



Cereals Research Needs and Prioritization for Organic Science Cluster

Andy Hammermeister
OACC



**Nova Scotia
Agricultural
College**



The Strategic Research Process

1. Trend analysis
2. Opportunities and Threats
3. Strengths and Weaknesses
4. Farmer survey
5. List of potential research questions
6. Establishing criteria for success
7. Rating the research questions against criteria
8. Inventory of organic research in Canada
9. Prioritizing based on impact, likelihood of success and cost/time

Farmer Survey Acknowledgements

- Agriculture and Agri-Food Canada
- Organic council of Ontario (OCO)
- Ecological Farmers Association of Ontario (EFAO)
- Canadian Organic Growers (COG)
- Certified Organic Association of BC
- Organic Crop Improvement Association
- Eco-Cert
- Organic Producers Association of Manitoba
- Pro-Cert and Quality Assurance International
- Canadian Seed Institute
- Atlantic Canadian Organic Regional Network (ACORN)
- Brenda Frick
- Hugh Martin
- Rochelle Eisen
- Joanne Thiessen-Martens
- Kristen Lowitt
- Tracey Salisbury
- Roxanne Beavers
- Karen Nelson



Survey Overview

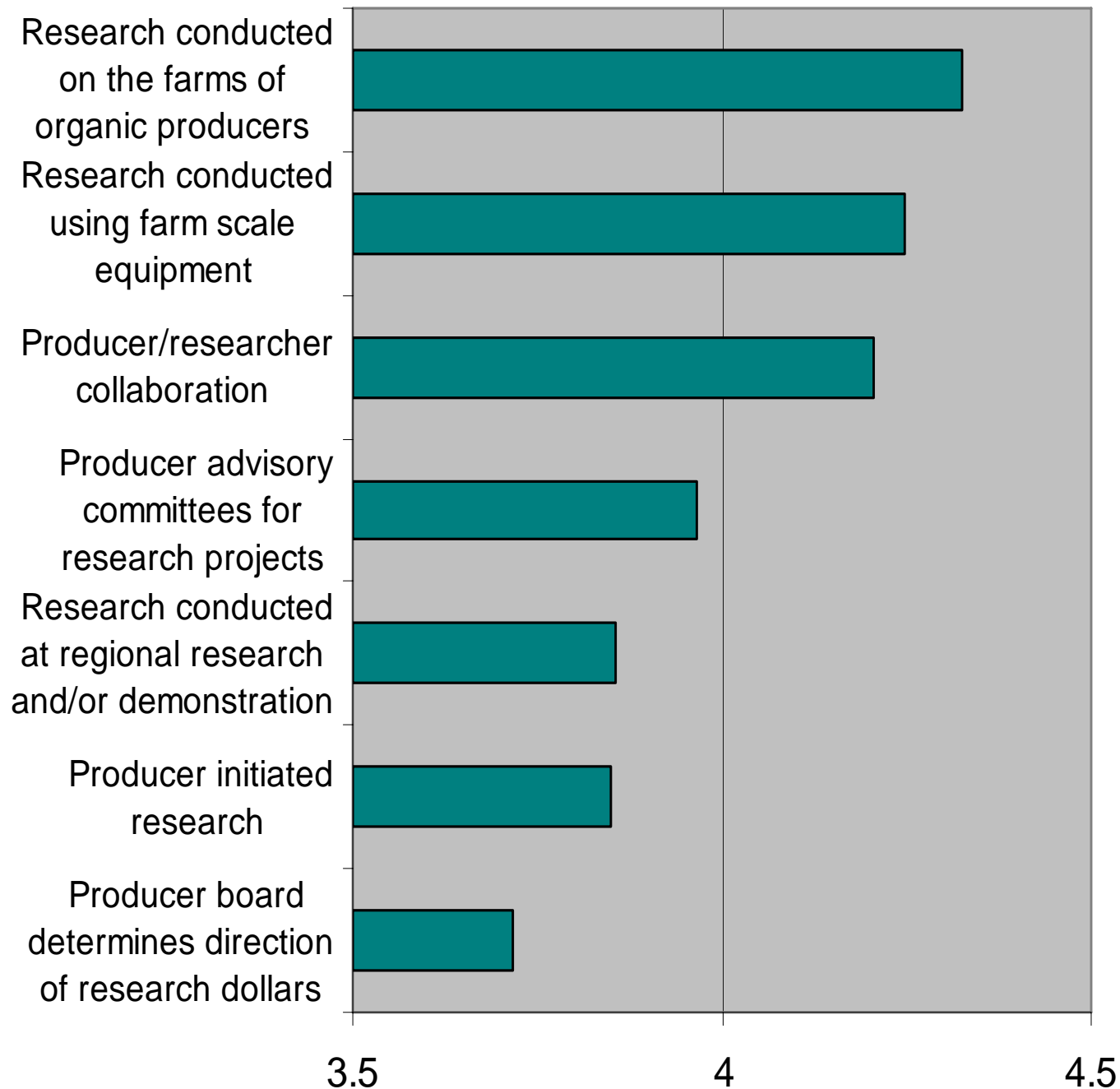
- Objective:
 - inventory organic research in Canada and prioritize organic research needs
- Survey
 - 2007, distributed 3781 surveys across Canada
 - Response rate of 16.2% (n=613)
 - Involved organic and transitional producers
- Key areas targeted:
 - Animals, Plants, Soils, Ecological Systems, Health and Food Quality, Marketing, Policy and Sustainable Agriculture
- National and Provincial Survey results
 - http://www.organicagcentre.ca/ResearchDatabase/res_strategies.asp



Current and Future Producers

	Field Crops	Livestock	Dairy	Vegetable (incl. greenhouse)	Fruit/ berry	Herbs/ spices
	---number or percentage of producers---					
Current and Future producers	347 63%	274 45%	35 7%	225 37%	186 30%	122 20%
BC	8	23		58	60	26
Alberta	43	32	7	10	6	4
Saskatchewan	175	29	2	18	17	19
Manitoba	42	32	4	10	6	4
Ontario	85	86	22	88	62	49
Maritimes	31	23	5	41	35	20

Research Management





Top 10 Research Needs Identified by Cereal Producers

Ranking	Category	Subject Area	Rating
1	Soil	Soil fertility and crop rotations	4.67
2	Plants	Beneficial crop rotations for specific problems	4.56
3	Plants	Ecological interactions in rotations	4.51
4	Plants	Rotations for weed control	4.48
5	Ecological Systems	Soil quality	4.48
7	Soil	Soil Biology - management to improve existing soil life	4.42
8	Plants	Cultural weed controls	4.40
9	Plants	Canada thistle control	4.38
10	Health and Food Quality	Quality and nutrition of organic field crops	4.35

Research Needs of Cereal Producers

Rank	Category	Subject Area	Rating
11	Soil	Minimizing soil compaction	4.33
12	Plants	Long term cropping systems research	4.33
14	Ecol. Systems	Pesticide reduction	4.30
15	Ecol. Systems	Energy use	4.26
16	Plants	Cultural disease controls	4.25
17	Plants	Mechanical weed controls (tillage)	4.23
18	Ecol. Systems	Biodiversity	4.20
19	Plants	Cultural insect controls	4.18
23	Plants	Wild mustard control	4.10
24	Prod. Economics	Grain production economics	4.08
25	Plants	Breeding/testing varieties for suitability in organic systems	4.06
26	Plants	Enhancing natural disease controls	4.05
27	Plants	Enhancing natural insect controls	4.01
28	Soil	Soil Biology - adding living organisms	4.00
30	Plants	Biological weed controls	3.96



Research Needs for Cereals Producers- Soils

Rank	Subject Area	Rating
1	Soil fertility and crop rotations	4.67
2	Soil Biology - management to improve existing soil life	4.42
3	Minimizing soil compaction	4.33
4	Soil Biology - adding living organisms (e.g. Inoculants)	4.00
5	Soil Chemistry - N,P,K, S management	3.95

- Producers comments:
 - Rotations for specific soil conditions
 - Tillage reduction and soil quality
 - Soil P and Ca management for plant nutrition
 - Need for microbiology, fertility and contaminate testing
 - Factsheet on soil test
 - Cover crops and green manure for fertility
 - Organic amendments

Rank	Plants Subject Area	Rating
1	Beneficial crop rotations for specific problems	4.67
2	Ecological interactions in rotations	4.56
3	Rotations for weed control	4.51
4	Cultural weed controls	4.48
5	Cultural controls (seeding rates, varieties, cropping management)	4.40
6	Canada thistle	4.38
7	Long term cropping systems research	4.33
8	Cultural disease controls	4.25
9	Mechanical weed controls	4.23
10	Cultural insect controls	4.18
11	Wild mustard	4.10
12	Breeding/testing varieties for suitability in organic systems	4.06
13	Enhancing natural disease controls	4.05
14	Enhancing natural insect controls	4.01
15	Biological disease controls	3.96
16	Specialized equipment for organic production systems	3.67
17	Biological insect controls	3.40
18	Mechanical weed controls for perennial crops	3.17
19,20,22	Organic herbicides, fungicides, insecticides	3.15



Research Needs for Cereal Producers- Plants

Rank	Subject Area	Rating
1	Beneficial crop rotations for specific problems	4.56
2	Ecological interactions in rotations	4.51
3	Rotations for weed control	4.48
4	Cultural weed controls	4.40
5	Canada thistle control	4.38

Cropping systems & rotations:

- Intercropping
- Green manure
- Rotation design

Weeds

- Canada thistle, wild oats and quack grass top weeds of concern
- Soil – weed interaction
- Crop competitiveness (and rotation)
- Tillage reduction and effective control
- Value as green manure
- Herbicides low priority
- Breeding/ cv. testing ranked 11/20 under plants, 25th overall
- Specialized equipment ranked 16th
- Insect management was low though many commented on wheat midge



Organic Research Prioritization Process

Andy Hammermeister
OACC



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Acknowledgements

- Agriculture and Agri-Food Canada's Advancing Canadian Agriculture and Agri-food program (ACAAF)
- Organic Agriculture Center of Canada (OACC)
- Nova Scotia Agricultural College (NSAC)
- Expert Committee on Organic Agriculture (ECOA)
- Karen Nelson



Agriculture and
Agri-Food Canada

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Overview of Process

- Nine criteria established by Expert Committee on Organic Agriculture
- Key areas:
 - Animals, Plants, Soils, Ecological Systems, Health and Food Quality, Marketing, Policy and Sustainable Agriculture
- 249 priority processes were distributed
- Response rate of 2.4% (n=59)



Criteria For Prioritization

- **Farmer Gross Margin**
- **Increase capacity for sales**
- **Increase production**
- **Animal Welfare**
- **Reduce environmental risk**
- **Characterize and support Environmental Goods and Services**
- **Inform policy makers**
- **Positive social climate**
- **Evolution of organic**
- **Likelihood of Success & Time to Complete**



Weighting of Criteria

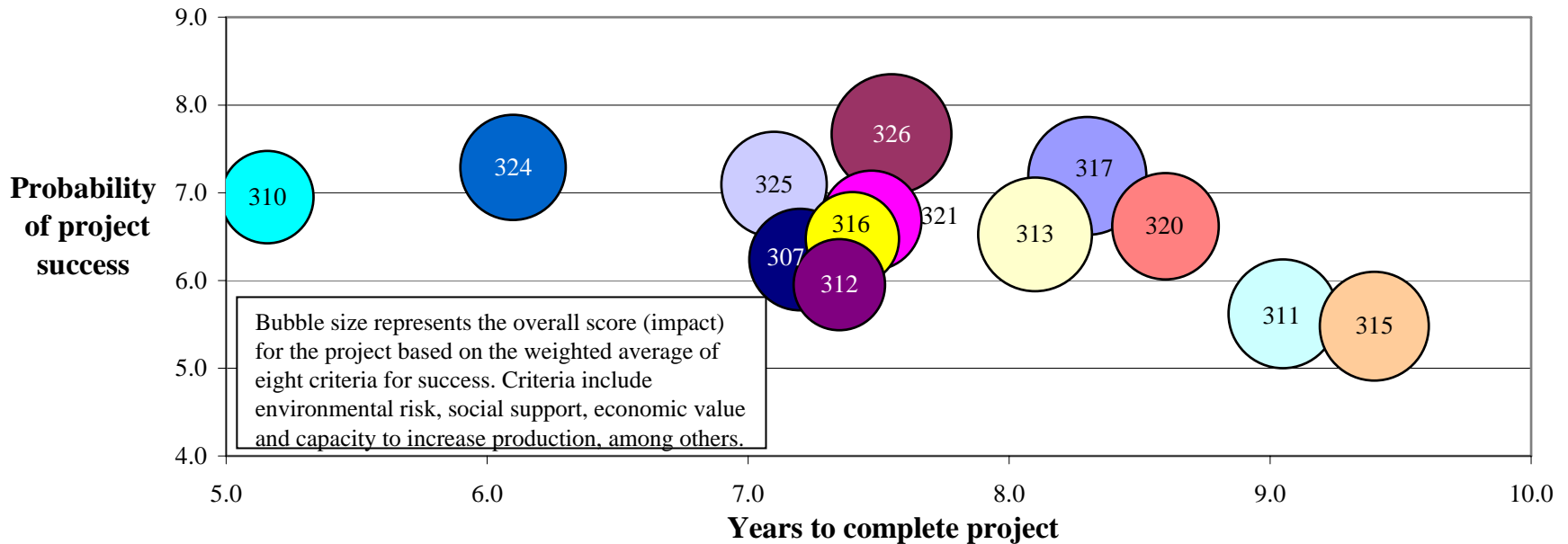
	Farmer Gross Margin	Increase capacity for sales	Increase production	Animal Welfare	Reduce enviro. risk	Char. & support EG&S	Inform policy makers	Positive social climate	Evol. of organic
Soils	4	4	4		3	3	1	1	1
Plants	4	4	4		3	3	1	1	1
Animals	3	3	3	5	2	2	1	1	1
Ecol. Systems	2	2	2		6	6	1	1	1
Sustainability	2	2	2		6	6	1	1	1
Policy	1	1	1		3	3	4	4	4
Market	2	2	2		6	6	1	1	1
Health and Food	2	2	2		6	6	1	1	1



Respondents by category

Category	# respondents
General	45
Plants	37
Soils	27
Ecological	22
Sustainability	21
Policy	14
Market	13
Health and Food	10
Animals	10
Total Respondents	59

Prioritization of organic sector projects - Plants (n=37)

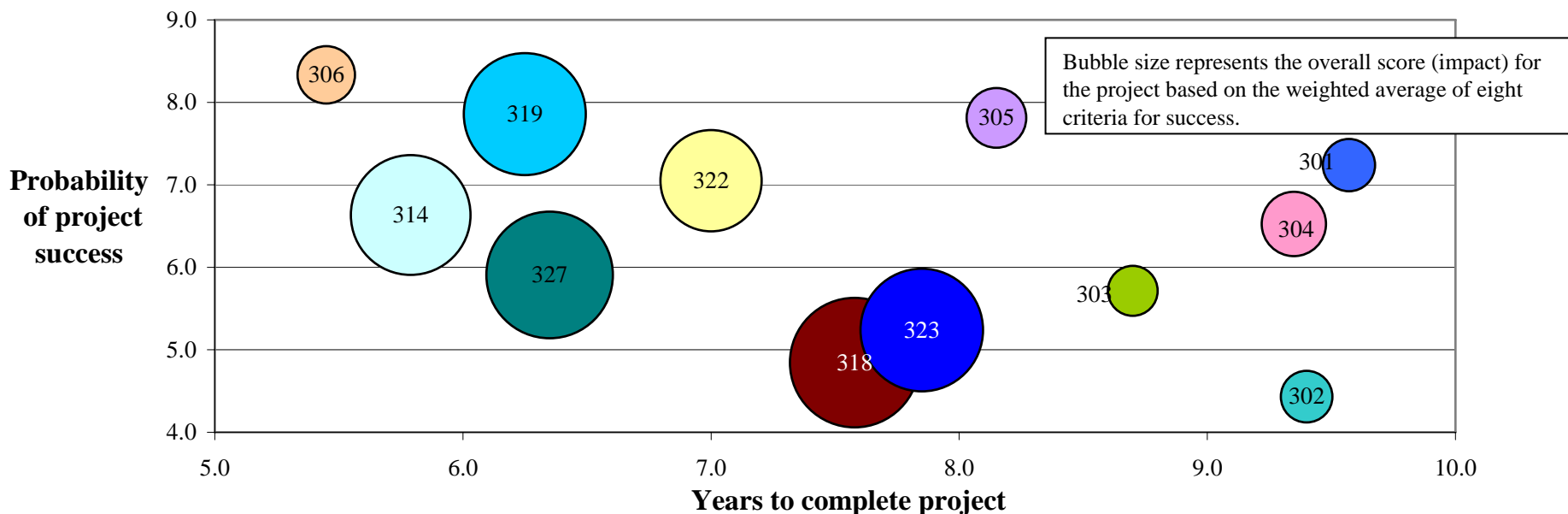


- 326- FR 1,2,3/20 (QC) Identify and/or develop integrated approaches to weed management (i.e. rotations, intercropping, timing of planting). (impact = 17.7)
- 317- FR 1,2,7,8 and 18/20 (QC) Identify and/or develop integrated approaches to insect management to reduce harvestable yield losses due to disease by >80%. (impact = 17.5)
- 313- FR 9/20 (QC) Identify and/or develop integrated approaches to disease management to reduce harvestable yield losses due to disease by > 80%. (impact = 16.9)
- 311- FR 12/20 (QC) Identify and/develop crop cultivars to reduce harvestable yield losses due to disease by at least 80 percent. (impact = 16.2)
- 315- FR 12/20 (QC) Identify and/or develop crop cultivars to reduce harvestable yield losses due to insects by at least 80 percent. (impact = 16.1)
- 320- FR 6,12/20 (QC) Identify and/or develop crop cultivars with a competitive advantage against weeds. (impact = 15.8)
- 324- FR 10/20 Identify, develop and/or refine mechanical, thermal or other weed control systems to reduce yield losses due to weeds by >80%. (impact = 15.6)
- 325- FR 10 and 16/20 (QC) Develop reduced- and no-tillage organic systems of weed control & design new machinery to manage these systems. (impact = 15.6)
- 307- FR n/a Develop marketable products and/or markets for cover crops used in organic management. (impact = 15.1)
- 321- FR 6,12/20 (QC) Identify and/or develop cover crops with weed suppressive abilities. (impact = 14.8)
- 316- FR 20/20 (QC) Identify and/or develop insect control products to reduce harvestable yield losses due to insects by .>80%. (impact = 13.8)
- 310- FR n/a Identify and/or develop organically acceptable means of reducing post-harvest storage losses. (impact = 13.7)
- 312- FR 18/20 (QC) Identify and/or develop control products to reduce harvestable yield losses due to disease by at least 80 percent. (impact = 13.6)

*FR entries in the legend refer to farmer rankings identified in the Final Results of the First Canadian Organic Farmer Survey of Research Needs in 2008

† QC entries in the legend refer to priority projects identified by the Organic Agriculture Committee of the Quebec Agriculture and Agri-Food Reference Centre

Prioritization of organic sector projects - Plants (n=37)

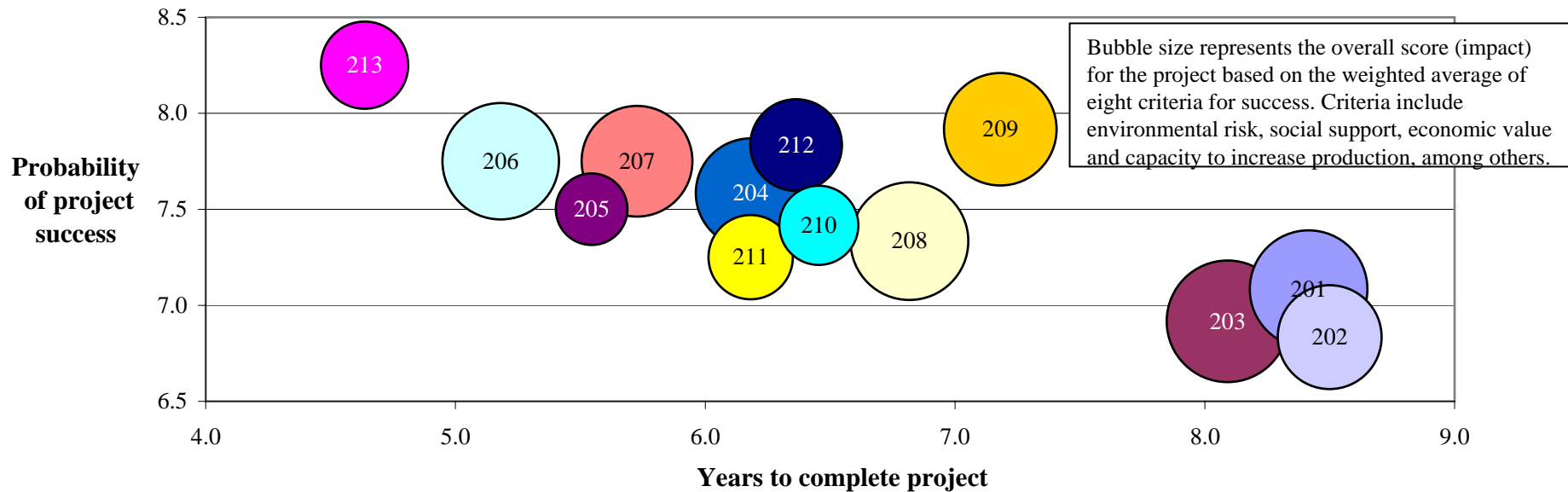


- 318- FR 5/20 Develop cultural practices to activate induced systemic resistance in crops. (impact = 13.4)
- 327- FR 2/20 (QC) Refine soil fertility management systems to minimize weed pressure. (impact = 13.1)
- 323- FR 19/20 (QC) Identify or develop weed control products with at least 80 percent efficacy. (impact = 12.7)
- 319- FR n/a Develop insect pest thresholds for organic management systems. (impact = 12.7)
- 314- FR 18/20 (QC) Analyze the risk of overuse of copper or sulphur fungicides and explore potential alternatives. (impact = 12.4)
- 308- QC Determine the cost of production associated with different organic vegetable farming practices. (impact = 11.0)
- 322- FR 3/20 Investigate weed seed bank dynamics under organic management systems. (impact = 10.5)
- 309- FR n/a Determine the effectiveness and economics of seed coatings including micronutrients, growth promoters and/or mycorrhizae. (impact = 9.5)
- 304- FR 4/20 Identify long-term cropping systems and/or rotations with higher yield and economic stability under variable climatic situations. (impact = 6.7)
- 305- FR 1/20 Develop intercropping systems, crop sequences & cropping practices with pulse crops & other legumes to increase N fixation. (impact = 6.2)
- 306- FR n/a Conduct a detailed analysis of legumes in organic farming systems RE: strengths, weaknesses opportunities and threats. (impact = 6.0)
- 301- FR 12/20 Identify or develop crop cultivars and/or crop traits for organic management with a five percent yield advantage. (impact = 5.5)
- 302- FR 12/20 Develop perennial grain varieties for organic management systems. (impact = 5.4)
- 303- FR 1/20 Develop crop cultivars and/or rotations that reduce phosphorus requirements by 20 percent but remain economically viable. (impact = 5.2)

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Prioritization of organic sector projects- Soils sector (n=27)



- 203- FR 2/8 Identify integrated management practices to optimize soil quality as a substrate for crop growth (impact = 18.0).
- 201- FR 1/8 Identify or develop crop rotations that sustain soil fertility and meet overall regional yield averages (impact = 17.4).
- 208- FR 1/8 Identify integrated management practices for optimizing soil nitrogen in order to maximize economic crop yields (impact = 17.3).
- 206- FR 3/8 Develop nutrient budgeting tools that account for whole farm nutrient flows and/or nutrients contributed by different crops and amendments (impact = 17.2).
- 209- FR 3/8 Identify the risk of soil phosphorus depletion under regionally specific organic management systems and potential solutions for organic producers (impact = 16.6).
- 207- FR 7/8 Develop fertilization strategies for crops with high nutritional requirements while minimizing the environmental risk of applying excess nutrients (impact = 16.4).
- 204- FR n/a Identify or develop organic farming techniques that can maintain soil quality and build soil organic matter with routine mechanical weed control (impact = 16.2).
- 202- FR 2/8 Explore specific cover crop sequences or mixtures interact with soil biota to stimulate plant resistance mechanisms and influence nutrient uptake (impact = 15.3).
- 212- FR n/a Determine the amount and timing of nutrient release from different soil amendments and their efficacy in terms of improving plant nutrition (impact = 13.5).
- 213- FR n/a Identify viable growing mediums and nutrient sources that are suitable for organic greenhouse and transplant production (impact = 12.9).
- 211- FR 6/8 Determine the nature and extent of deficiencies of macronutrients as possible links to the nutritional quality of foods (impact = 12.5).
- 210- FR 6/8 Determine the nature and extent of deficiencies of micronutrients and possible links to the nutritional quality of foods (impact = 11.7).
- 205- FR 4/8 Conduct efficacy testing on products marketed as soil microbial stimulants or biological enhancers (impact = 10.6).

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