

BIOENERGY PERCEPTION STUDY

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IMPORTANCE OF BIOFUELS

- Limited source of fossil energy
- Global warming
- Sustainability
- Energy security
- Rural development



THE SOUTHEAST PARTNERSHIP FOR INTEGRATED BIOMASS SUPPLY SYSTEMS (IBSS)

Goals:

- Provide implementable 'real world' solutions;
- Manage technological, economical, and social barriers → decrease risks;
- Maximize societal gains;
- Develop tools for supporting impact evaluation and decision making;
- Provide high impact education and communication tool for all stakeholders.



<http://vimeo.com/auburnresearch/ibss>

IBSS for Southern states

RESEARCH OBJECTIVE

To examine stakeholders' perception of bioenergy industry and biofuels

Expected Outcomes:

- Inform the industry about gaps in stakeholders' understanding of the bioenergy industry;
- Use the results to develop education and communication tools for stakeholders;
- Conduct social impact analysis (social LCA) - Case studies.

LITERATURE REVIEW

- Only selected **stakeholder** groups included;
- Lack of **extensive** and **integrated** stakeholder studies;
- Lack of focus on **South East US** about biofuels;
- Lack of **social impact assessment studies**;
- Focus on bioenergy but only **few studies on biofuel**.

LITERATURE REVIEW

1. Perception depends on:

- Stakeholder group;
- Geographical region;
- The time of study;
- Market maturity.

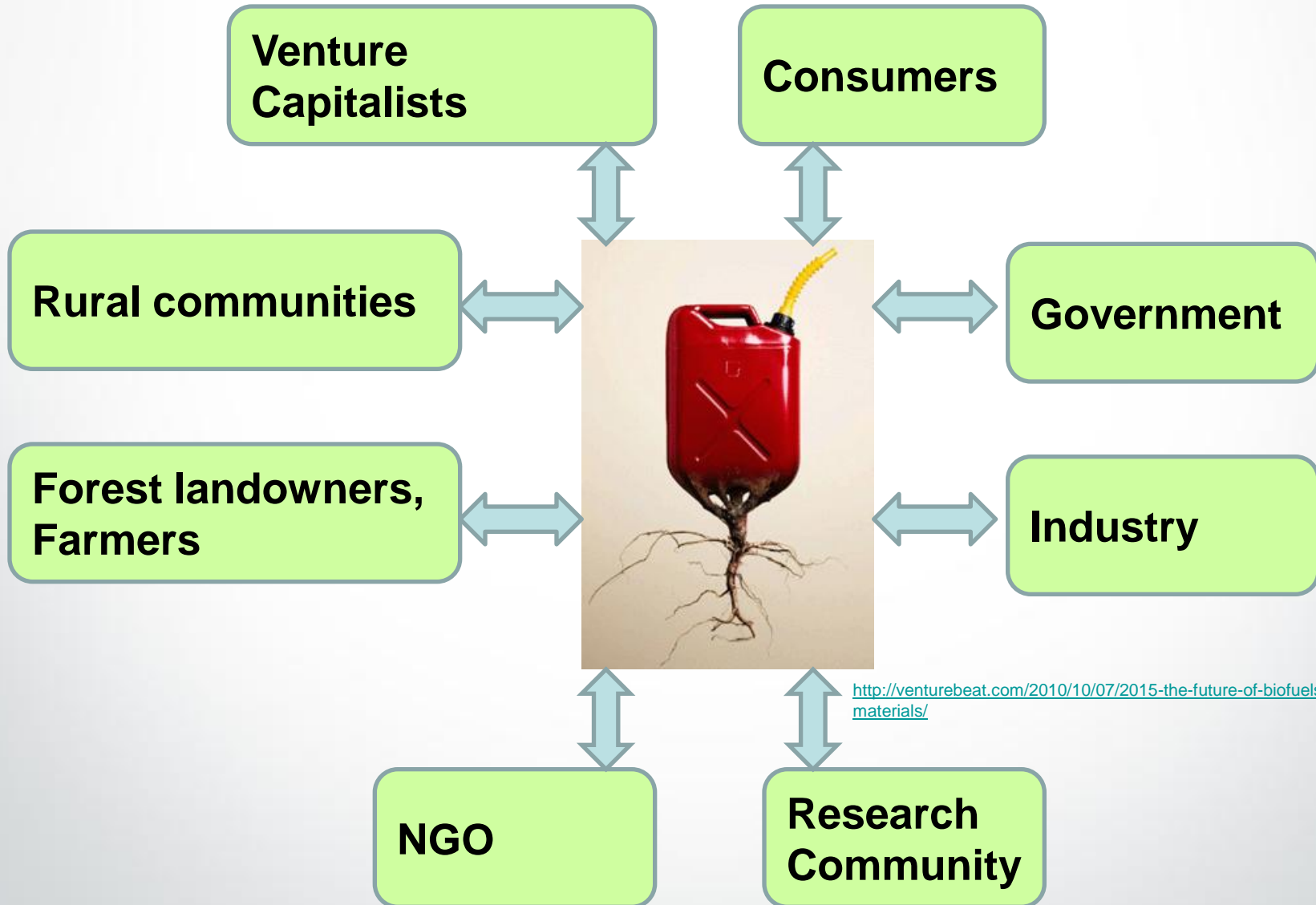


<http://www.usnews.com/news/articles/2012/08/29/545-miles-per-gallon-for-all-cars-by-2025-not-exactly>

2. Specific terms that consumers can relate to should be used;
3. Price/cost of biofuels;
4. National security;
5. Improvement of local economy.

METHODOLOGY

TARGETED STAKEHOLDERS



METHODOLOGY

Scope: NC and TN consumers

Data collection

- Instrument: Web based surveys
- Sampling frame: 6 millions NC, 2 millions TN
- Sample: Randomly selected email addresses (100k by state)
- Time period: April-July
- Expected response: 1000 by state
- Pilot: General public and industry



<http://magmods.wordpress.com/2011/03/23/magmods-questionnaire-3/>

RESULT OF PILOT SURVEYS (N=34)

Evaluate your level of concern about different environmental topics

Not at all concerned (1)	Moderately concerned (2)	Neutral (3)	Concerned (4)	Extremely concerned (5)
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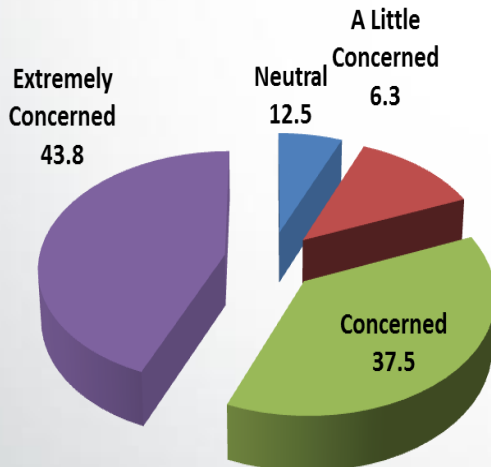
Most concerned:

- Unemployment (Mean: 4.19)
- Increasing global population

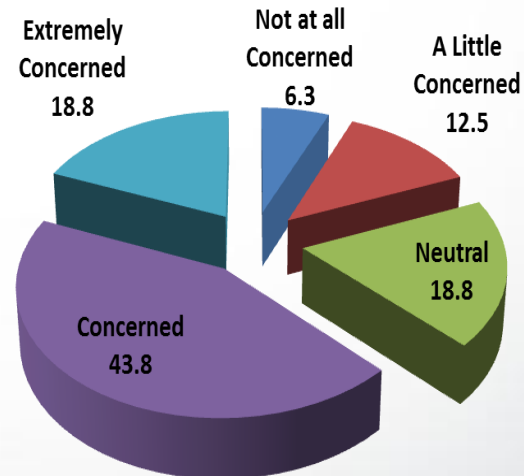
Less concerned:

- Decreasing fossil energy reserves (Mean 3.56)
- U.S. Dependence on foreign oil

Unemployment



Decreasing fossil energy reserves



RESULT OF PILOT SURVEYS

If biofuel for transportation was available at gas stations, what are the most important factors to choose biofuel

Extremely Unimportant (1)	Unimportant (2)	Neither important nor unimportant (3)	Important (4)	Extremely unimportant (5)
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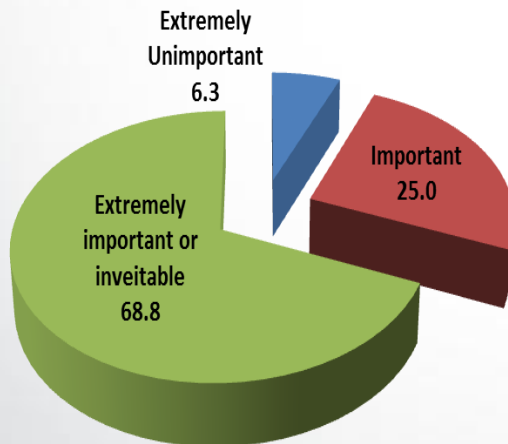
Most important:

- Vehicle compatibility (4.50),
- Biofuel will not change engine lifetime,
- Price.

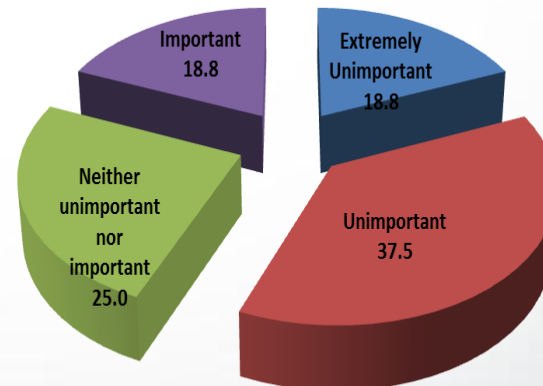
Less important:

- My colleagues/neighbors/family opinion (2.5),
- Tax breaks.

My vehicle compatibility with biofuel



Colleagues'/neighbors'/family's opinion about biofuels



RESULT OF PILOT SURVEYS

Strongly disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly agree (5)
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Energy security

- Reduce US dependence on foreign oil,
- Produce biofuels to meet our country's energy demand

Price

- I would purchase biofuels even if it is a little more expensive than gasoline

Miscellaneous

- I would like my local power provider to use renewable fuels sources
- I would support the cutting of trees for biofuels if trees were replanted in the same place

Source

- Grasses can be used for producing biofuel
- Trees can be used for producing biofuel
- Landfill wastes could be a valuable source of bioenergy

Jobs

- Investment in biofuel industry creates jobs
- Biofuel refineries in my region provide jobs

Less agreed one:

- I think biofuels made from trees will cause groceries to be more expensive

PERCEPTIONS OF FOREST AND FARM LANDOWNERS



Source: ecfla.org

Methodology

- Scope : NC, TN
- Data Collection
 - Instrument: Mail Surveys
 - Sampling Frame
 - Time Period: April-September 2013
 - Expected Response: 250 Forest and 250 Farm from each state
 - Pilot: Informed interest groups within the forestry industry -18 responses 16 complete

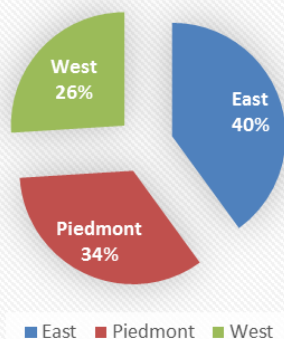


<http://yourmoneydrawer.com/survey-serve-you-better/>

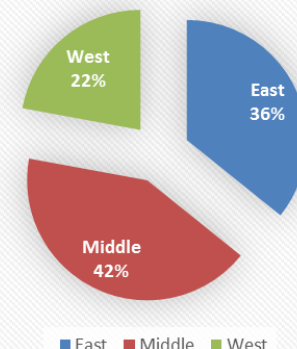
Sampling Method

- State Database
 - US Forest Service: Forest Inventory Analysis
 - USDA: County Agriculture Fact Sheets
- County Database:
 - NC and TN are both geographically divided into three regions

County Distribution within the state of NC

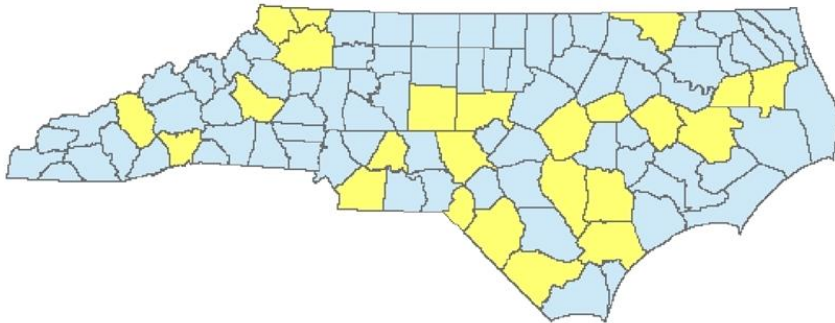


County Distribution within the state of TN



State County Selections

Selected 25 Counties in North Carolina

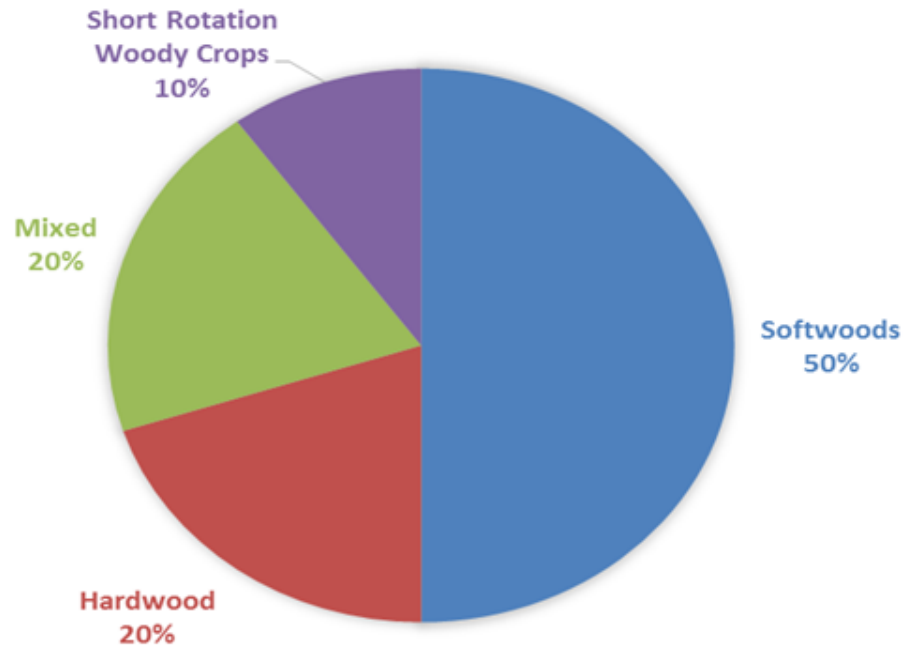


Selected Counties in Tennessee



Crops likely to plant as a Forest Landowner

AS A FOREST LANDOWNER WHICH CROPS WOULD YOU BE MORE LIKELY TO PLANT FOR BIOENERGY PURPOSES?



Top 3 and Bottom 2 Agreement Statements

- 4.8 In my opinion, domestically produced fuel is critical to the **nation's national security**
 - 4.6 I would like **to learn more** about growing and harvesting wood for bioenergy (biofuels & biopower)
 - 4.6 Wood/trees are currently being used in my state for **producing power/electricity**
-
- 1.07 In my opinion, growing biomass for bioenergy is **not profitable**
 - 1 In my opinion, biofuel production from trees is not environmentally friendly

NEXT STEPS

Conduct consumer and landowner surveys

- Send out email for consumers, mail to landowners
- Data collection,
- Interpret results

Conduct surveys for other stakeholder groups

Plan educational tools, other actions by stakeholder group



Questions?



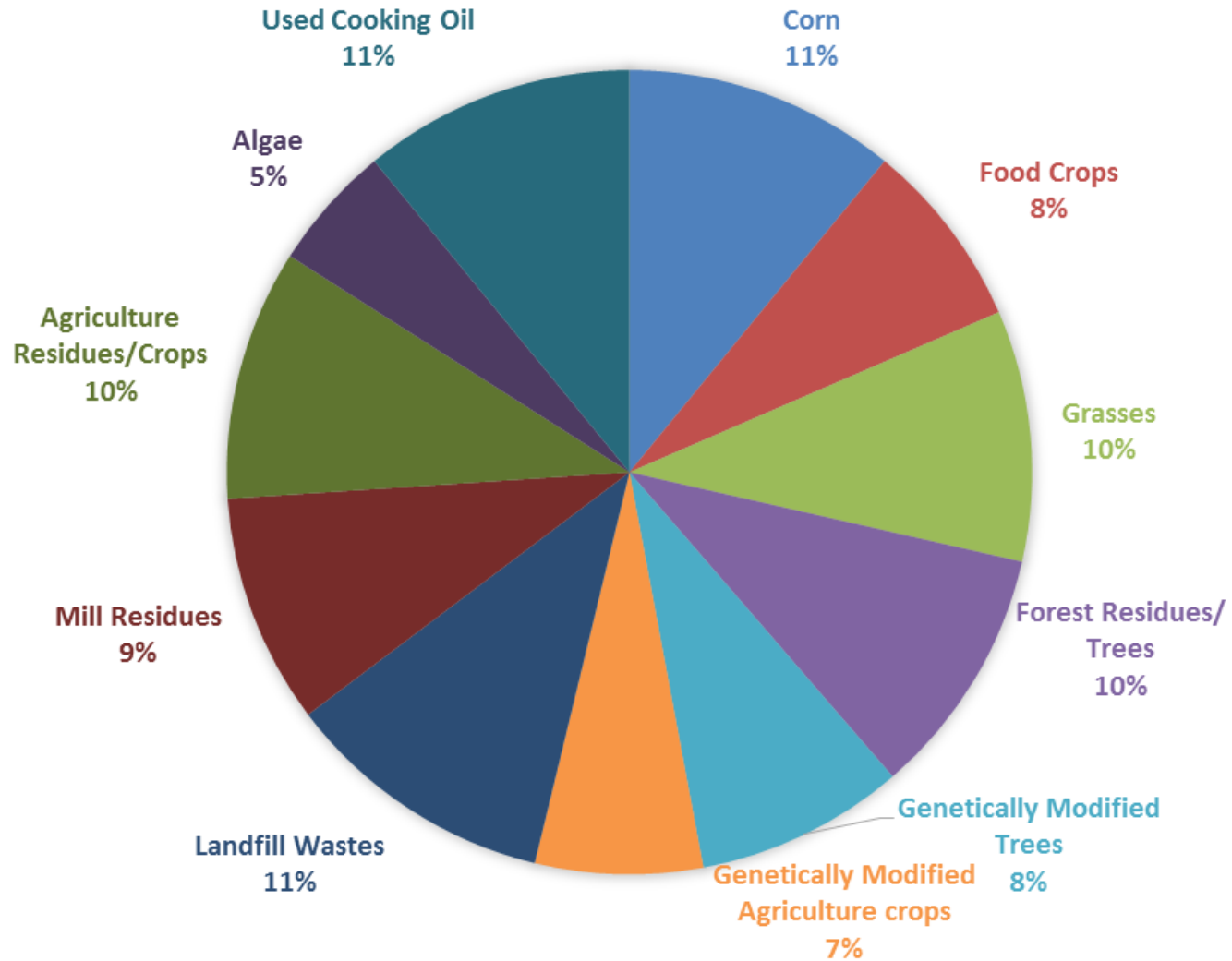
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WHICH OF THE FOLLOWING SOURCES OF BIOENERGY ARE YOU AWARE OF?



Open ended responses

- What type of information would you need in order to grow trees for bioenergy purposes?
 - Type of wood needed. Sites that will be most productive. Tree sources that will be most productive on the designated sites. Management plans to achieve this goal. Cost and timing for harvest schedule and income schedule from crop. Guarantee for market and price.
 - There would have to be a market equal to or better than pulpwood
 - Cost of planting, length of rotation, tons of fiber per acre produced during rotation and expected price per ton to landowner.

I Don't Know Responses

- I would supply forest residues/trees to produce bioenergy
- I believe that it is profitable to grow and sell wood to the bio-power industry (electricity) vs. other forestry markets (e.g., pulp)
- I believe that it is profitable to grow and sell wood for the biofuels industry vs. to other forestry markets (e.g., pulp)
- I am aware that genetically modified trees are currently being grown for energy (biofuels & biopower)
- I have heard of short rotation trees as a source of bioenergy (biofuels for transportation)
- I believe it will be profitable to grow grasses in addition to timber in my forest land for energy purpose

THANK YOU FOR YOUR ATTENTION!

Questions?



DATA COLLECTION SOFTWARE - QUALTRICS

online survey software



CUSTOMER INSIGHTS
PRODUCT FEEDBACK
MARKET RESEARCH
CUSTOMER SATISFACTION

<http://www.qualtrics.com/blog/about-qualtrics/>

ANALYSIS

SOFTWARE - SPSS

IBM Product

SPSS predictive analytics software, you can predict with confidence what will happen next.



SPSS Statistics

Identify your best customers, forecast future trends, and perform advanced analysis.



SPSS Amos

Easily perform structural equation modeling (SEM) for more accurate results.



SPSS SamplePower

Easily identify the appropriate sample size - every time - for any research criteria.



SPSS Statistics Developer

Integrate the power of R and Python with the core functionality of SPSS Statistics.



SPSS Data Collection

Achieve a deeper understanding of people's attitudes, preferences and opinions.



SPSS Text Analytics for Surveys

Analyze survey text and discover valuable, hidden insights.



SPSS Visualization Designer

Easily create and share compelling visualizations that communicate your analytic results.

ANALYSIS SOFTWARE - SPSS

The screenshot displays the IBM SPSS Statistics interface. The main window, titled '*Output1 [Document1] - IBM SPSS Statistics Viewer', shows a list of variables on the left and a pie chart in the center. The pie chart is divided into two segments, one green and one yellow. The inset window, titled 'Graduates3.sav [DataSet1] - IBM SPSS Statistics Data Editor', shows a table of data with 12 rows and 10 columns. The columns are labeled V1, V2, V3, V4, Q1_ZIP, Q2_Gen der, Q3_Birth, and Q4_HighSchool. The data rows show various values, including 'Default Response Set', dates, and numerical values.

	V1	V2	V3	V4	Q1_ZIP	Q2_Gen der	Q3_Birth	Q4_HighSchool	
1	Default Response Set	12-Fe...	12-Fe...	1	27606	2	29		5
2	Default Response Set	12-Fe...	12-Fe...	1	27606	2	26		9
3	Default Response Set	12-Fe...	12-Fe...	1	27606	1	30 all		all
4	Default Response Set	12-Fe...	12-Fe...	1	27612	2	54 1974		197
5	Default Response Set	12-Fe...	12-Fe...	1	27616	2	20 4		4
6	Default Response Set	12-Fe...	12-Fe...	1	27610	1	22 4		6
7	Default Response Set	12-Fe...	12-Fe...	1	27606	1	26 1999		200
8	Default Response Set	12-Fe...	12-Fe...	1	80228	2	22 2009		201
9	Default Response Set	12-Fe...	12-Fe...	1	27603	1	24		
10	Default Response Set	12-Fe...	12-Fe...	1	27606	1	24		
11	Default Response Set	15-Fe...	15-Fe...	1	27606	1	23 4		6
12	Default Response Set	15-Fe...	15-Fe...	1	27603	1	25 4		8

Food availability/shortage

DATA COLLECTION SOFTWARE - QUALTRICS

The screenshot displays the Qualtrics Survey Software interface. At the top, there is a navigation bar with tabs for 'My Surveys', 'Create Survey', 'Edit Survey', 'Distribute Survey', 'View Results', 'Polls', 'Library', 'Panels', and 'Reporting'. Below this is a toolbar with icons for 'Look & Feel', 'Survey Options', 'Survey Flow', 'Print Survey', 'Spell Check', 'Preview Survey', and 'Launch Survey'. A search bar and 'Advanced Options' dropdown are also present.

The main content area shows the 'Consumer3' survey. A red banner at the top of the survey area states: "This survey has been taken 1 times. Editing could invalidate the results! [Learn More](#)". Below this is a 'Default Question Block' containing three questions:

- Q1:** "What is the ZIP/postal code of your current residence?" (Text input field)
- Q2:** "What is your gender?" (Radio buttons for Male and Female)
- Q3:** "What is your year of birth?" (Year dropdown menu)

On the right side, there is a configuration panel for the selected question (Q2). It includes options for 'Change Item Type' (set to Multiple Choice), 'Choices' (set to 2), 'Automatic Choices', 'Answers' (set to Single Answer), 'Position' (set to Vertical), 'Validation Options' (checked for Force Response), and 'Validation Type' (set to None). A sidebar on the right contains various actions like 'Add Page Break', 'Add Display Logic', 'Add Skip Logic', 'Copy Question', 'Move Question', and 'Preview Question'.

The bottom of the screen shows a Windows taskbar with icons for Internet Explorer, File Explorer, and several office applications. The system tray in the bottom right corner shows the time as 8:46 AM on 4/1/2013.

QUESTIONNAIRE

North Carolina State University

NCSU No Header

General

Fonts

Colors

Advanced

Next Button Text: >>

Back Button Text: <<

Progress Bar: With Text

Questions Per Page: 3

Highlight Questions

Question Separator

Evaluate your level of concern about the following topics.

	Not at all Concerned	A Little Concerned	Neutral	Concerned	Extremely Concerned
Pollutants in the environment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Increasing global population	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Food availability/shortage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Energy availability for the future generations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Global climate change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Greenhouse gas emissions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decreasing fossil energy reserves	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
U.S. dependence on foreign oil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price of transportation fuels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The price of energy (e.g., electricity, natural gas, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
General unemployment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Rural unemployment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Livelihood of farmers and forest landowners	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Local economy of my region	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

0% 100%

CORE

Q1 What is the ZIP/postal code of your current residence?

Q2 What is your gender?

Q3 What is your year of birth?

Q5 Where do you get your information about energy?

- Magazines or Newspapers (1)
- Government Websites (2)
- Radio or Television (3)
- Non-profit organizations (website or on-site) (4)
- Word of mouth or Social Networks (e.g. Facebook, Twitter, MySpace) (5)
- I am not interested in energy (6)
- Other (7)

	Not at all concerned (1)	Moderately concerned (2)	Neutral (3)	Concerned (4)	Extremely concerned (5)
Pollutants in the environment (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Energy availability for the future generations (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Global climate change (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
U.S. dependence on foreign oil (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price of transportation fuels (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The price of energy (e.g., electricity, natural gas, etc.) (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
National unemployment rate (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regional unemployment rate (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 Please rate your relative agreement of the following statements considering biofuels for transportation ((1) Strongly disagree; (2) Disagree; (3) Neither disagree nor agree; (4) Agree; (5) Strongly agree)

	Strongly disagree (1)	Disagree (2)	Neither Agree nor Disagree (3)	Agree (4)	Strongly Agree (5)
I think biofuel industry will improve the rural economy (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think biofuel is good for national security (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Using bio-based fuels will reduce dependence on foreign oil (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that investment in biofuel industry will create jobs (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Biofuels can be produced economically (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe biofuel industry will have more benefit than risks for the society (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would only purchase biofuels if they were available at most or all gas stations (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would only purchase biofuels if they were the same price as gasoline (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand that biofuels can be produced from forest or crop residues (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understand that in the southeast US biofuels can be produced from purpose grown energy crops without impacting native forest ecosystems (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Questions on:

- Demographics
- Environmental consciousness
- Biofuel