Science Roadmap for Agriculture Survey

Executive Summary
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Four Major Objectives of the Survey

➢ Assess the level of priority for each challenge and their respective four sub-challenges.

Low Priority			High Priority	
1	2	3	4	5
○	○	○	○	○

➢ Assess allocation of resources over the next 5 years for each of these challenges.

Less Resources		No Change	More Resources	
1	2	3	4	5
○	○	○	○	○

➢ Identify the disciplines where the current capacity was most restricting research progress on addressing these challenges.

1	2	3	4	5	6	7
Develop new & more competitive crop products	Develop new products & uses for animals	Lessen the risks of climatic change on food, fiber, & fuel	Improve environmental stewardship	Improve economic return to ag producers	Strengthen our communities and families	Improved food safety and health thru agrifood sys
□	□	□	□	□	□	□

➢ Identify institutions or groups that were most influential in prioritizing Experiment Station efforts.

2004						2010				
Least				Most		Least				Most
1	2	3	4	5		1	2	3	4	5
○	○	○	○	○		○	○	○	○	○

Sample Characteristics

➢ Out of 300 potential respondents, 95 completed the online survey, representing a 31.7% response rate.

➢ The average age of the respondent was 54 years. The sample was primarily male (89.2%) with 10.8% female.

➢ Almost half of the sample had an affiliation with an Experiment Station (48.4%) with the remaining respondents affiliated with Extension (29.5%) or an Academic program (22.1%).

➢ The average years of affiliation was 19.1 years.

ACOP, 17.9%
ESCOP, 49.5%
ECOP, 32.6%
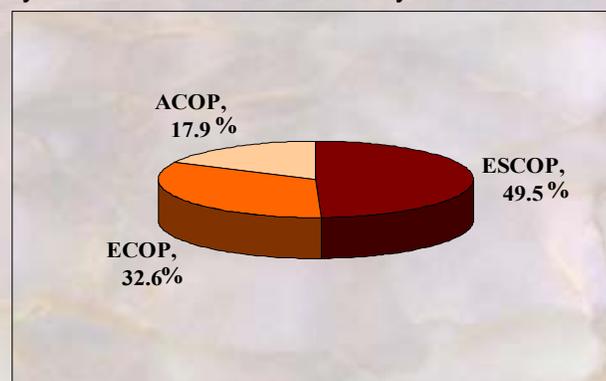
Assessment of the level
of priority for each challenge
and their respective four sub-challenges

Rank Order of Priority and Allocation Means
of the Seven Major Challenges.

Challenge	Priority Mean	Significantly Different Groups					Allocation Mean
7. We can ensure improved food safety and health through agriculture & food systems	4.53						4.19
4. We can provide information & knowledge needed to further improve environmental stewardship	4.40						4.10
5. We can improve economic return to agricultural producers	4.20						3.89
6. We can strengthen our communities & families	4.12						3.91
1. We can develop new & more competitive crop products & new uses for diverse crops & novel plant species	3.96						3.65
3. We can lessen risks of local & global climatic change on food, fiber, & fuel production	3.65						3.32
2. We can develop new products & new uses for animals	3.40						3.20

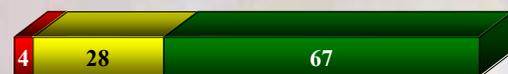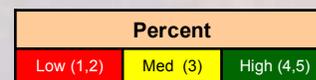# 7. We can ensure improved food safety & health through agriculture & food systems

Primary Challenge	Mean
We can ensure improved food safety & health through agriculture & food systems	4.53

Sub-Challenges	Mean
4. Eliminating food-borne illnesses	4.40
2. Developing technologies to create health-promoting foods	4.23
1. Improving nutritional value of foods	4.19
3. Discovering better educational methods to help individuals make informed food choices	4.16

Percent

| Low (1,2) | Med (3) | High (4,5) |

Primary Challenge: 1 | 5 | 94
4. Eliminating food-borne illnesses: 1 | 11 | 88
2. Developing technologies: 4 | 12 | 84
1. Improving nutritional value: 3 | 17 | 80
3. Discovering better educational methods: 4 | 14 | 82
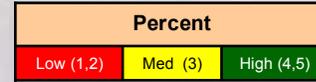
*Colors denote significantly different means

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4. We can provide information & knowledge needed to further improve environmental stewardship

Primary Challenge	Mean
We can provide information & knowledge needed to further improve environmental stewardship	4.40

Sub-Challenges	Mean
1. Developing better methods to protect environment both on & beyond farm from any negative impacts of agriculture through optimum use of cropping systems including agro-forestry, phyto-remediation, & site-specific management	4.28
3. Finding alternative uses for wastes generated by agriculture	4.28
2. Decreasing our dependence on chemicals with harmful effects to people & environment by optimizing their use in effective crop, weed, pest, & pathogen management strategies	4.22
4. Developing better economic models & incentive to assure that environmental stewardship is encouraged	3.99

Percent

| Low (1,2) | Med (3) | High (4,5) |

Primary Challenge: 1 | 8 | 91
1. Developing better methods: 3 | 9 | 88
3. Finding alternative uses: 4 | 8 | 87
2. Decreasing dependence on chemicals: 4 | 12 | 84
4. Developing better economic models: 4 | 28 | 67

5. We can improve economic return to agricultural producers

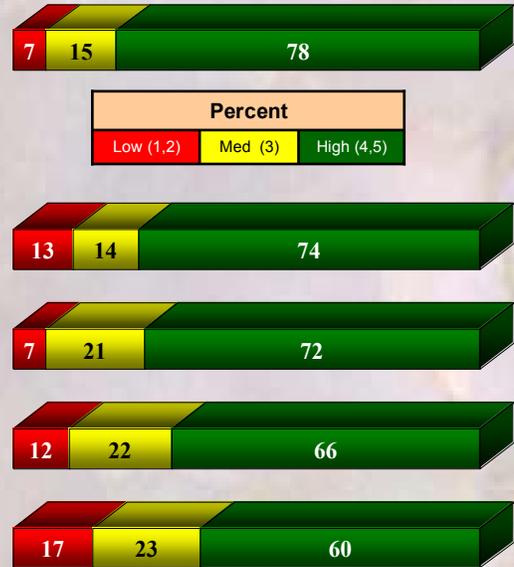| Primary Challenge	Mean
We can improve economic return to agricultural producers	4.20
Sub-Challenges	**Mean**
2. Developing sustainable production systems that are profitable & protective of environment, including ways to optimize integration of crop & livestock production systems	4.32
3. Developing better understanding of how local, regional, national, & global food economies affect economic return to agricultural producers in U.S.	3.89
1. Designing improved decision support systems for risk-based management farming (small-, medium-, & large-scale)	3.83
4. Finding ways to improve strategies for community-supported food production systems	3.68

Percent: Low (1,2) | Med (3) | High (4,5)

- 2 | 16 | 82
- 2 | 13 | 85
- 6 | 32 | 62
- 8 | 22 | 70
- 15 | 22 | 63
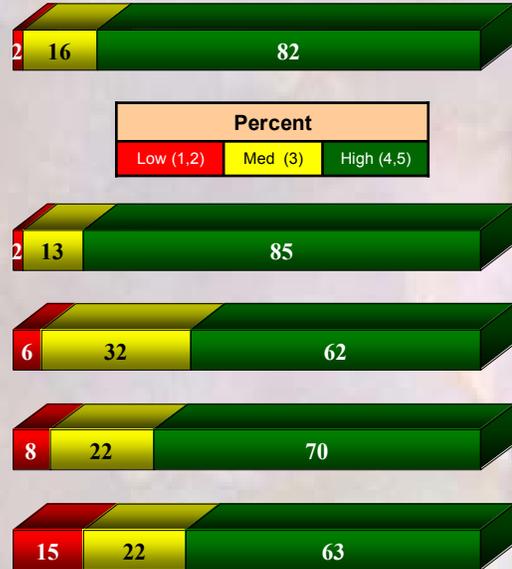
6. We can strengthen our communities & families

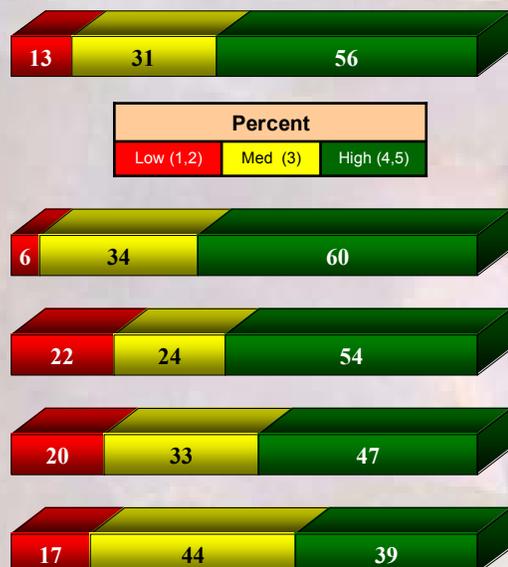| Primary Challenge	Mean
We can strengthen our communities & families	4.12
Sub-Challenges	**Mean**
2. Stimulating entrepreneurship & business development in rural communities & new forms of economic activity built around regional trade associations, rural cooperatives, & local production networks	4.25
3. Building new coalitions among environmental, labor, & community development groups to facilitate democratic social change to ensure that families have access to food, health care, education, & welfare services	3.89
1. Enhancing problem-solving capacities of rural communities through leadership development	3.76
4. Determining strategies to enhance well-being of families & individuals	3.76

Percent: Low (1,2) | Med (3) | High (4,5)

- 4 | 19 | 77
- 2 | 12 | 86
- 10 | 14 | 76
- 12 | 22 | 66
- 12 | 24 | 64

1. We can develop new & more competitive crop products & new uses for diverse crops & novel plant species

Primary Challenge	Mean
We can develop new & more competitive crop products & new uses for diverse crops & novel plant species	3.96

Sub-Challenges	Mean
2. Conceiving new markets for new plant products & new uses for these crops	3.93
3. Developing technologies to improve the processing efficiency of crop bio-products	3.93
4. Supporting the development of marketing infrastructure for crop bio-products	3.77
1. Improving crop biomass quantities, qualities & agricultural production efficiencies	3.59

Primary Challenge bar: 7 | 15 | 78

Percent legend: Low (1,2) | Med (3) | High (4,5)

Sub-Challenge bars:
- 13 | 14 | 74
- 7 | 21 | 72
- 12 | 22 | 66
- 17 | 23 | 60

3. We can lessen risks of local & global climatic change on food, fiber, & fuel production

Primary Challenge	Mean
We can lessen risks of local & global climatic change on food, fiber, & fuel production	3.65

Sub-Challenges	Mean
1. Diminishing rate of long-term global change by increasing storage of carbon & nitrogen in soil, plants, & plant products	3.61
4. Creating broad-based, comprehensive models to assess socio-economic impacts, risks, & opportunities associated with global climate change & extreme climate events in agriculture	3.43
3. Integrating long-term weather forecasting, market infrastructures, & cropping & livestock management systems to rapidly optimize domestic food, fiber, & fuel production in response to global climatic changes	3.37
2. Minimizing effects of long-term global climatic changes on production of crops & livestock	3.27

Primary Challenge bar: 13 | 31 | 56

Percent legend: Low (1,2) | Med (3) | High (4,5)

Sub-Challenge bars:
- 6 | 34 | 60
- 22 | 24 | 54
- 20 | 33 | 47
- 17 | 44 | 39

2. We can develop new products & new uses for animals

Primary Challenge	Mean
We can develop new products & new uses for animals	3.40
Sub-Challenges	**Mean**
3. Developing innovative technologies to reduce impact of animal agriculture on environment	4.40
2. Enhancing the value of food & other animal products for both producer & consumer by using conventional & newly developed technologies that are socially & ethically acceptable	3.84
4. Developing new & enhanced technologies for improved efficiency & welfare of animals that are processed for food	3.51
1. Improving conventional technologies as well as developing new technologies to improve the efficiency of animal production	3.32

Percent
Low (1,2) Med (3) High (4,5)

18 31 51

2 7 91

11 18 72

17 36 47

20 35 45
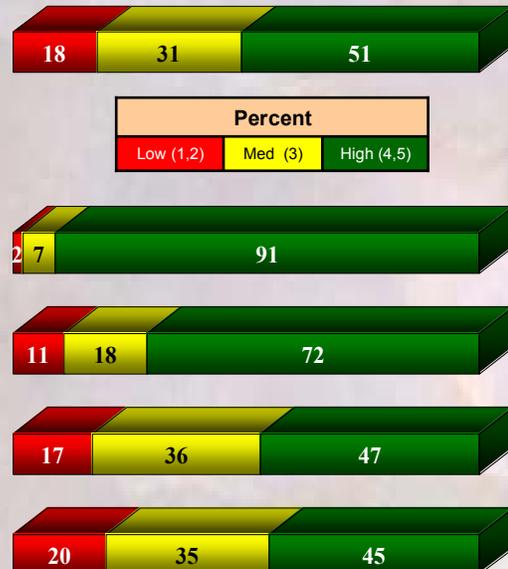
Summary for Objective #1:
Assess the level of priority for each challenge and their respective four sub-challenges

Low, medium & high groupings of the major challenges:
- Food safety (#7) and Environmental stewardship (#4)
  received the highest priorities.
- Economic return to Ag producers (#5), Strengthening communities & families (#6)
  and Competitive Crops (#1) were moderate.
- Lessening risks of climatic change (#3) and New uses for animal products (#2)
  received the lowest priority.

Most Important sub-challenges:
- Eliminating food-borne illnesses for #7.
- Protecting the environment, New uses for wastes, and
  Decreasing chemicals for #4
- Developing sustainable production for #5
- Stimulating business for rural communities for #6
- Conceiving new markets and Developing processing technologies for #1
- Increasing storage of carbon & nitrogen in soil & plants for #3
- Reduce impact of animal agriculture on environment (highest overall sub-challenge)
  and Enhancing the value of food & other animal products for #2
  (Both were above their primary challenge).

Allocation of resources
over the next 5 years
for each of these challenges

Priority and Allocation Percentages
of the Seven Major Challenges

Priority

Challenge	Low (1,2)	Med (3)	High (4,5)
# 7 Food Safety	1	5	94
# 4 Environment	1	8	91
# 5 Ag Producers	2	16	82
# 6 Comm/Family	4	19	77
# 1 Crop Products	7	15	78
# 3 Climate	13	31	56
# 2 Animal	18	31	51

Percent
- Low (1,2)
- Med (3)
- High (4,5)

Challenge	Less (1,2)	Same (3)	More (4,5)
# 7 Food Safety	2	15	83
# 4 Environment	0	17	83
# 5 Ag Producers	2	31	67
# 6 Comm/Family	7	27	66
# 1 Crop Products	7	33	60
# 3 Climate	19	39	42
# 2 Animal	17	47	36

Percent
- Less (1,2)
- Same (3)
- More (4,5)

Allocation of Resources

Summary for Objective #2:
Assess allocation of resources over the next 5 years for each of these challenges

Allocation of resources took on a similar pattern to their priority levels

➢Over 80% felt more was needed for Food safety (#7) and
Environmental stewardship (#4)

➢About two-thirds felt more was needed for Economic return to Ag producers (#5),
Strengthening communities & families (#6) and Competitive Crops (#1)
while about a third felt it should remain the same.

➢Less than half felt Lessening risks of climatic change (#3) and New uses for animal
products (#2) should be increased, with almost as many reporting it should
remain the same and another 20% feeling they should be reduced..

Suggestions for New Challenges
for the ESCOP Roadmap

Conservation & Energy
➢Soil, water, air, energy conservation, forestry land use policy,
valuating non-commodity ag & forest lands, Energy crops &
renewables, bio-based fuels

International & Security Concerns
➢Effects of globalization, International trade, policy &
competition, Agro-security, Dealing with bioterrorism

Human Development
➢4-H and youth development, Consumer education, Leadership
development, Urban environmental and agricultural education,
Extension education for both consumers and producers

Disciplines where current capacity was restricting research progress on addressing these challenges

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Mean Number of Disciplines Affecting The Major Challenge Areas

Major Challenge Area	Mean Number of Disciplines			
	Total	Biological	Physical	Social
#4 Environment	7.2	2.7	2.3	2.2
#7 Food Safety	6.4	4.1	0.8	1.6
#1 Crops	5.9	3.7	1.0	1.2
#5 Ag Producers	4.9	2.1	1.1	1.7
#3 Climate	4.9	1.9	1.9	1.1
#2 Animals	4.8	3.1	0.7	1.0
#6 Community/Family	4.5	1.2	0.7	2.7

➢Challenge #4 had the highest mean number of disciplines, crossing the fields of biological, physical, and social sciences

➢Challenges #7 and #1 were also significantly higher yet primarily within the biological sciences

Top reported disciplines by ranked challenge areas.

Discipline	Food #7	Environ #4	AgProd #5	ComFam #6	Crops #1	Climate #3	Animal #2
Economics		31.6%	47.4%	42.1%	29.5%		
Information- Communication	36.8%	41.1%	30.5%	45.3%			
Education	33.7%	33.7%		43.2%			
Molecular biology					42.1%		34.7%
Nutrition- Metabolism	46.3%						
Ecology		46.3%					
Sociology				44.2%			
Hydrology		40.0%					
Meteorology- Climatology						35.8%	
Biochemistry- Biophysics					34.7%		
Genetics (breeding)					33.7%		32.6%
Bacteriology	33.7%						
Engineering		33.7%					
Management			32.6%				
Statistics- Econometrics -Biometrics			30.5%				
Cellular biology					30.5%		
Ecology						30.5%	
Biology (whole systems)		29.5%					

Summary for Objective #3:
Identify the disciplines where the current capacity was most restricting research progress on addressing these challenges

➢ **Disciplines affecting multiple challenges:**
  Economics, (#4,#5,#6,#1)
  Information-Communication (#7,#4,#6)
  Education (#7,#4,#6)
  Molecular biology (#1, #2)

➢ **Over 40% reported in a single challenge:**
  Nutrition-Metabolism (#7), Ecology & Hydrology (#4), Sociology (#6)

➢ **30%-40% reported in a single challenge:**
  Bacteriology (#7)
      Engineering & Biology (#4)
  Management, Statistics-Econometrics–Biometrics (#5)
  Biochemistry-Biophysics, Genetics, & Cellular biology, (#1)
  Meteorology-Climatology & Ecology (#3)

Most influential institutions
in prioritizing
Experiment Station efforts

Ranking of Institutions and Groups by
Mean Influence for 2004 & 2010

Rank	2004	Mean	2010	Mean
1	Commodity groups	4.19	State Legislature	3.84
2	Farmers & rancher groups	3.97	Environmental groups	3.80
3	State Legislature	3.72	Agribusinesses	3.76
4	USDA	3.69	Food safety groups	3.69
5	Agribusinesses	3.63	Commodity groups	3.69
6	Congress	3.51	Congress	3.58
7	Environmental groups	2.99	Farmers & rancher groups	3.47
8	Public trade policy	2.91	Public trade policy	3.43
9	Food safety groups	2.86	Urban consumers	3.41
10	Urban consumers	2.62	USDA	3.38
11	Rural development groups	2.60	Rural development groups	3.25
12	University Presidents	2.51	Middle class consumers	3.14
13	Middle class consumers	2.48	Food Retailers	3.08
14	Food Retailers	2.33	University Presidents	2.75
15	Poorer consumers	1.90	Poorer consumers	2.44

Change	
Decrease	
Same	
Increase	

Significant Relationships between Top 10 Institution Priorities 2010 and the Challenge & Sub-challenge Priorities

Rank	2010	Food #7	Environ #4	AgProd #5	ComFam #6	Crops #1	Climate #3	Animal #2
1	State Legislature	7-1		5-4		**P#1** 1-1	3-3	**P#2** 2-1
2	Environmental groups					1-2		
3	Agribusinesses	7-2 7-1	4-2 4-3 4-4		6-1 6-4	**P#1** 1-2 1-4	3-2 3-4	**P#2** 2-1 2-2
4	Food safety groups	**P#7** 7-4		5-1	6-1 6-4		3-2 3-3	2-2
5	Commodity groups	**P#7**	4-1	**P#5**		**P#1**		
6	Congress							
7	Farmers & rancher groups		4-2 4-3			**P#1** 1-3	3-2	2-1 2-2 2-3
8	Public trade policy	7-1		5-3			3-2 3-3	2-2
9	Urban consumers	7-1 7-4			**P#6** 6-1 6-4	**P#1** 1-1 1-2	3-3	**P#2** 2-4
10	USDA		4-4					
11	Rural development groups		4-2 4-3 4-4	5-4	**P#6** 6-1 6-2 6-3 6-4	1-2 1-3	3-3 3-4	

Summary for Objective #4:
Identify institutions or groups that were most influential in prioritizing Experiment Station efforts

➢**Top 6 in 2004:** Commodity groups, Farmers & rancher groups, State Legislature, USDA, Agribusinesses, & Congress

➢**Top 6 predicted for 2010:** State Legislature, Environmental groups, Agribusinesses, Food safety groups, Commodity groups and Congress

➢**Top Influences with little change:** State Legislature, Congress & Agribusinesses

➢**Increase in 2010:** Environmental groups, Urban consumers, Food safety groups, Rural development groups, Middle class consumers, Food Retailers & Public trade policy groups

➢**Decrease from 2004:** Farmers & rancher groups, Commodity groups, & USDA

Summary for Science Roadmap for Agriculture Survey

➢ All challenges and their sub-challenges received above average ratings for both priority and allocation of resources denoting their continued relevance to addressing the issues of today.

➢ Primary emphasis is on food safety & environmental stewardship followed by economic return to ag producers, strengthening families & developing crops. Less support is found for challenges related to climate and new uses for animals.   The exception being when the latter focuses on environmental stewardship.

➢ Suggestions for new challenges also focused on issues of food safety (ie. Agri-security & bioterrorism) & environmental stewardship (i.e conservation & land use).   Areas of human development were also suggested (i.e, 4H, extension, & ag education)

Summary for Science Roadmap for Agriculture Survey (continued)

➢ Each major challenge is affected by their respective disciplines
  Molecular biology: Crops (#1) & Animals (#2)
  Meteorology: Climate (#3)
  Nutrition: Food Safety (#4)
  Management, Statistics: Economic Return (#5)
  Sociology, Education: Community & Family (#6)
  Ecology: Environment (#7)

➢ However across the challenges, the success of meeting these seem to depend heavily on disciplines in the social sciences such as economics, information-communication, education & sociology.

Summary for Science Roadmap for Agriculture Survey (continued)

➢ State Legislature, Congress, and Agribusinesses will continue to exert their influences on the priorities of Experiment Stations and are related to the priority levels of both Crops #1 & Animals #2 major challenges.

➢ In addition, Environmental and Food Safety groups are expected to increase in their influence over the next five years which are in line with the top two challenges Food Safety #7 and Environmental Stewardship #4.

➢ Commodity groups also play a strong role in Economic Return for Ag producers #5 as well as Crops #1 and Food Safety #7 in 2010.

Summaries for the Major Challenges and their Sub-challenges

Allocation & Priority Percentages

Correlates Between priorities

Top Disciplines Affecting Area

NEW Challenges
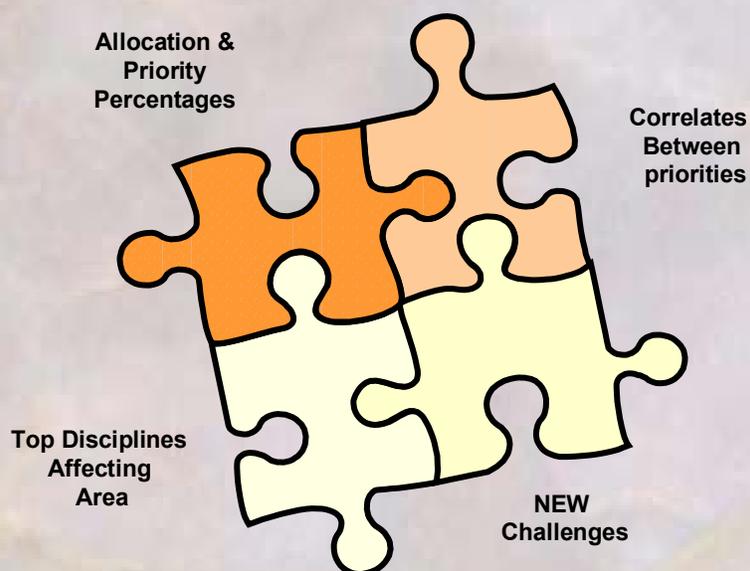
Summary for #7: We can ensure improved food safety & health through agriculture & food systems

Allocation-Priority Percentages

A-#7	2	15	83
P-#7	5	94	
7-4	1	11	88
7-2	4	12	84
7-1	3	17	80
7-3	4	14	82
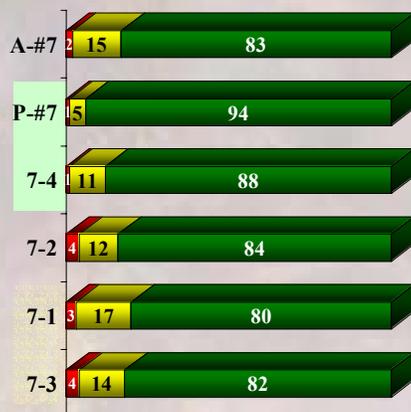
Top Disciplines Affecting Area	Percent
Nutrition- Metabolism	46.3%
Information- Communication	36.8%
Bacteriology	33.7%
Education	33.7%

Correlates between priorities

Institution/Group	P#7	7-4	7-2	7-1	7-3
#1 State Legislature '04 '10				ns .21	
#3 Agri-businesses			.24 .27	.24 .27	
#4 Food safety groups	ns .22		ns .33		
#5 Commodity groups	ns .24				
#8 Public Trade Policy				ns .26	
#9 Urban Consumers			ns .22	ns .28	
#15 Poorer consumers	ns .22				ns .28

NEW Challenges: Agro-security; Dealing with bioterrorism

Summary for # 4: We can provide information & knowledge needed to further improve environmental stewardship

A-#4	17	83	
P-#4	8	91	
4-1	3	9	88
4-3	4	8	87
4-2	4	12	84
4-4	4	28	67

Top Disciplines Affecting Area	Percent
Ecology	46.3%
Information- Communication	41.1%
Hydrology	40.0%
Education	33.7%
Engineering	33.7%
Economics	31.6%
Biology (whole systems)	29.5%

Institution/Group	P#4	4-1	4-3	4-2	4-4
#3 Agri-businesses '04 '10			ns .21	ns .21	ns .24
#5 Commodity groups			ns .21		
#7 Farmer/ rancher			.25 .26	.26 .31	
#10 USDA					ns -.22
#11 Rural Development			ns .26	ns .24	ns .26
#12 Middle class consumers			.23 ns		ns .26
#14 University Presidents			ns .22		

NEW: Soil, water, air, energy conservation; forestry land use policy; valuating non-commodity ag & forest lands; Urban environmental and agricultural education

Summary for # 5: We can improve economic return to agricultural producers

Chart bars (A-#5, P-#5, 5-2, 5-3, 5-1, 5-4)
A-#5: 2 / 31 / 67
P-#5: 2 / 16 / 82
5-2: 2 / 13 / 85
5-3: 6 / 32 / 62
5-1: 8 / 22 / 70
5-4: 15 / 22 / 63
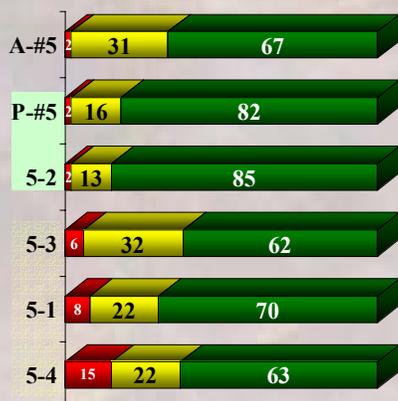
Top Disciplines Affecting Area	Percent
Economics	47.4%
Management	32.6%
Information- Communication	30.5%
Statistics- Econometrics - Biometrics	30.5%

Institution/Group	P#5	5-2	5-3	5-1	5-4
#1 State Legislature '04 '10			-.25 ns		-.25 -.23
#4 Food safety groups				ns .22	
#5 Commodity Groups	ns .27				
#8 Public Trade Policy			ns .28		
#11 Rural Development					ns .23
#12 Middle class consumers				ns .27	
#14 University Presidents	ns .24				.22 .24
#15 Poorer Consumers	.26. 27			ns .33	

NEW: Effects of globalization; International trade, policy & competition

Summary for # 6: We can strengthen our communities & families

Chart bars (A-#6, P-#6, 6-2, 6-3, 6-1, 6-4)
A-#6: 7 / 27 / 66
P-#6: 4 / 19 / 77
6-2: 2 / 12 / 86
6-3: 10 / 14 / 76
6-1: 12 / 22 / 66
6-4: 12 / 24 / 64

Top Disciplines Affecting Area	Percent
Information- Communication	45.3%
Sociology	44.2%
Education	43.2%
Economics	42.1%

Institution/Group	P#6	6-2	6-3	6-1	6-4
#3 Agri-businesses '04 '10				ns .30	ns .24
#4 Food safety groups				ns .22	ns .28
#7 Farmer/ ranchers				.22 ns	
#9 Urban consumers	ns .26			ns .21	ns .23
#11 Rural Development	ns .24	ns .26	ns .21	ns .35	.22 .35
#12 Middle class consumers					ns .24
#15 Poorer consumers	ns .31	ns .30			ns .23

NEW: 4-H and youth development; Consumer education; Leadership development; Extension education for both consumers and producers

Summary for # 1. We can develop new & more competitive crop products & new uses for diverse crops & novel plant species

A-#1	7	33	60
P-#1	7	15	78
1-2	13	14	74
1-3	7	21	72
1-4	12	22	66
1-1	17	23	60

Top Disciplines Affecting Area	Percent
Molecular biology	42.1%
Biochemistry- Biophysics	34.7%
Genetics (breeding)	33.7%
Cellular biology	30.5%

NEW: Energy crops & renewables, bio-based fuels

Institution/Group	P#1	1-2	1-3	1-4	1-1
#1 State Legislature '04 '10	.28 .33				ns .21
#2 Environmental groups		-.22 -.26	-.22 ns		
#3 Agri-businesses	.31 .33	ns .26		ns .26	
#5 Commodity groups	ns .25				
#7 Farmer/ranch	.37 .29	.30 ns	.20 .26		.22 ns
#9 Urban consumers	.21 .21	ns .22			ns .21
#11 Rural Development		ns .26	ns .23		
#12 Middle class consumers				ns .24	
#14 University Presidents		.28 .33	.30 .21		
#15 Poorer consumers	.22 ns				

Summary for # 3: We can lessen risks of local & global climatic change on food, fiber, & fuel production

A-#3	19	39	42
P-#3	13	31	56
3-1	6	34	60
3-4	22	24	54
3-3	20	33	47
3-2	17	44	39

Top Disciplines Affecting Area	Percent
Meteorology- Climatology	35.8%
Ecology	30.5%

NEW: "Climate change as a result of agricultural production is a theory not a proven fact and I personally do not think we should be discussing this and pooling resources in this area. "

Institution/Group	P#3	3-1	3-4	3-3	3-2
#1 State Legislature '04 '10				.26 .23	
#2 Environmental groups			ns		
#3 Agri- businesses			ns .23		.23 .26
#4 Food safety groups				ns .27	.24 .27
#7 Farmer/ranchers					ns .21
#8 Public Trade Policy				ns .26	.24 .28
#9 Urban consumers				ns .21	.23 ns
#11 Rural Development			ns .25	ns .24	
#12 Middle class consumers					.31 ns
#13 Food Retailers			ns .23	ns .22	.23 ns
#15 Poorer consumers	ns .22			ns .24	ns .22

Summary for # 2: We can develop new products & new uses for animals

Bar chart values:
- A-#2: 17 | 47 | 36
- P-#2: 18 | 31 | 51
- 2-3: 2 | 7 | 91
- 2-2: 11 | 18 | 72
- 2-4: 17 | 36 | 47
- 2-1: 20 | 35 | 45

Top Disciplines Affecting Area	Percent
Molecular biology	34.7%
Genetics (breeding)	32.6%

Institution/Group	P#2	2-3	2-2	2-4	2-1
#1 State Legislature '04 '10	ns .23				.22 .21
#3 Agri-businesses	ns .25		ns .24		ns .29
#4 Food safety groups			ns .30		
#7 Farmer/ranchers		.22 .26	ns .21		ns .25
#8 Public Trade Policy			ns .20		
#9 Urban consumers	ns .26		ns	ns .24	
#10 USDA					.25 ns
#12 Middle class consumers	.24 .21	ns .29	ns .27	ns .21	
#15 Poorer consumers		ns .24	ns .24	ns	
#14 University Presidents		ns .24		ns .22	ns .23

Original Survey with Means, Standard Deviations, and Percentages for each question

ESCOP Survey

SECTION ONE: The following statements assessed each of the seven challenges of the 2001 report as well as their sub areas for scientific focus.   We asked respondents to indicate their opinion of the degree of priority for each of the seven areas and each of their sub areas of focus. Each Challenge area has a table of means, standard deviations, and percentages for each category (ranging from Low Priority,1 to High Priority ,5)

Challenge #1			Low Priority				High Priority
Primary Challenge	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
We can develop new & more competitive crop products & new uses for diverse crops & novel plant species	3.96	0.91	2.1%	5.3%	14.7%	50.5%	27.4%
Sub-Challenges	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
1. Improving crop biomass quantities, qualities & agricultural production efficiencies	3.59	1.08	4.2%	12.6%	23.2%	40.0%	20.0%
2. Conceiving new markets for new plant products & new uses for these crops	3.93	1.07	3.2%	9.5%	13.7%	38.9%	34.7%
3. Developing technologies to improve the processing efficiency of crop bio-products	3.93	0.96	2.1%	5.3%	21.1%	41.1%	30.5%
4. Supporting the development of marketing infrastructure for crop bio-products	3.77	1.09	5.3%	6.3%	22.1%	38.9%	27.4%

Challenge #2			Low Priority				High Priority
Primary Challenge	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
We can develop new products & new uses for animals	3.40	0.98	3.2%	15.1%	31.2%	39.8%	10.8%
Sub-Challenges	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
1. Improving conventional technologies as well as developing new technologies to improve the efficiency of animal production	3.32	1.08	6.4%	13.8%	35.1%	30.9%	13.8%
2. Enhancing the value of food & other animal products for both producer & consumer by using conventional & newly developed technologies that are socially & ethically acceptable	3.84	0.97	2.1%	8.4%	17.9%	46.3%	25.3%
3. Developing innovative technologies to reduce impact of animal agriculture on environment	4.40	0.76	1.1%	1.1%	7.4%	37.9%	52.6%
4. Developing new & enhanced technologies for improved efficiency & welfare of animals that are processed for food	3.51	1.03	1.1%	15.8%	35.8%	26.3%	21.1%

Challenge #3			Low Priority				High Priority
Primary Challenge	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
We can lessen risks of local & global climatic change on food, fiber, & fuel production	3.65	1.03	2.2%	10.8%	31.2%	32.3%	23.7%
Sub-Challenges	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
1. Diminishing rate of long-term global change by increasing storage of carbon & nitrogen in soil, plants, & plant products	3.61	0.81	2.1%	4.3%	34.0%	50.0%	9.6%
2. Minimizing effects of long-term global climatic changes on production of crops & livestock	3.27	0.95	4.2%	12.6%	44.2%	29.5%	9.5%
3. Integrating long-term weather forecasting, market infrastructures, & cropping & livestock management systems to rapidly optimize domestic food, fiber, & fuel production in response to global climatic changes	3.37	1.01	3.2%	16.8%	32.6%	34.7%	12.6%
4. Creating broad-based, comprehensive models to assess socio-economic impacts, risks, & opportunities associated with global climate change & extreme climate events in agriculture	3.43	1.09	4.2%	17.9%	24.2%	37.9%	15.8%

Challenge #4			Low Priority				High Priority
Primary Challenge	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
We can provide information & knowledge needed to further improve environmental stewardship	4.40	0.69	0.0%	1.1%	8.4%	40.0%	50.5%
Sub-Challenges	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
1. Developing better methods to protect environment both on & beyond farm from any negative impacts of agriculture through optimum use of cropping systems including agro-forestry, phyto-remediation, & site-specific management	4.28	0.75	0.0%	3.2%	8.5%	45.7%	42.6%
2. Decreasing our dependence on chemicals with harmful effects to people & environment by optimizing their use in effective crop, weed, pest, & pathogen management strategies	4.22	0.86	1.1%	3.2%	11.7%	40.4%	43.6%
3. Finding alternative uses for wastes generated by agriculture	4.28	0.83	1.1%	3.2%	8.4%	41.1%	46.3%
4. Developing better economic models & incentive to assure that environmental stewardship is encouraged	3.99	0.94	1.1%	3.2%	28.4%	30.5%	36.8%

Challenge #5			Low Priority				High Priority
Primary Challenge	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
We can improve economic return to agricultural producers	4.20	0.82	1.1%	1.1%	16.0%	40.4%	41.5%
Sub-Challenges	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
1. Designing improved decision support systems for risk-based management farming (small-, medium-, & large-scale)	3.83	0.94	2.1%	6.3%	22.1%	45.3%	24.2%
2. Developing sustainable production systems that are profitable & protective of environment, including ways to optimize integration of crop & livestock production systems	4.32	0.78	0.0%	2.1%	12.6%	36.8%	48.4%
3. Developing better understanding of how local, regional, national, & global food economies affect economic return to agricultural producers in U.S.	3.89	0.95	0.0%	6.3%	31.6%	28.4%	33.7%
4. Finding ways to improve strategies for community-supported food production systems	3.68	1.08	4.2%	10.5%	22.1%	38.9%	24.2%

Challenge #6			Low Priority				High Priority
Primary Challenge	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
We can strengthen our communities & families	4.12	0.90	1.1%	3.2%	19.1%	36.2%	40.4%
Sub-Challenges	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
1. Enhancing problem-solving capacities of rural communities through leadership development	3.76	1.11	6.3%	5.3%	22.1%	38.9%	27.4%
2. Stimulating entrepreneurship & business development in rural communities & new forms of economic activity built around regional trade associations, rural cooperatives, & local production networks	4.25	0.79	1.1%	1.1%	11.6%	44.2%	42.1%
3. Building new coalitions among environmental, labor, & community development groups to facilitate democratic social change to ensure that families have access to food, health care, education, & welfare services	3.89	1.06	5.3%	5.3%	13.7%	46.3%	29.5%
4. Determining strategies to enhance well-being of families & individuals	3.76	1.07	4.2%	7.4%	24.2%	36.8%	27.4%

Challenge #7			Low Priority				High Priority
Primary Challenge	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
We can ensure improved food safety & health through agriculture & food systems	4.53	0.65	0.0%	1.1%	5.3%	33.0%	60.6%
Sub-Challenges	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
1. Improving nutritional value of foods	4.19	0.87	1.1%	2.1%	16.8%	36.8%	43.2%
2. Developing technologies to create health-promoting foods	4.23	0.86	1.1%	3.2%	11.6%	40.0%	44.2%
3. Discovering better educational methods to help individuals make informed food choices	4.16	0.85	1.1%	3.2%	13.7%	43.2%	38.9%
4. Eliminating food-borne illnesses	4.40	0.76	1.1%	0.0%	10.5%	34.7%	53.7%

SECTION TWO: This section asked to indicate priorities **over the next five (5) years** for allocating resources to each of the seven challenge areas.

PRIORITIES OF CHALLENGES			Less Resources		Same		More Resources
Challenges	**Mean**	**Std**	**1**	**2**	**3**	**4**	**5**
1. We can develop new & more competitive crop products & new uses for diverse crops & novel plant species	3.65	0.91	3.2%	4.2%	32.6%	44.2%	15.8%
2. We can develop new products & new uses for animals	3.20	0.92	5.3%	11.6%	47.4%	29.5%	6.3%
3. We can lessen risks of local & global climatic change on food, fiber, & fuel production	3.32	0.95	2.1%	16.8%	38.9%	31.6%	10.5%
4. We can provide information & knowledge needed to further improve environmental stewardship	4.10	0.66	0.0%	0.0%	17.0%	56.4%	26.6%
5. We can improve economic return to agricultural producers	3.89	0.84	1.1%	1.1%	31.2%	40.9%	25.8%
6. We can strengthen our communities & families	3.91	0.95	0.0%	7.4%	26.6%	33.0%	33.0%
7. We can ensure improved food safety & health through agriculture & food systems	4.19	0.81	1.1%	1.1%	14.9%	43.6%	39.4%

If you were to add new challenges to the ESCOP Roadmap, what new challenges would you include?

Conservation & Energy
  ➤ Soil, water, air conservation, forestry land use policy, recycling organics, valuating non-commodity ag & forest lands, Energy crops & renewables, bio-based fuels, energy conservation

International & Security Concerns
  ➤ Effects of globalization, International trade, policy & competition, Food Safety, Agro-security, Dealing with bioterrorism

Human Development
  ➤ 4-H and youth development, Consumer education, Leadership development, Urban environmental and agricultural education, Extension education for both consumers and producers

SECTION THREE: For each Roadmap Challenge, the following percentages indicate the percent of the respondents who think a particular discipline area has a current capacity that is significantly *limiting or hindering* meeting that challenge.

DISCIPLINE AREAS	Develop new & more competitive crop products	Develop new products & uses for animals	Lessen the risks of climatic change on food, fiber, & fuel	Improve environmental stewardship	Improve economic return to ag producers	Strengthen our communities and families	Improved food safety and health thru ag/food sys
Biological	1	2	3	4	5	6	7
1. Biochemistry- Biophysics	**34.7%**	**25.3%**	18.9%	**20.0%**	6.3%	8.4%	**26.3%**
2. Nutrition- Metabolism	16.8%	17.9%	5.3%	5.3%	15.8%	13.7%	**46.3%**
3. Physiology	16.8%	**20.0%**	14.7%	6.3%	8.4%	7.4%	13.7%
4. Cellular biology	**30.5%**	22.1%	7.4%	7.4%	10.5%	5.3%	17.9%
5. Molecular biology	**42.1%**	**34.7%**	11.6%	11.6%	13.7%	4.2%	**23.2%**
6. Developmental biology	**23.2%**	**20.0%**	7.4%	7.4%	6.3%	7.4%	8.4%
7. Biology (whole systems)	**22.1%**	**21.1%**	**21.1%**	**29.5%**	16.8%	9.5%	18.9%
8. Ecology	9.5%	6.3%	**30.5%**	**46.3%**	12.6%	8.4%	7.4%
9. Genetics (breeding)	**33.7%**	**32.6%**	10.5%	11.6%	16.8%	4.2%	16.8%
10. Immunology	5.3%	15.8%	2.1%	1.1%	6.3%	5.3%	16.8%
11. Bacteriology	8.4%	9.5%	7.4%	8.4%	8.4%	6.3%	**33.7%**
12. Virology	11.6%	8.4%	5.3%	8.4%	7.4%	4.2%	**22.1%**
13. Mycology	8.4%	2.1%	4.2%	8.4%	7.4%	1.1%	16.8%
14. Other Microbiology	9.5%	3.2%	3.2%	7.4%	4.2%	0.0%	18.9%
15. Parasitology	4.2%	12.6%	3.2%	7.4%	6.3%	2.1%	12.6%
16. Nematology	17.9%	3.2%	5.3%	6.3%	13.7%	1.1%	5.3%
17. Entomology- Acarology	17.9%	8.4%	10.5%	13.7%	14.7%	2.1%	8.4%
18. Weed science	**21.1%**	3.2%	10.5%	18.9%	13.7%	4.2%	3.2%
19. Toxicology	7.4%	11.6%	6.3%	13.7%	3.2%	5.3%	**24.2%**
20. Pathology	11.6%	6.3%	1.1%	8.4%	10.5%	4.2%	14.7%
21. Epidemiology	6.3%	9.5%	1.1%	7.4%	6.3%	8.4%	**28.4%**
22. Pharmacology	9.5%	12.6%	2.1%	4.2%	3.2%	5.3%	17.9%
23. Limnology	4.2%	1.1%	3.2%	14.7%	0.0%	2.1%	5.3%

Physical	Develop new & more competitive crop products	Develop new products & uses for animals	Lessen the risks of climatic change on food, fiber, & fuel	Improve environmental stewardship	Improve economic return to ag producers	Strengthen our communities and families	Improved food safety and health thru ag/food sys
	1	2	3	4	5	6	7
24. Chemistry	22.1%	17.9%	11.6%	17.9%	6.3%	4.2%	20.0%
25. Physics	7.4%	3.2%	17.9%	14.7%	3.2%	3.2%	4.2%
26. Engineering	23.2%	17.9%	18.9%	33.7%	17.9%	4.2%	13.7%
27. Geology	2.1%	1.1%	14.7%	23.2%	2.1%	2.1%	2.1%
28. Mineralogy	3.2%	1.1%	8.4%	18.9%	2.1%	2.1%	1.1%
29. Hydrology	5.3%	1.1%	17.9%	40.0%	5.3%	4.2%	3.2%
30. Geography	2.1%	2.1%	9.5%	14.7%	4.2%	8.4%	3.2%
31. Pedology	3.2%	0.0%	7.4%	13.7%	7.4%	3.2%	2.1%
32.Meteorology- Climatology	6.3%	3.2%	35.8%	22.1%	10.5%	3.2%	2.1%
33. Mathematics- Computer Science	10.5%	9.5%	18.9%	13.7%	16.8%	10.5%	10.5%
34. Statistics- Econometrics -Biometrics	16.8%	13.7%	25.3%	15.8%	30.5%	20.0%	16.8%
Social and Behavioral	Develop new & more competitive crop products	Develop new products & uses for animals	Lessen the risks of climatic change on food, fiber, & fuel	Improve environmental stewardship	Improve economic return to ag producers	Strengthen our communities and families	Improved food safety and health thru ag/food sys
	1	2	3	4	5	6	7
35. Anthropology	2.1%	2.1%	2.1%	8.4%	4.2%	26.3%	9.5%
36. Economics	29.5%	22.1%	17.9%	31.6%	47.4%	42.1%	23.2%
37. Education	12.6%	9.5%	14.7%	33.7%	21.1%	43.2%	33.7%
38. Information- Communication	17.9%	15.8%	27.4%	41.1%	30.5%	45.3%	36.8%
39. History	2.1%	2.1%	3.2%	4.2%	6.3%	8.4%	4.2%
40. Law	8.4%	7.4%	11.6%	25.3%	13.7%	12.6%	12.6%
41. Political science	7.4%	6.3%	9.5%	20.0%	11.6%	17.9%	7.4%
42. Psychology	3.2%	2.1%	1.1%	7.4%	2.1%	21.1%	10.5%
43. Sociology	10.5%	9.5%	12.6%	23.2%	11.6%	44.2%	17.9%
44. Sensory science (human	15.8%	14.7%	3.2%	5.3%	3.2%	8.4%	15.8%
45. Management	14.7%	12.6%	13.7%	27.4%	32.6%	16.8%	12.6%
46. Art- Architecture	1.1%	1.1%	1.1%	2.1%	2.1%	11.6%	3.2%
47. Landscape architecture	3.2%	2.1%	4.2%	20.0%	5.3%	13.7%	2.1%

SECTION FOUR: This section asked to indicate which of the following institutions or groups were currently the most or least influential in prioritizing Experiment Station efforts in the **Fall of 2004** and then for the **Fall of 2010**.

Most Influential to Prioritizing Efforts				Least				Most
INSTITUTIONS & GROUPS		Mean	Std	1	2	3	4	5
1. Congress	2004	3.51	1.07	3.4%	13.8%	31.0%	32.2%	19.5%
	2010	3.58	1.11	4.7%	11.6%	27.9%	32.6%	23.3%
2. Agribusinesses	2004	3.63	0.95	2.3%	11.4%	22.7%	48.9%	14.8%
	2010	3.76	0.96	1.1%	10.3%	23.0%	42.5%	23.0%
3. Environmental groups	2004	2.99	0.86	3.4%	23.9%	46.6%	22.7%	3.4%
	2010	3.80	0.76	0.0%	3.5%	30.2%	48.8%	17.4%
4. Food Retailers	2004	2.33	0.87	17.2%	41.4%	32.2%	9.2%	0.0%
	2010	3.08	0.92	4.7%	19.8%	43.0%	27.9%	4.7%
5. Rural development groups	2004	2.60	0.92	9.2%	41.4%	31.0%	17.2%	1.1%
	2010	3.25	0.96	0.0%	27.1%	30.6%	32.9%	9.4%
6. Food safety groups	2004	2.86	1.00	10.3%	24.1%	36.8%	26.4%	2.3%
	2010	3.69	0.93	0.0%	8.3%	38.1%	29.8%	23.8%
7. Farmers & rancher groups	2004	3.97	0.99	2.3%	4.5%	22.7%	35.2%	35.2%
	2010	3.47	1.05	2.3%	16.3%	32.6%	30.2%	18.6%
8. Middle class consumers	2004	2.48	0.99	19.5%	27.6%	39.1%	12.6%	1.1%
	2010	3.14	0.95	5.8%	16.3%	40.7%	32.6%	4.7%
9. Poorer consumers	2004	1.90	1.01	44.8%	28.7%	21.8%	1.1%	3.4%
	2010	2.44	1.13	24.7%	28.2%	30.6%	11.8%	4.7%
10. Commodity groups	2004	4.19	0.80	0.0%	4.5%	10.2%	46.6%	38.6%
	2010	3.69	0.96	1.1%	12.6%	20.7%	47.1%	18.4%
11. Urban consumers	2004	2.62	0.94	12.6%	31.0%	39.1%	16.1%	1.1%
	2010	3.41	0.94	5.9%	4.7%	41.2%	38.8%	9.4%
12. Public trade policy	2004	2.91	1.01	10.2%	20.5%	42.0%	22.7%	4.5%
	2010	3.43	0.98	3.4%	12.6%	34.5%	36.8%	12.6%
13. USDA	2004	3.69	0.89	1.1%	5.7%	35.2%	38.6%	19.3%
	2010	3.38	1.01	2.3%	15.1%	40.7%	25.6%	16.3%
14. State Legislature	2004	3.72	0.98	1.1%	9.1%	31.8%	33.0%	25.0%
	2010	3.84	0.96	1.2%	8.1%	23.3%	40.7%	26.7%
15. University Presidents	2004	2.51	1.06	14.9%	40.2%	31.0%	6.9%	6.9%
	2010	2.75	1.13	15.3%	24.7%	37.6%	14.1%	8.2%