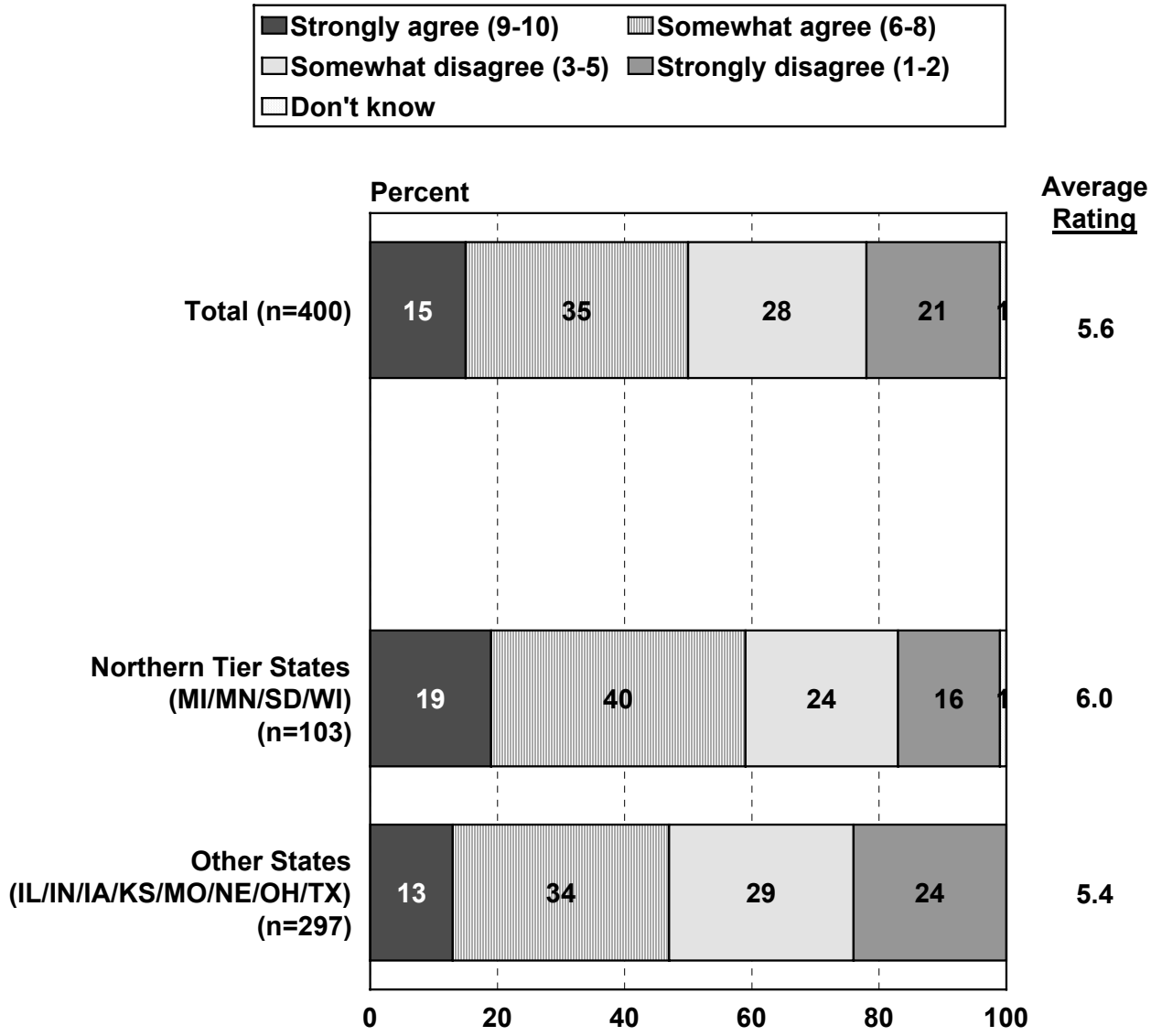
(Base=All Respondents)



Q.26 Again, I would like to read you a few statements and get your reaction to each? Using a scale of 1 to 10 where 1 is "strongly disagree" and 10 is "strongly agree," how do you rate "I would definitely harvest stover for the production of Ethanol if there were a service to harvest and transport the stover?"

Level Of Agreement With Various Statements Regarding The Harvesting Of Corn Stover
- I Would Benefit From Removing Some Of The Corn Stover Because It Would Allow Earlier Soil Warming -

(Base=All Respondents)



Q.26 Again, I would like to read you a few statements and get your reaction to each? Using a scale of 1 to 10 where 1 is "strongly disagree" and 10 is "strongly agree," how do you rate "I would benefit from removing some of the corn stover because it would allow earlier soil warming?"

Reaction To The U.S. Department Of Energy's Involvement In The Ethanol From Corn Stover Program

(Base = All respondents)

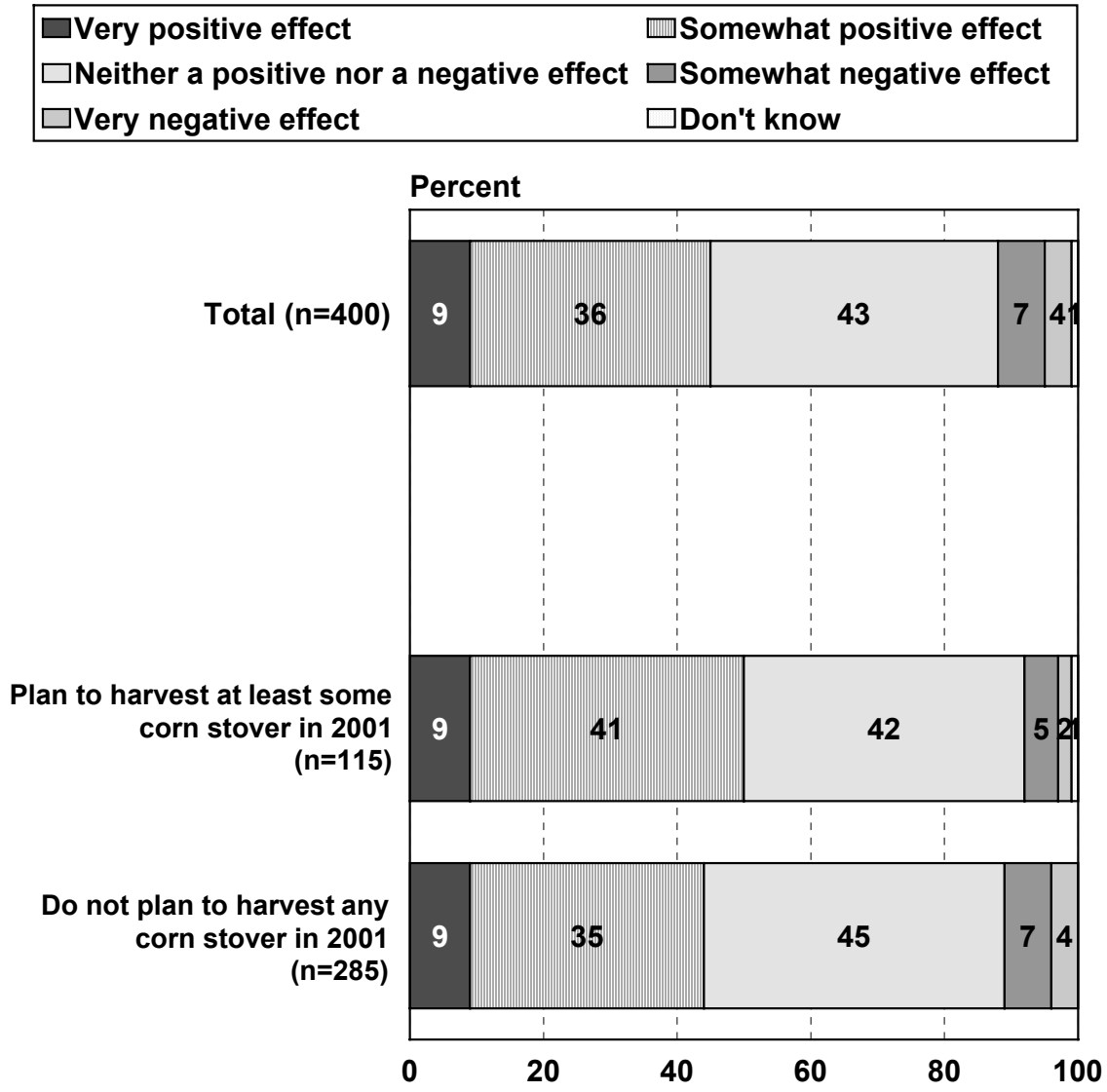
- Mentions of 3% or more -

	Total (n=400)	Plan to harvest corn stover in 2001 (n=115)	Do not plan to harvest corn stover in 2001 (n=285)
No objections/okay/fine	35%	36%	35%
Good idea	29%	32%	27%
Need to be involved to help the farmers.	10%	11%	9%
Should not be involved	5%	3%	6%
Not a good idea	3%	3%	3%
Don't know	4%	5%	3%

Q.27 What is your reaction to having the U.S. Department Of Energy involved in the Ethanol stover program?

Effect That The U.S. Department Of Energy's Involvement Would Have On Decision To Harvest Corn Stover For Ethanol Production

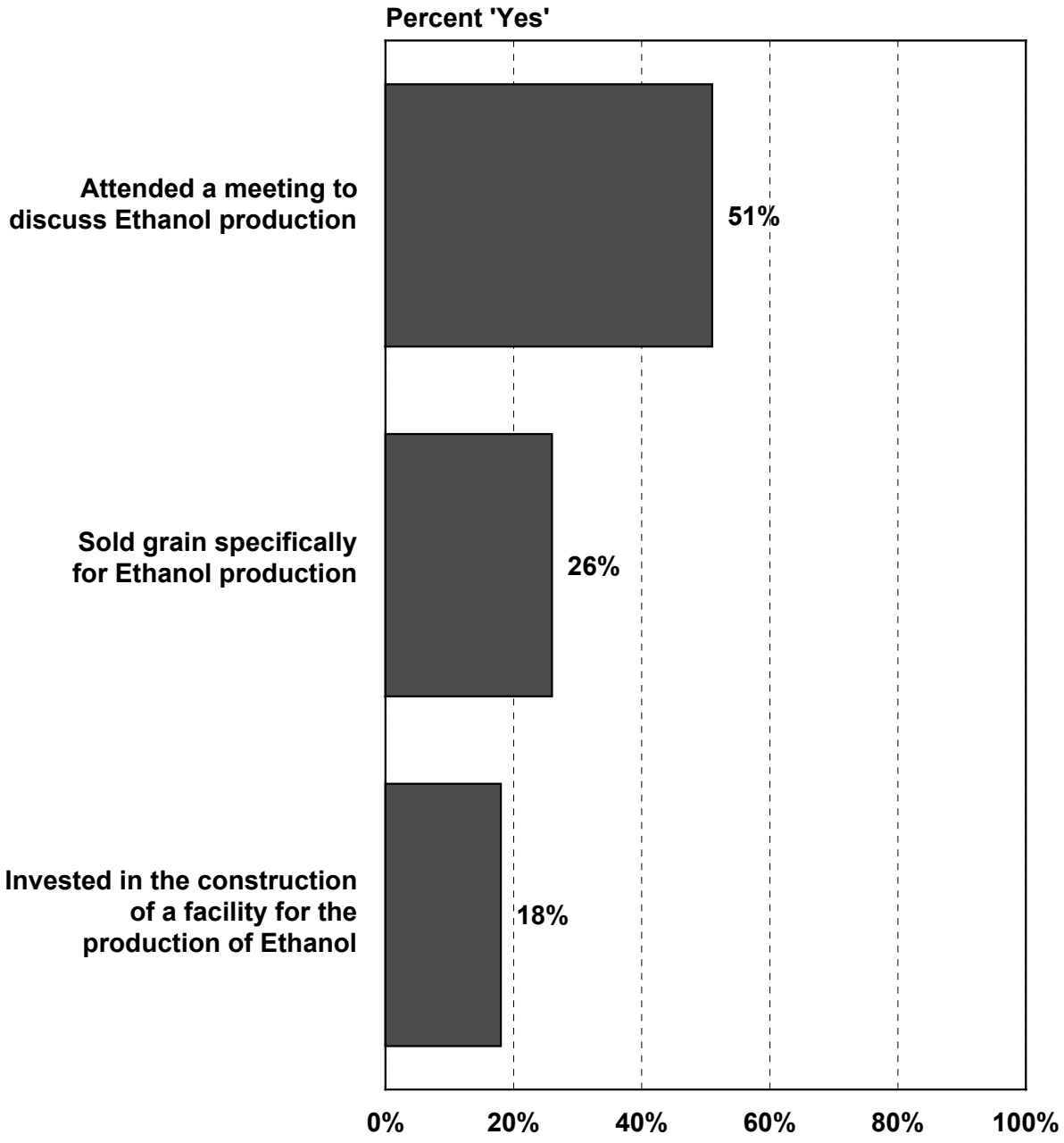
(Base=All Respondents)



Q.28 Knowing that the U.S. Department of Energy is developing this technology, what effect would that have on your decision to harvest your corn stover for the production of Ethanol. Would you say it would have a:

Grower Involvement In The Production Of Ethanol

(Base=All Respondents, n=400)

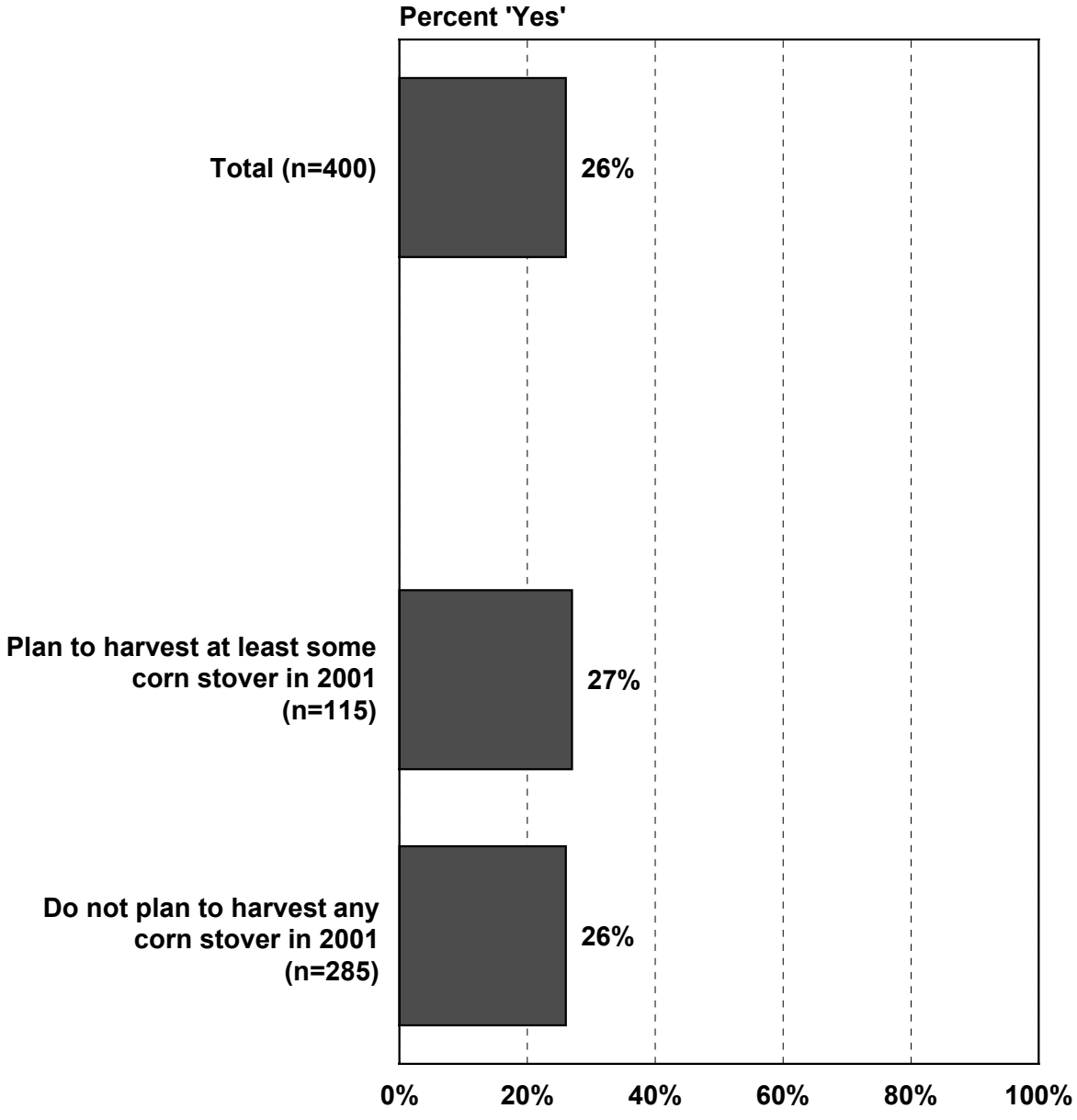


Q.29 Have you been involved in the production of Ethanol in any of the following ways? Have you:

Grower Involvement In The Production Of Ethanol

- Sold Grain Specifically For Ethanol Production -

(Base=All Respondents)

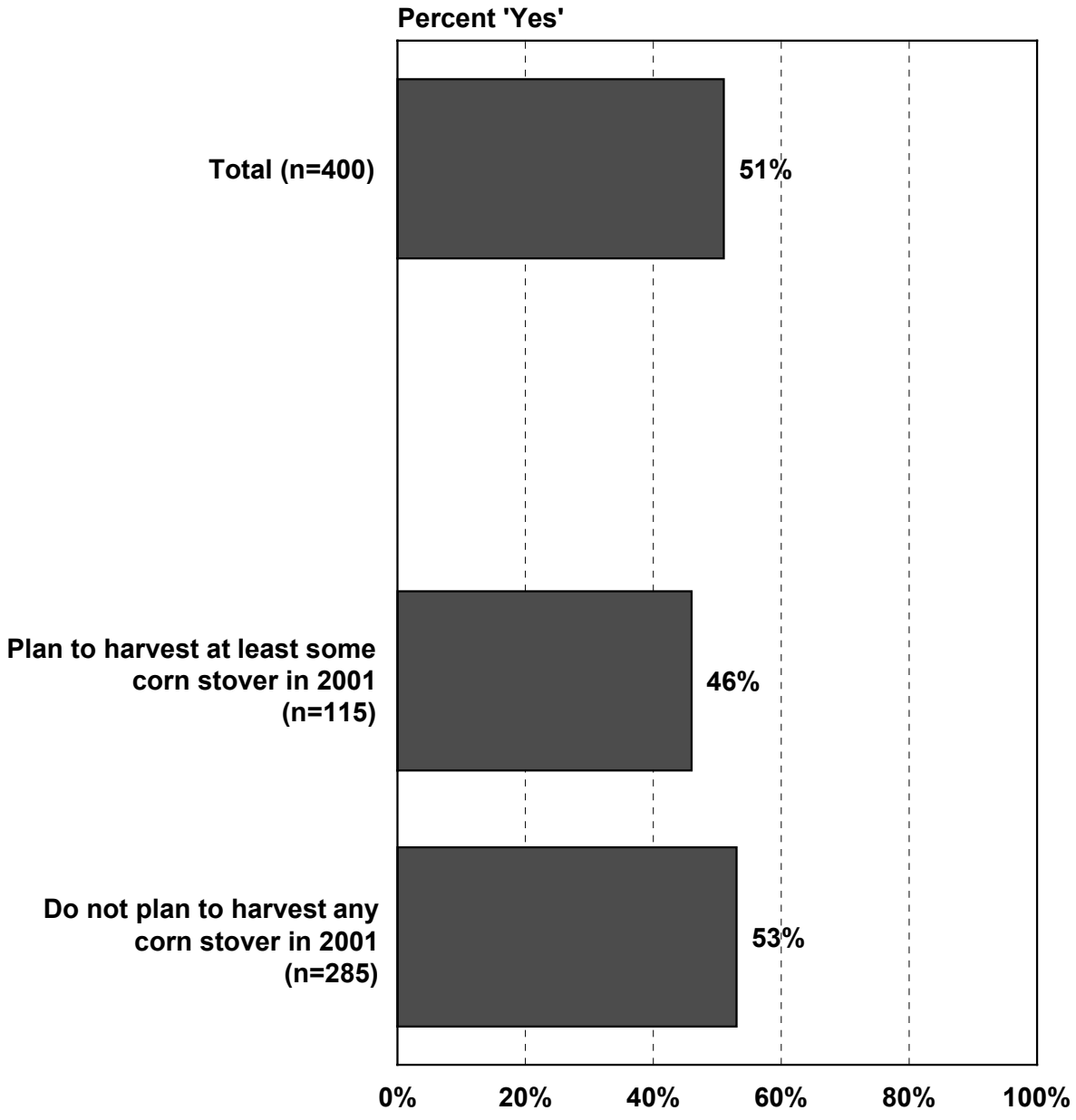


Q.29 Have you been involved in the production of Ethanol in any of the following ways? Have you:

Grower Involvement In The Production Of Ethanol

- Attended A Meeting To Discuss Ethanol Production -

(Base=All Respondents)

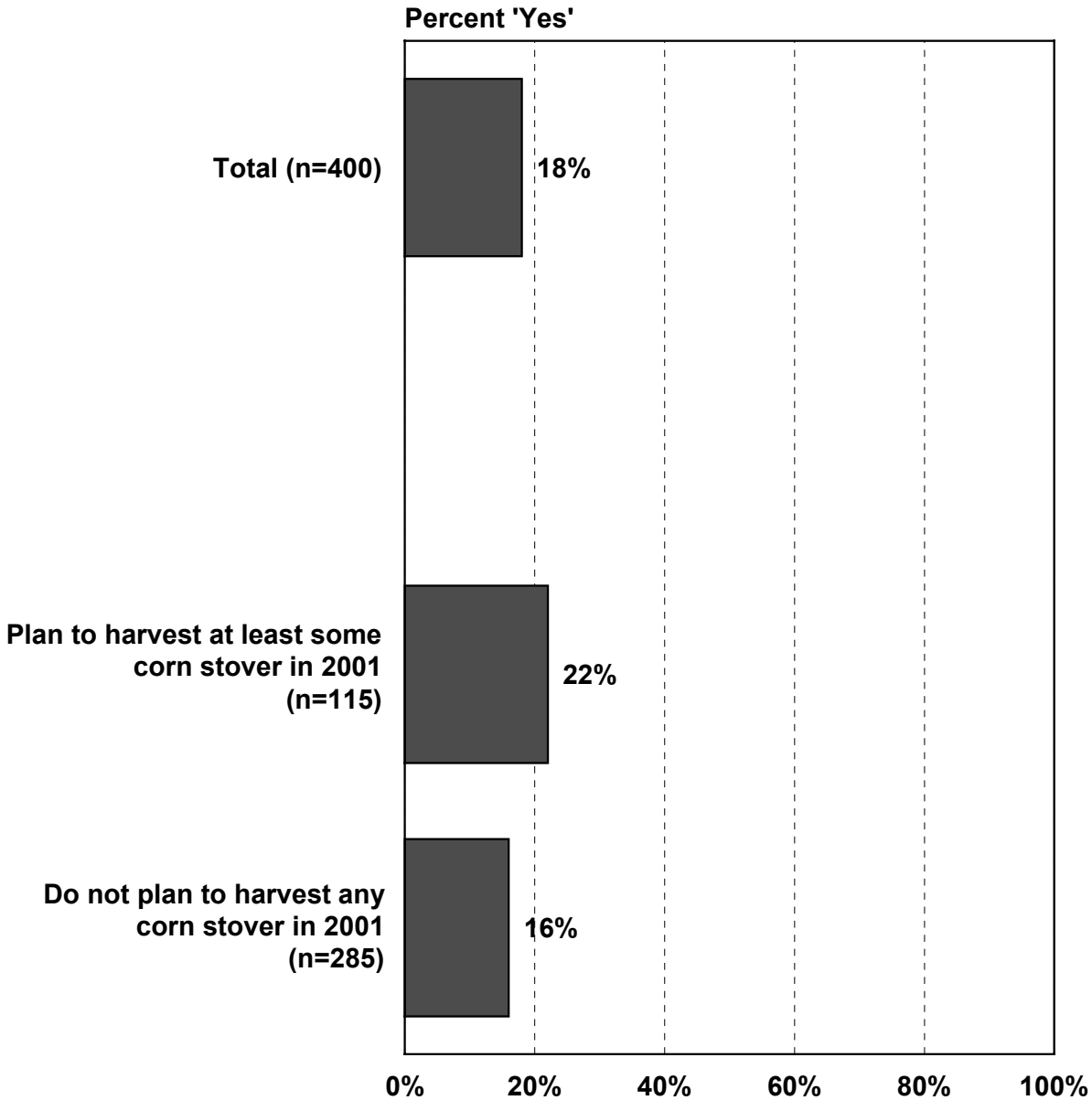


Q.29 Have you been involved in the production of Ethanol in any of the following ways? Have you:

Grower Involvement In The Production Of Ethanol

- Invested In The Construction Of A Facility For The Production Of Ethanol -

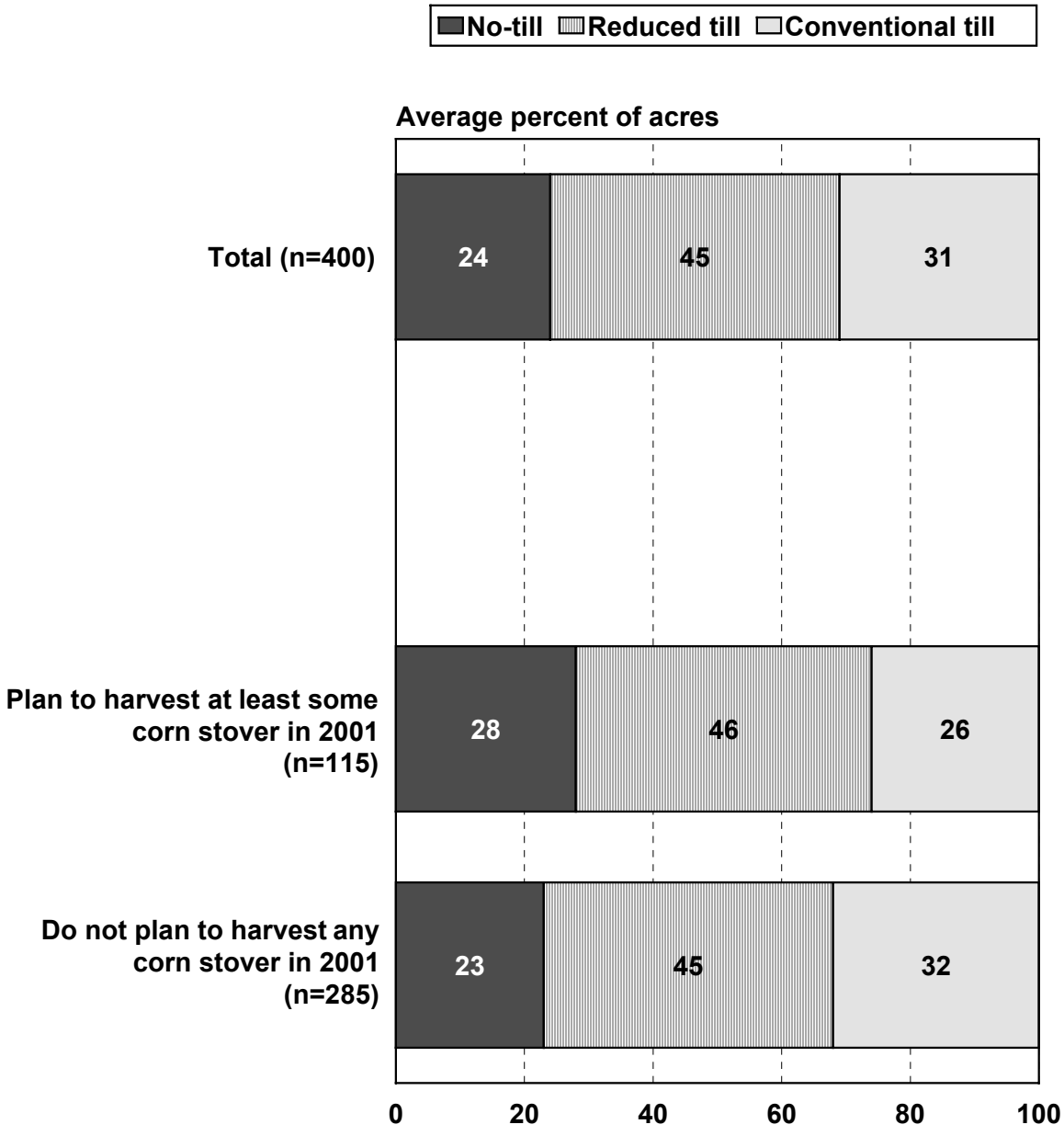
(Base=All Respondents)



Q.29 Have you been involved in the production of Ethanol in any of the following ways? Have you:

Tillage Practices For 2001 Corn Acres

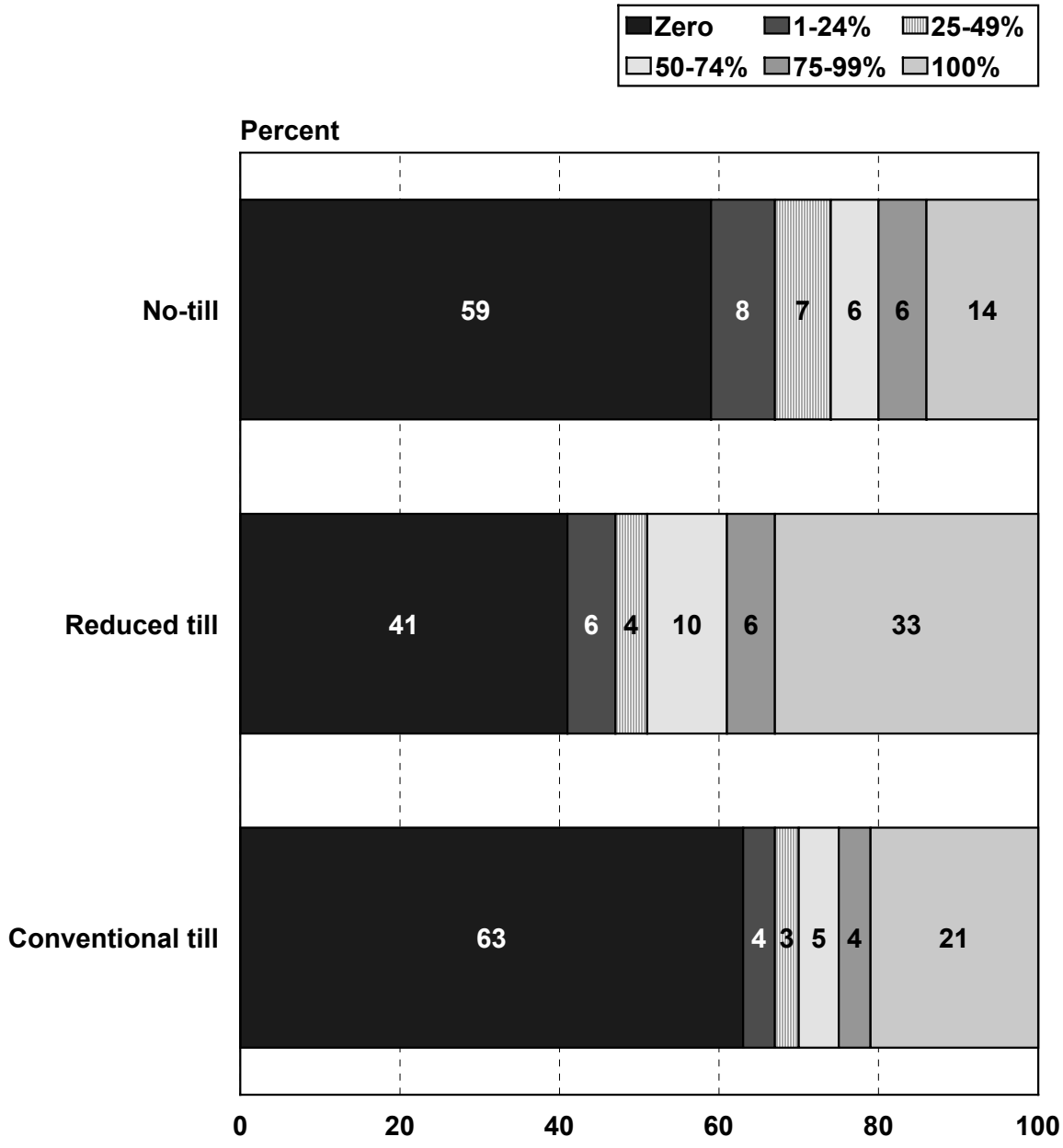
(Base=All Respondents)



Q.30 What percent of your 2001 corn acres are:

Tillage Practices For 2001 Corn Acres

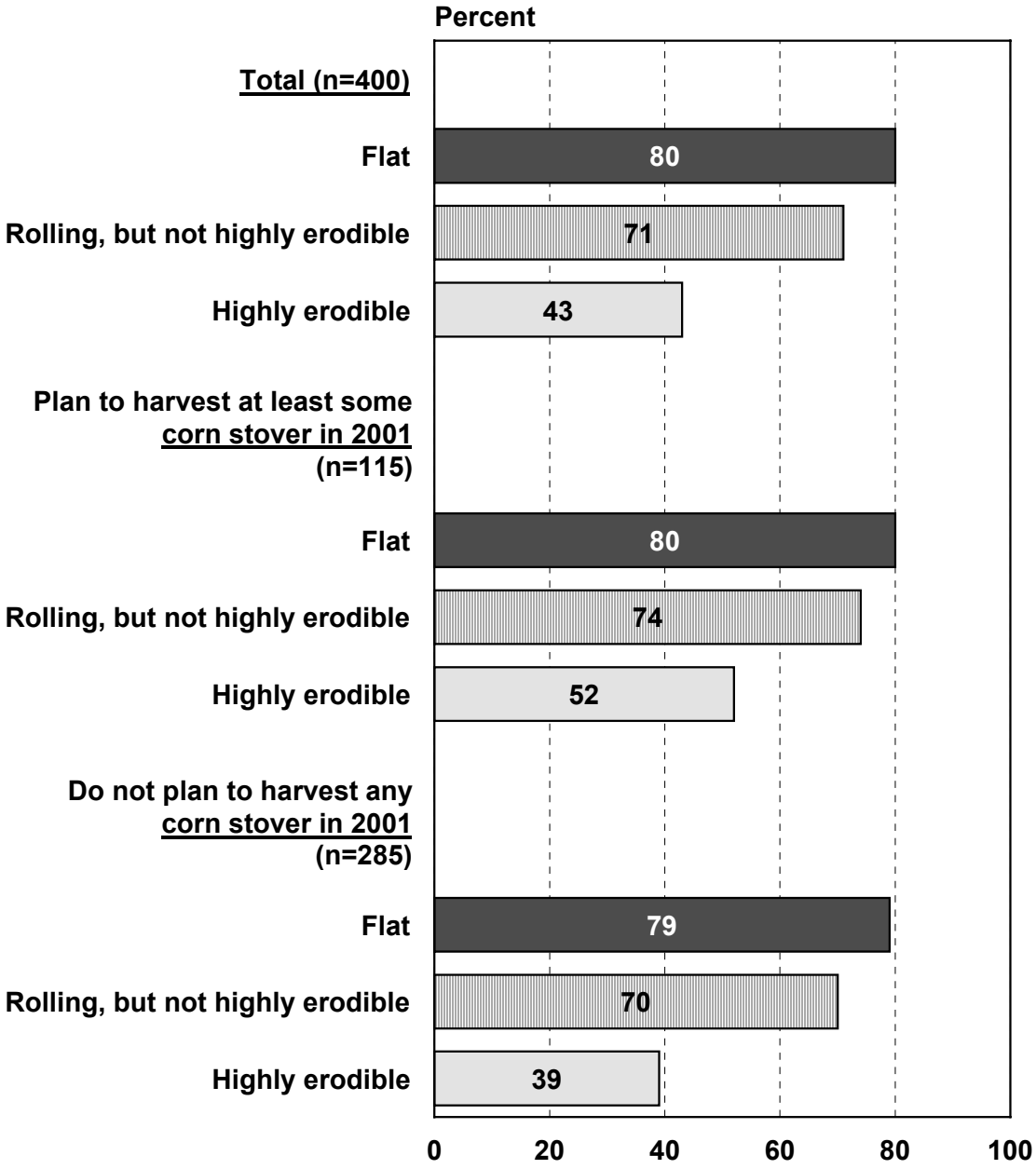
(Base=All Respondents, n=400)



Q.30 What percent of your 2001 corn acres are:

Type Of Crop Land For Corn

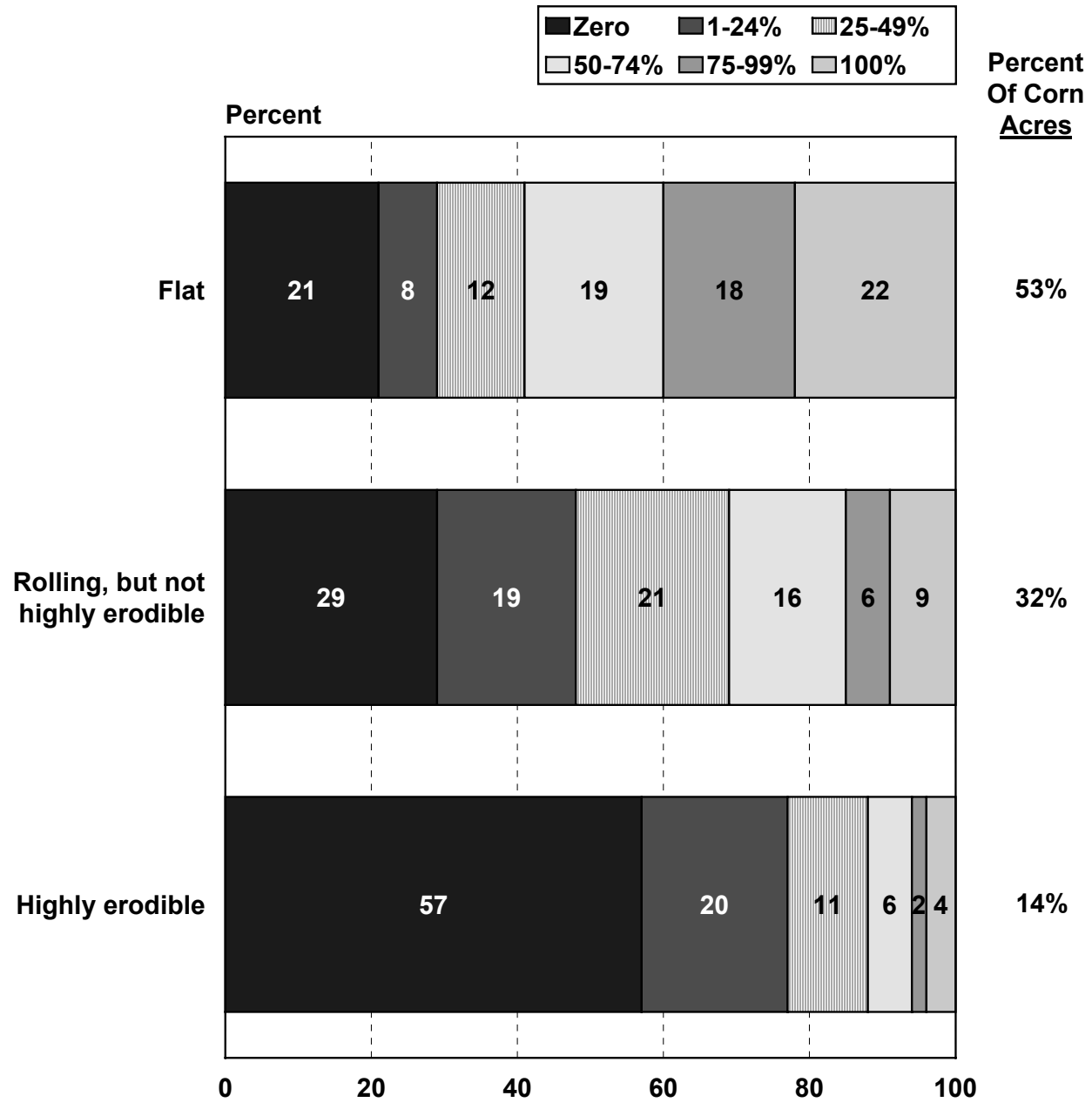
(Base=All Respondents)



Q.31 Which of the following types of crop land do you have for corn? Do you have:

Type Of Crop Land For Corn

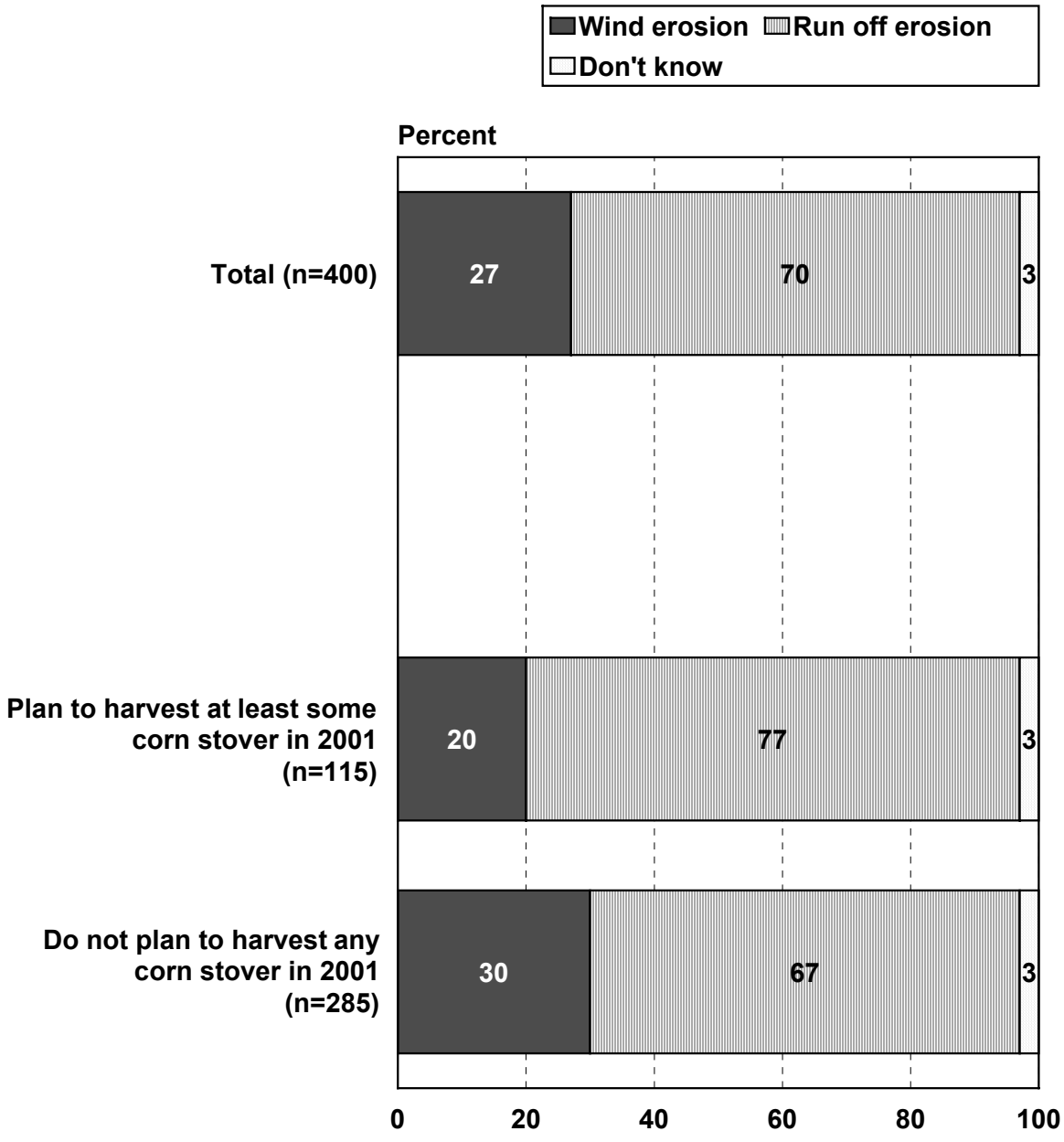
(Base=All Respondents, n=400)



Q.32 What percent of your corn acres are: Flat, rolling, but highly erodible, or highly erodible?

Erosion Concerns Or Challenges

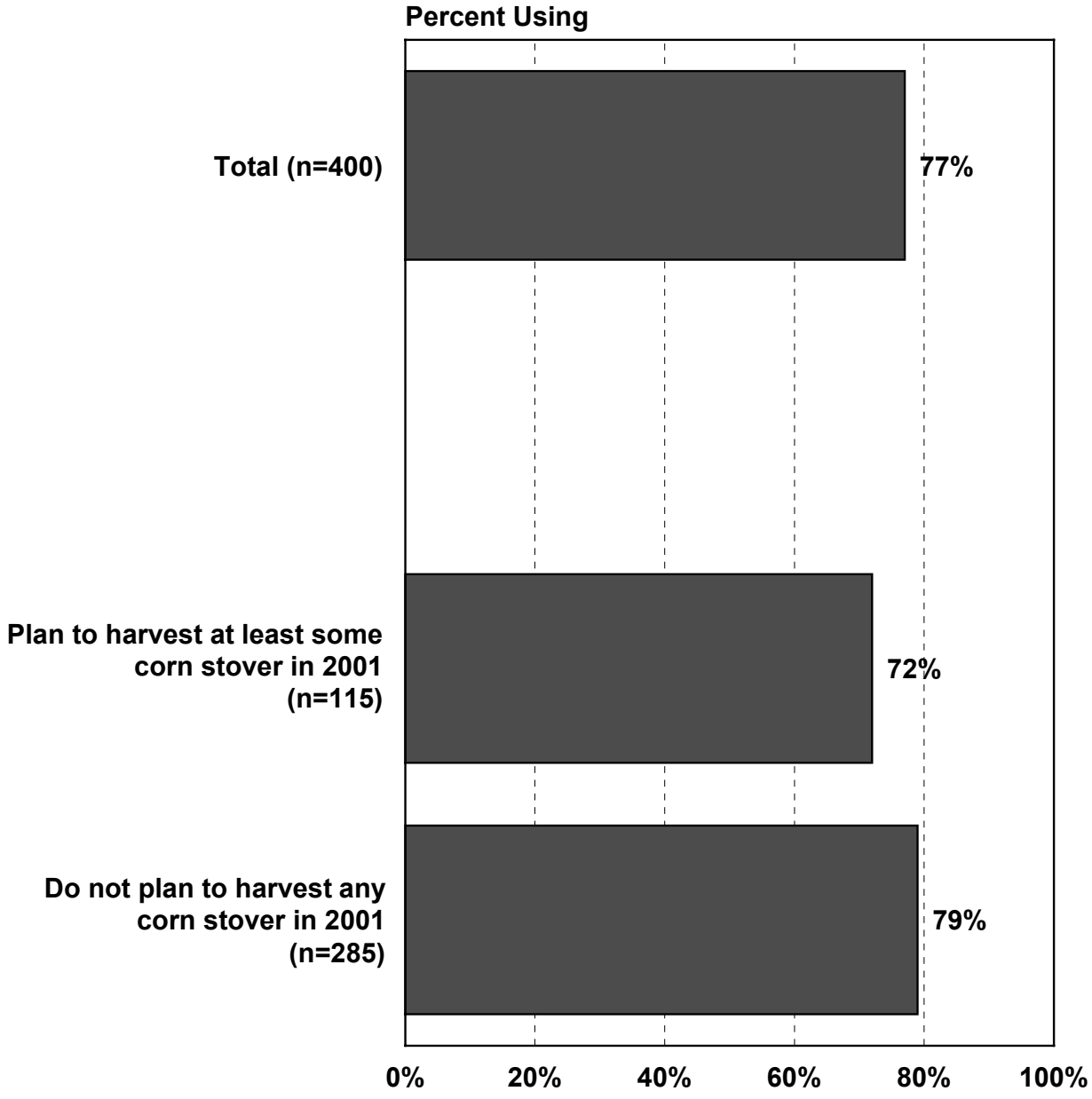
(Base=All Respondents)



Q33 Which would be of greatest concern or challenge to your farming operation? Would you say:

Incidence Of Using Ethanol Blend Gasoline In Vehicles

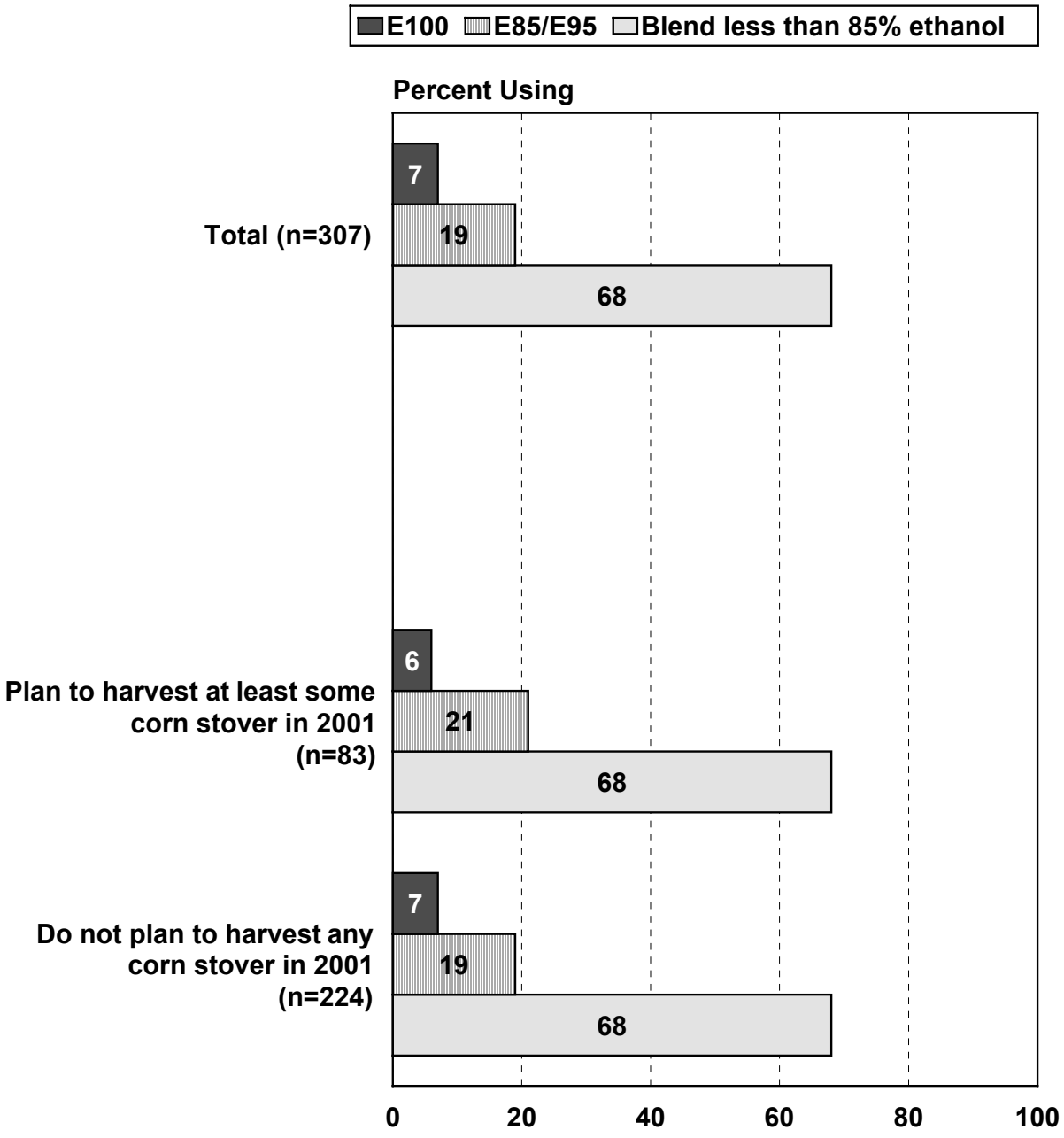
(Base=All Respondents)



Q.34 Do you currently use Ethanol blend gasoline in any of your vehicles?

Incidence Of Using Various Ethanol Types

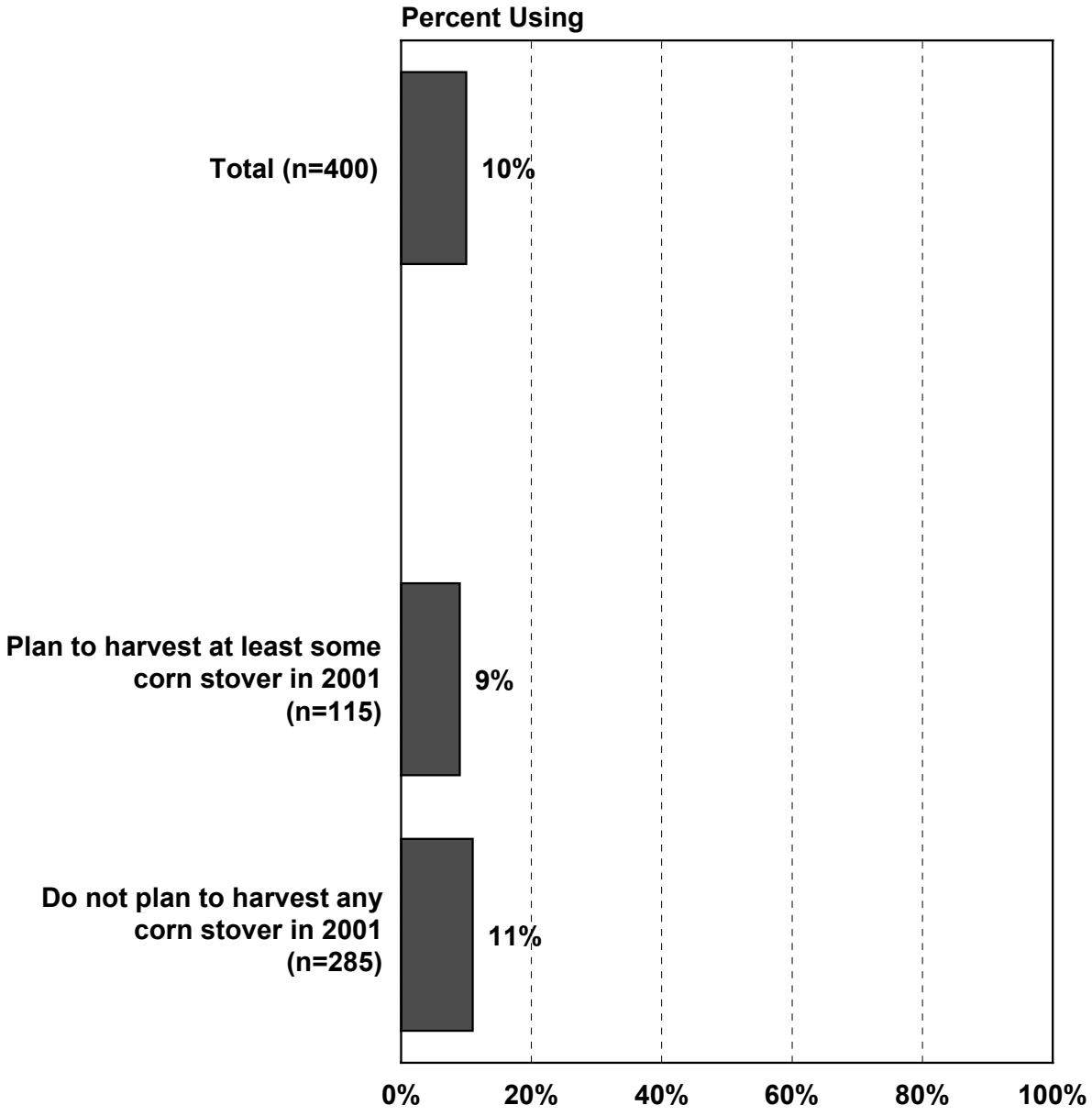
(Base=Respondents who use any Ethanol blend gasoline in their vehicles)



Q.35 Do you use E100?
Q.36 Do you use E85 or E95?
Q.37 Do you use any blend with less than 85% ethanol?

Incidence Of Using Soy Diesel Blend Fuel In Vehicles

(Base=All Respondents)



Q.38 Do you currently use Soy Diesel blend fuels in any of your vehicles?

APPENDIX

Coding #: _____ (1-6)	**Respondent First Name:** _____ (7-21)
	Respondent Last Name: _____ (22-36)
	Phone: _____ (37-46)
	Respondent ID: _____ (47-52)
	Batch: _____ (53-55)
	Interview #: _____ (56-59)

Quotas:	**Date:** _____
	Edited by: _____
	Open End checked by: _____
	Edited by: _____
	Project #: 7603-111

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D.O.E.
BIOFUELS STUDY

Hello my name is _____ with Marketing Horizons, an agricultural marketing research firm. We are talking with corn growers in your area about alternative fuel sources and would like to include your opinions. Please be assured I'm not trying to sell you anything and that any information you provide will be kept confidential.

A. Are you actively involved in farming?

Yes..... (__)
No ..... (__) – **Thank and terminate**

B. Are you the person who makes the decisions regarding the operations of your farm?

Yes..... (__)
No ..... (__) – **Ask for the appropriate person**

C. How many acres of corn did you plant this year in 2001?

_____ acres
[If less than 300 acres thank and terminate]

D. How many of your **[Q.C acres]** of corn are GMO corn?

_____ acres

E. What is your average corn yield per acre for your operation?

_____

F. How would you describe your typical crop rotation?

Year 1: _____

Year 2: _____

Year 3: _____

G. And, which of the following includes your age?

Under 25 ..... (__) - **Thank and terminate**
25 to 35 ..... (__)
36 to 45 ..... (__)
46 to 55 ..... (__)
56 to 65 ..... (__)
Over 65 ..... (__) - **Thank and terminate**

1. What sources of information do you generally seek out to learn "what's new" in crop production technology? **[Do not read list]**

a. (_) Company reps*
b. (_) County agents
c. (_) Dealers
d (_) DTN
e. (_) EPA
f. (_) Farm magazines
g. (_) Farmer meetings
h. (_) Government agents
i. (_) Internet
j. (_) National Resources Conservation Service (NRCS)
k. (_) Other growers/neighbors
l. (_) Radio
m. (_) Television
n. (_) Trade shows
o. (_) University extensions
p. (_) U.S. Department of Agriculture (U.S.D.A.)
q. (_) Other _____
[specify]

[* If Company reps mentioned in Q.1 >> ask]

1a. Is the company rep for a(n):

(__) Equipment company
(__) Seed company
(__) Chemical Company

2. Which of the following do you believe are involved in the research and development of alternative fuels?

	Yes	No
[Rotate]		
a. U.S. Department of Agriculture (U.S.D.A.)	(__)-1	(__)-2
b. U.S. Department of Energy	(__)-1	(__)-2
c. Oil companies	(__)-1	(__)-2
d. National Corn Growers Association (NCGA)	(__)-1	(__)-2
e. U.S. Department of Transportation	(__)-1	(__)-2
f. State Corn Growers Association	(__)-1	(__)-2
g. Farm Coops	(__)-1	(__)-2
h. American Farm Bureau Federation	(__)-1	(__)-2
i. State government agencies	(__)-1	(__)-2
j. EPA	(__)-1	(__)-2
k. University in your state	(__)-1	(__)-2

3. Are you aware of the National Renewable Energy Laboratory (NREL)?

Yes..... (__)
No..... (__)

4. What other organizations or agencies do you believe are involved in the research and development of alternative fuels?

_____

_____

5. Have you heard of the U.S. Department of Energy's BioFuels Program?

Yes..... (__)
No..... (__)

6. Now please consider the Ethanol program where Ethanol is produced from grain. Using a scale of 1 to 10 where 1 is "not at all beneficial" and 10 is "very beneficial," how beneficial would you say the Ethanol program is to each of the following:

Rating

[Rotate]

a. Corn growers ..... (___)
b. The environment ..... (___)
c. U.S. society in general..... (___)
d. Oil companies..... (___)
e. Petroleum refines..... (___)
f. Gasoline and fuel retailers..... (___)
g. Elevators and grain producers ..... (___)

7. What do you see as the major benefits resulting from the production and use of Ethanol?

_____

_____

_____

8. What do you feel are the disadvantages of the production and use of Ethanol?

_____

_____

_____

9. I would like to read you a few statements and get your reaction to each. Using a scale of 1 to 10 where 1 is "strongly disagree" and 10 is "strongly agree," how do you rate_____?

	Strongly Disagree									Strongly Agree
[Rotate]										
a. Producing Ethanol can significantly reduce our dependence on foreign oil	1	2	3	4	5	6	7	8	9	10
b. Using Ethanol is very beneficial to the environment	1	2	3	4	5	6	7	8	9	10
c. Using Ethanol produced from grain results in higher corn prices for the grower	1	2	3	4	5	6	7	8	9	10
d. I have no reservations about selling grain for the production of Ethanol	1	2	3	4	5	6	7	8	9	10
e. The public is well informed about the benefits of using ethanol as a fuel blend	1	2	3	4	5	6	7	8	9	10
f. The production of Ethanol will increase greatly over the new few years	1	2	3	4	5	6	7	8	9	10
g. Producing Ethanol from grain is undesirable because it takes away from the food supply	1	2	3	4	5	6	7	8	9	10
h. Publicity for the promotion of Ethanol has been adequate	1	2	3	4	5	6	7	8	9	10

10. Which of the following should be promoting Ethanol consumption? Would you say the:

	Yes	No
[Rotate]		
a. U.S. Department of Agriculture (U.S.D.A.)	(__)-1	(__)-2
b. U.S. Department of Energy	(__)-1	(__)-2
c. Oil companies	(__)-1	(__)-2
d. National Corn Growers Association (NCGA)	(__)-1	(__)-2
e. U.S. Department of Transportation	(__)-1	(__)-2
f. State Corn Growers Association	(__)-1	(__)-2
g. Farm Coops	(__)-1	(__)-2
h. American Farm Bureau Federation	(__)-1	(__)-2
i. State government agencies	(__)-1	(__)-2
j. EPA	(__)-1	(__)-2

11. Should check-off dollars be used to promote Ethanol consumption?

Yes..... (__)
No..... (__)

Now I would like to talk to you about your corn stover. For the purposes of this survey, we define corn stover as husks, stalks, cobs, leaves - all parts of the plant except the grain.

12. What do you plan to do with your corn stover this year in 2001? Do you plan to:

Harvest at least some of it ..... (__)
Will not harvest any of it..... (__) **-- Skip to Q.16**

13. What percent of your corn stover do you plan to harvest?

_____%

14. How do you plan to bundle your stover after harvest?

[Do not read list]

a. (_) Bale
b. (_) Cube
c. (_) Other _____
[Specify]

15. How do you plan to use the corn stover that you harvest?

[Do not read list]

a. (_) For bedding
b. (_) Animal feed
c. (_) Silage
d. (_) Other _____
[Specify]

[Skip to Q.17]

16. Why don't you harvest any of your corn stover?

[Do not read list]

a. (_) No use for corn stover
b. (_) Concerned about erosion
c. (_) Don't have time to harvest
d. (_) Don't have the equipment to harvest
e. (_) Concern about soil tilth
f. (_) Concern about reducing soil fertility
d. (_) Other _____
[Specify]

I would like to describe a new program being developed. The U.S. Department of Energy, through its BioFuels Program, is in the process of developing the technology to produce alternative transportation fuels and fuel additives. The technology exists to make Ethanol from other plant materials, not just grains, or starches and sugars. One aspect of this program is to utilize corn stover for the production of bioethanol for transportation.

17. What is your initial reaction to having this alternative fuel available? Using a scale of 1 to 10 where 1 is "very negative" and 10 is "very positive," how do you feel overall about the production of Ethanol from corn stover?

Very Negative									**Very Positive**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

18. Knowing what you do about using corn stover for the production of bioethanol for transportation, and if corn stover could be harvested at a reasonable profit, how likely would you be to sell at least some of your corn stover for the production of Ethanol? Would you say you would be:

Very likely..... (__)
Somewhat likely..... (__)
Not too likely..... (__) **-- Skip to Q.23**
Not at all likely..... (__) **-- Skip to Q.23**

[Ask Q.19 through Q.22 of those "very/somewhat likely" in Q.18]

19. Why would you be **[very likely/somewhat likely]** to sell at least some of your stover for the production of Ethanol?

_____

_____

_____

20. What, if any, problems do you associate with harvesting your stover?

_____

_____

_____

21. Which of the following best describes how you would harvest your corn stover? Would you be most likely to:

(__) Harvest at least some of the stover from all of your corn fields

OR

(__) Harvest at least some of your stover from some of your corn fields

22. On those fields where you plan to harvest at least some of the stover, what percent of the stover would you want to leave on your fields?

_____%

[Skip to Q.25]

[Ask Q.23 and Q.24 of those "not too likely/not at all likely" in Q.18]

23. Why would you not be likely to harvest at least some of your corn stover for the production of Ethanol?

_____

_____

_____

24. What, if any, advantages do you associate with harvesting your stover?

_____

_____

_____

25. What is the minimum you would have to be paid per ton, in order to harvest your corn stover?

$_____

26. Again, I would like to read you a few statements and get your reaction to each. Using a scale of 1 to 10 where 1 is "strongly disagree" and 10 is "strongly agree," how do you rate _____?

	Strongly Disagree									**Strongly Agree**
[Rotate]										
a. I would definitely harvest stover for the production of Ethanol if there were a service to harvest and transport the stover	1	2	3	4	5	6	7	8	9	10
b. I would have to apply more fertilizer if I harvest some of my corn stover	1	2	3	4	5	6	7	8	9	10
c. I would have serious erosion problems if I harvested some of my corn stover	1	2	3	4	5	6	7	8	9	10
d. Although some residue is required to protect the soil from erosion, some residue can be safely removed	1	2	3	4	5	6	7	8	9	10
e. Since planting corn-on-corn produces a buildup of corn stover, harvesting corn stover is more advantageous for growers who plant corn-on-corn	1	2	3	4	5	6	7	8	9	10
f. Excessive corn stover residue reduces crop yields in no-till farming	1	2	3	4	5	6	7	8	9	10
g. Excessive residue contributes to problems with weeds, diseases, and pests	1	2	3	4	5	6	7	8	9	10
h. Producing Ethanol from corn stover would benefit the farmer, processor, and environment	1	2	3	4	5	6	7	8	9	10
i. Since herbicides and pesticides are partially absorbed by the corn stover, control is more difficult and expensive	1	2	3	4	5	6	7	8	9	10
j. There would be no difference between Ethanol produced from corn stover and Ethanol produced from grain	1	2	3	4	5	6	7	8	9	10
k. Growers would be less likely to harvest stover from Bt corn than from conventional corn	1	2	3	4	5	6	7	8	9	10
l. I would benefit from removing some of the corn stover because it would allow earlier soil warming	1	2	3	4	5	6	7	8	9	10
m. Stover would not likely be removed from no-till acres	1	2	3	4	5	6	7	8	9	10

27. As I indicated earlier, the U.S. Department of Energy is developing the technology for the production of Ethanol from corn stover. What is your reaction to having the U.S. Department of Energy involved in the Ethanol from stover program?

_____

_____

_____

28. Knowing that the U.S. Department of Energy is developing this technology, what effect would that have on your decision to harvest your corn stover for the production of Ethanol. Would you say it would have a:

Very positive effect ..... (__)
Somewhat positive effect ..... (__)
Neither a positive nor a negative effect..... (__)
Somewhat negative effect ..... (__)
Very negative effect ..... (__)

29. Have you been involved in the production of Ethanol in any of the following ways? Have you:

	Yes	**No**
a. Sold grain specifically for Ethanol production.....	(__)-1	(__)-2
b. Attended a meeting to discuss Ethanol production	(__)-1	(__)-2
c. Invested in the construction of a facility for the production of Ethanol.....	(__)-1	(__)-2

30. What percent of your 2001 corn acres are:

No-till _____%
Reduced till _____%
Conventional till _____%

31. Which of the following types of crop land do you have for corn? Do you have:

32. What percentage of your corn acres are:

	Q.31 Yes	Q.31 No	Q.32 % Of Corn Acres
Flat	(__)-1	(__)-2	_____
Rolling, but not highly erodible	(__)-1	(__)-2	_____
Highly erodible	(__)-1	(__)-2	_____

33. Which would be of greater concern or challenge to your farming operation? Would you say:

Wind erosion ..... (__)
Run off erosion ..... (__)

34. Do you currently use Ethanol blend gasoline in any of your vehicles?

Yes ..... (__)
No ..... (__) **-- Skip to Q.38**

35. Do you use E100?

Yes ..... (__)
No ..... (__)

36. Do you use E85 or E95 ethanol blends?

Yes ..... (__)
No ..... (__)

37. Do you use any blend with less than 85% ethanol?

Yes ..... (__)
No ..... (__)

38. Do you currently use Soy Diesel blend fuels in any of your vehicles?

Yes..... (__)
No ..... (__)

That is all my questions for today, thank you for your time.

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13. ABSTRACT *(Maximum 200 words)*

The DOE is in the process of developing technologies for converting plant matter other than feed stock, e.g., corn stover, into biofuels. The goal of this research project was to determine what the farming community thinks of ethanol as a fuel source, and specifically what they think of bioethanol produced from corn stover. This project also assessed the image of the DOE and the biofuels program and determined the perceived barriers to ethanol-from-stover production.

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