USDA/ARS NP 306 Assessment Panel Report

A Retrospective Analysis of the Relevance and Impact of USDA/ARS NP 306 –

Quality and Utilization of Agricultural Products

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Panel Members

Fiber/Textile Quality/Ginning	Harrison Ashley VP Ginner Services National Cotton Council
Fats & Oils Quality and Processing	Dr. John Massingill, JR Director CCBT Texas State University
Animal Products Quality/Processing	Dr. Jerome Levy Director R&D Stahl (USA),Inc.
Functional Foods/Phytochemicals	Dr. John Finley Professor and Chair Louisiana State University

Panel Members

Grain and Oilseed Quality/Processing	**Dr. Ron Madl** Director Grain Sci and Industry Kansas State University
Non-Lipid Biobased Products	**Dr. Robert Dorsch** Dir. Rtd. Biotech Bus Development DuPont Corporation
Fruits and Vegetables Quality/Processing	**Dr. Barry Swanson** Professor and Interim Chair Washington State University

Process for the Assessment

- Two components

- Seven Problem Areas

- 23 objectives

- 162 accomplishment descriptions

- Face to face meeting March 4 and 5, 2008

Component 1

- PA 1a: Definition and Basis for Quality
- PA 1b: Methods to Evaluate and Predict Quality
- PA1c: Factors and Processes that Affect Quality
- PA 1d: Preservation and/or Enhancement of Quality and Marketability

Component 2

- PA 2a: New Product Technology

- PA 2b: New Uses for Agricultural By-Products

- PA 2c: New and Improved Processes and Feedstocks

Criteria for Ratings - Relevance

Importance of the Research

- to the respective stakeholders
- to the knowledge base in the area

Rating

- 5 = high relevance
- 1 = low relevance

Criteria for Ratings - Impact

- Did the research advance knowledge?
  - Has the research resulted in applied technology?
    - Has the research yielded social or economic advantages for consumers?
- Have new or improved scientific methods or technologies been developed and adopted?

Criteria for Ratings - Impact

- 5 = high impact

Significant benefit, influence, and or/progress

- 3= medium impact

Moderate benefit, influence, and or/progress

- 1 = low impact

Little or no benefit, influence, and or/progress

PA 1a: Definition and Basis for Quality

Objectives:

1. Identify attributes that define quality of agricultural products.

2. Develop better understanding of relationships between composition and component molecular structure and end-use quality and function and sensory characteristics.

3. Assess quality trends and needs of agricultural products in global markets.

PA 1a: Definition and Basis for Quality

14 Accomplishments I = 2.4 R = 2.9

Histogram for 1a
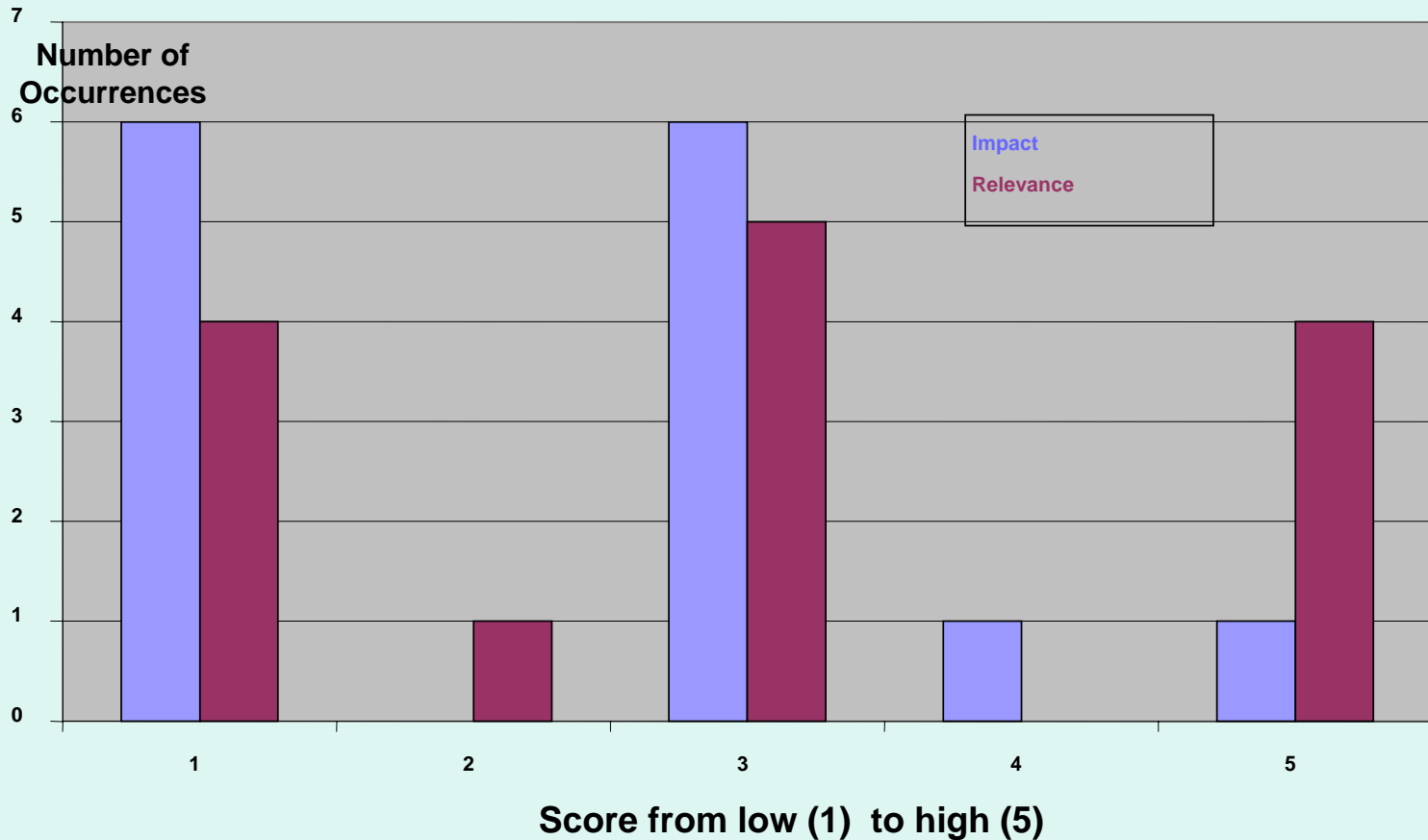
"The Team observed that the health promoting potential of citrus limonoids, molecular modeling of collagen in tanning, organic acids and sour flavors, the molecular-genetic basis for wheat kernel texture, and the effect of moisture on cotton functionality are good examples of accomplishments designed to develop a better understanding of relationships between composition and end-use quality, function and sensory characteristics."

# Problem Area 1b. Methods to Evaluate and Predict Quality

Objectives:

1 - Develop rapid, non-destructive methods for detection and measurement of physical/chemical quality attributes and quality defects.

2 - Develop automated, high-throughput on-line grading, sorting, and packaging systems for agricultural products.

3 - Develop methods to evaluate the performance of sampling plans to measure quality characteristics of agricultural commodities shipped in bulk.

4 - Develop and utilize multispectral techniques, imaging and image analysis, and methods incorporating information technology and artificial intelligence for further improvement of processing and grading.

Problem Area 1b. Methods to Evaluate and Predict Quality
37 Accomplishments I = 3.3 R = 4.1

Histogram of 1b
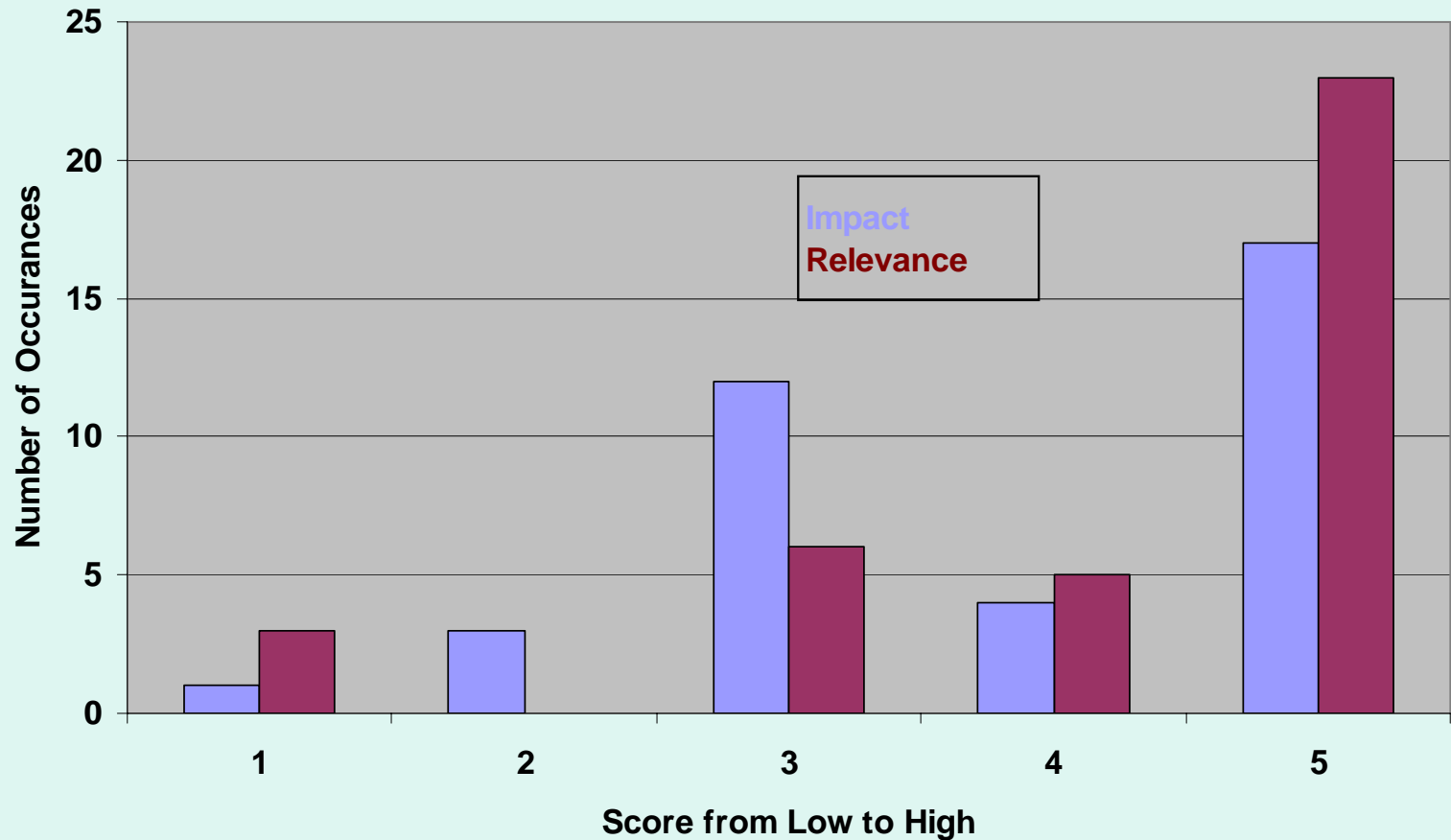
"The team felt that this problem area needs continued investment to address issues relevant to the stakeholders."

# Problem Area 1c. Factors and Processes that Affect Quality

Objectives:

1 - Determine influence of pre-harvest factors on quality, including genetics, production practices and environment.

2 - Determine influence of post-harvest factors on quality, including storage, handling, grading, and processing.

3 - Evaluate effects of safety and environmental protocols on quality of foods.

Problem Area 1c. Factors and Processes that Affect Quality
21 Accomplishments I = 3.2 R = 3.6
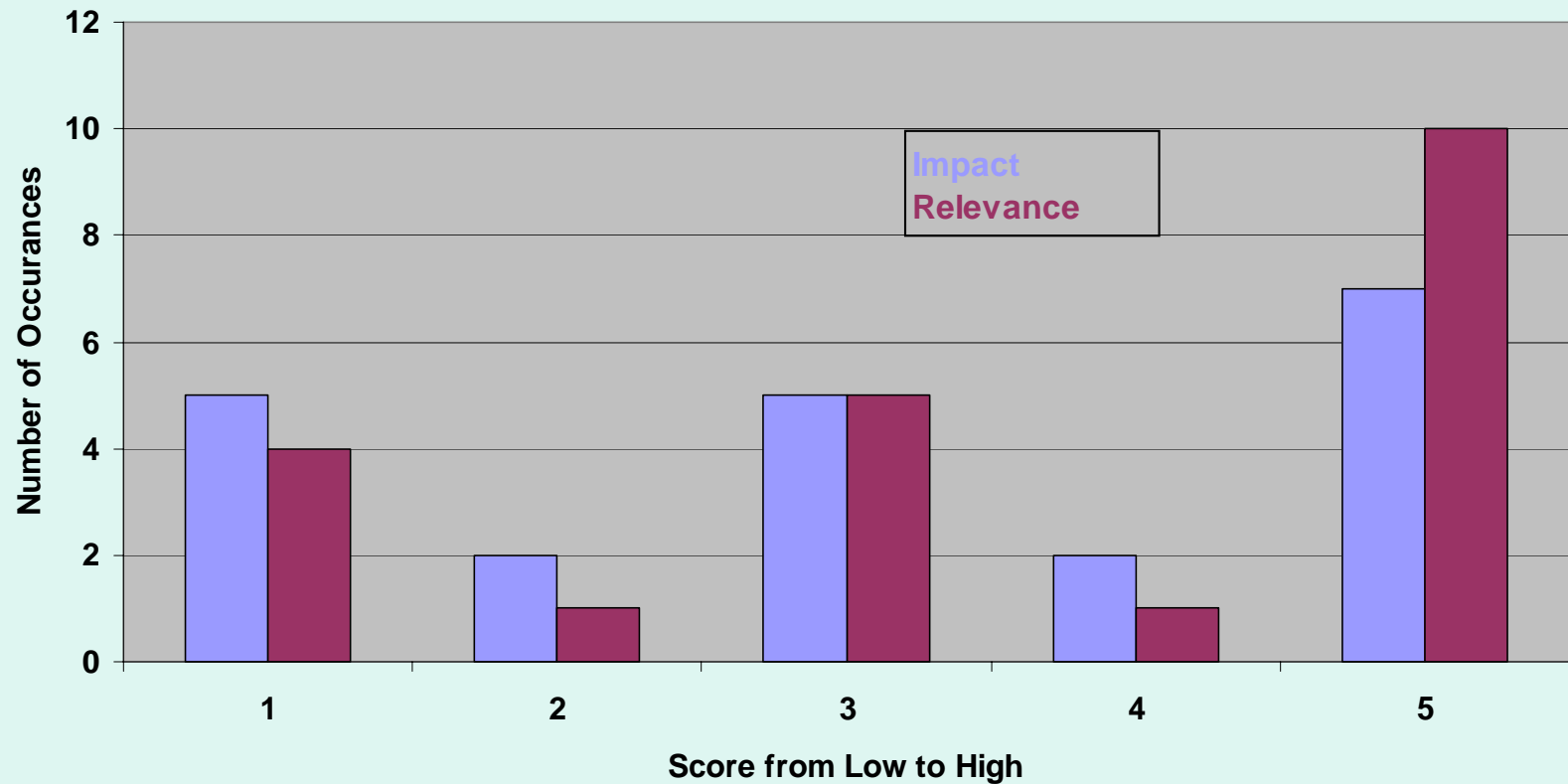
"The review team determined that the processes affecting leather quality, improved rice milling, peanut curing decision support system development, identity preserved (IP) grain handling, expeller pressed soybean oils, peanut blanching, roasting peanut allergenicity, acceptable restored moisture levels for cotton, and deterioration of cotton quality during storage have medium to high impact and relevancy and are good examples of post-harvest factors on quality, including storage, handling, grading, and processing."

# Problem Area 1d. Preservation and/or Enhancement of Quality and Marketability

Objectives:

1: Develop strategies to enhance intrinsic product quality and consistency.

2: Improve storage technologies which maintain quality and nutrition and increase shelf life.

3: Enhance nutritional value of agricultural products.

4: Investigate use of antagonistic yeasts and bacteria for antimicrobial effects to enhance safety and reduce spoilage.

5: Develop environmentally friendly strategies for plant and animal pathogen control.

6: Minimize effects of pest infestation and food-borne risks on trade of agricultural products.

Problem Area 1d. Preservation and/or Enhancement of Quality and Marketability
11 Accomplishments I = 4.2 R = 3.6

Histogram for 1d
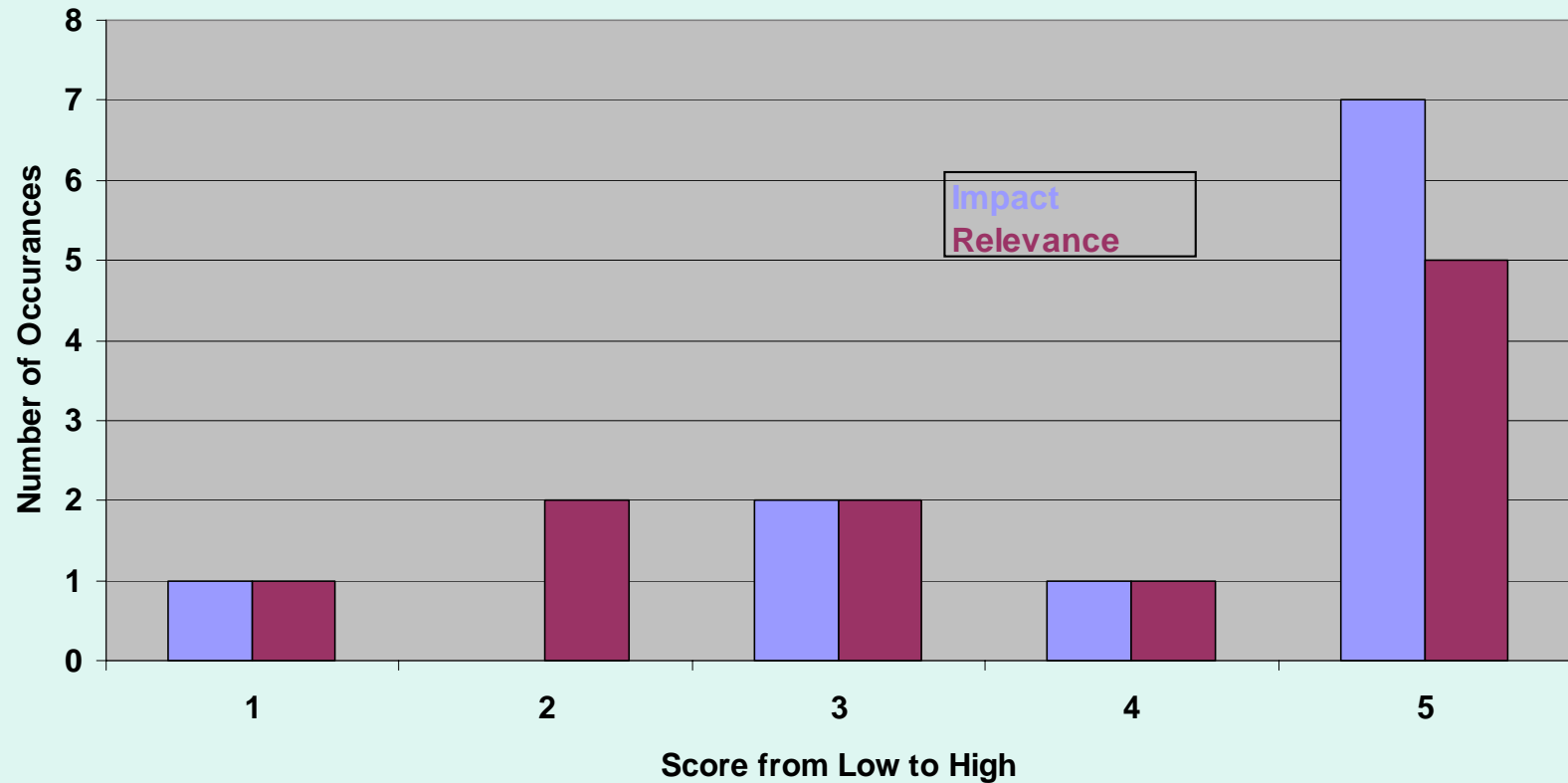
"Just over half of the accomplishments fell under Objective 1 and all but one rated HIGH for IMPACT and between MED and HIGH for RELEVANCE. These high ratings encompassed a variety of project themes, ranging from meat tenderization to roller ginning of cotton to fruit quality and indicate a broad emphasis on product quality and consistency."

Problem 2a. New Product Technology

Fruits, Vegetables, Tree Nuts and Sugar Crops:

Objectives

1: Identify and characterize functional compounds and components in agricultural commodities and their byproducts

2: Improve understanding of relationship between composition, molecular structure, and physical state and end-use functionality of these compounds and components.

3: Use new knowledge of product properties and component interactions to develop functional intermediates or products

Problem 2a. New Product Technology
36 Accomplishments I = 2.8 R = 3.2
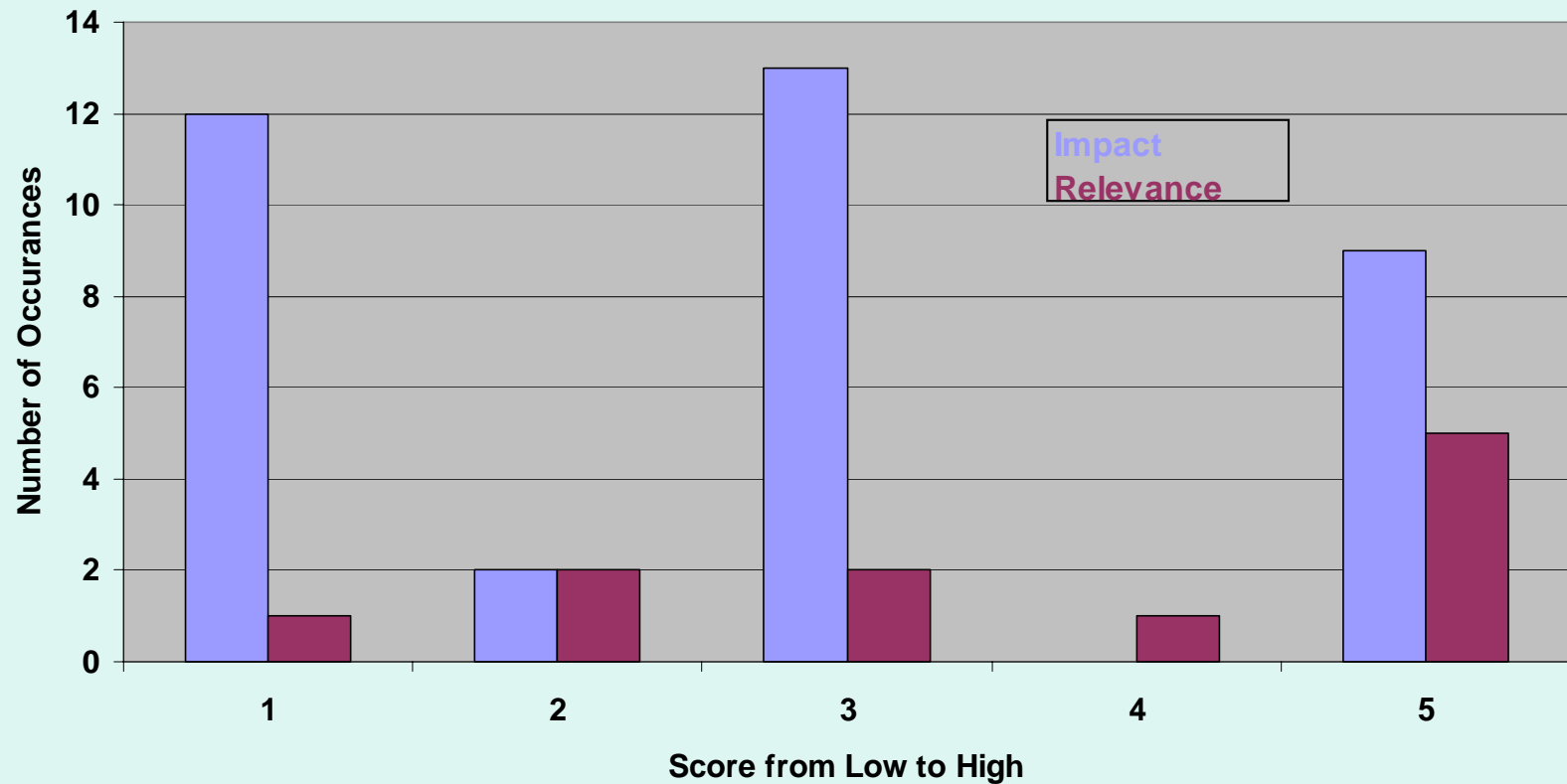
"The panel was concerned that there were several projects in this section that would be considered technology and may not be appropriate to the mission and objectives. Specifically the continuous casting technology for fruit and vegetable wraps and the fruit bars were successful in that the technologies were used by industry but the panel questioned the importance to ARS. Similar concerns were expressed about extruded snacks from whey."

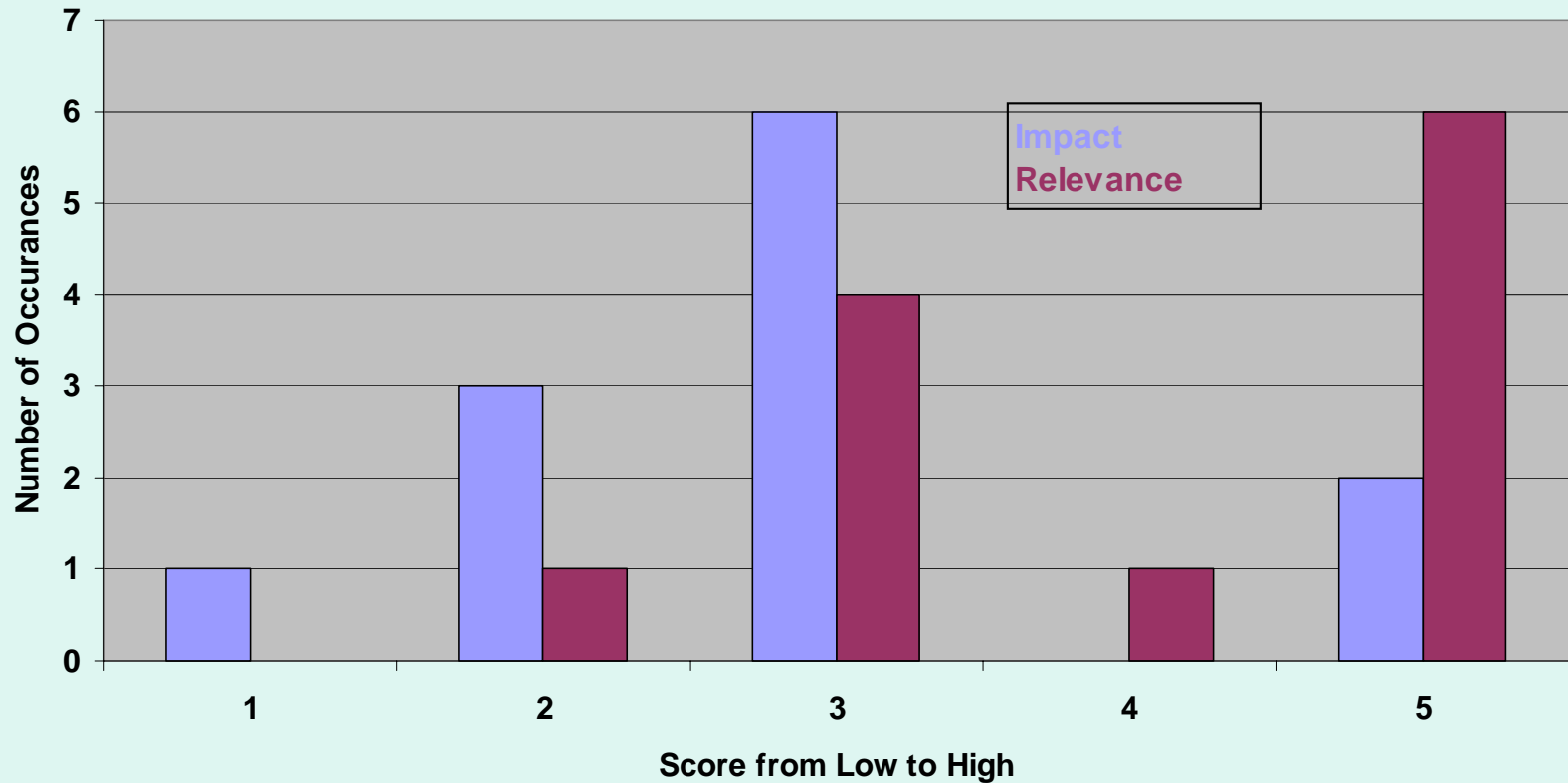# Problem Area 2b. New Uses for Agricultural By-products

Objectives:

1. Identify and characterize by-product components for potential value-added products.

2. Convert low value agricultural residues into higher value products.

Problem Area 2b. New Uses for Agricultural By-products
12 Accomplishments I = 2.9 R = 4.0

Histogram of 2b

"Area 2b does not make up much of the NP306 effort and the projects are by definition opportunistic. The two successes are assessed as having High Relevance because they utilize otherwise ignored waste materials that would have simply become a waste disposal problem rather than a commercial opportunity. These waste streams are smaller volume or truly difficult to utilize; the implicit assumption is that very large streams of more accessible materials will flow to lignocellulosic biofuels."

# Problem Area 2c. New and Improved Processes and Feedstocks

Objectives:

1. Improve/develop processes and technologies that are environmentally benign.

2. Develop improved and new techniques and technologies to convert agricultural products into value-added foods and biobased products.

Problem Area 2c. New and Improved Processes and Feedstocks
36 Accomplishments I = 3.6 R = 4.1

Histogram of 2c
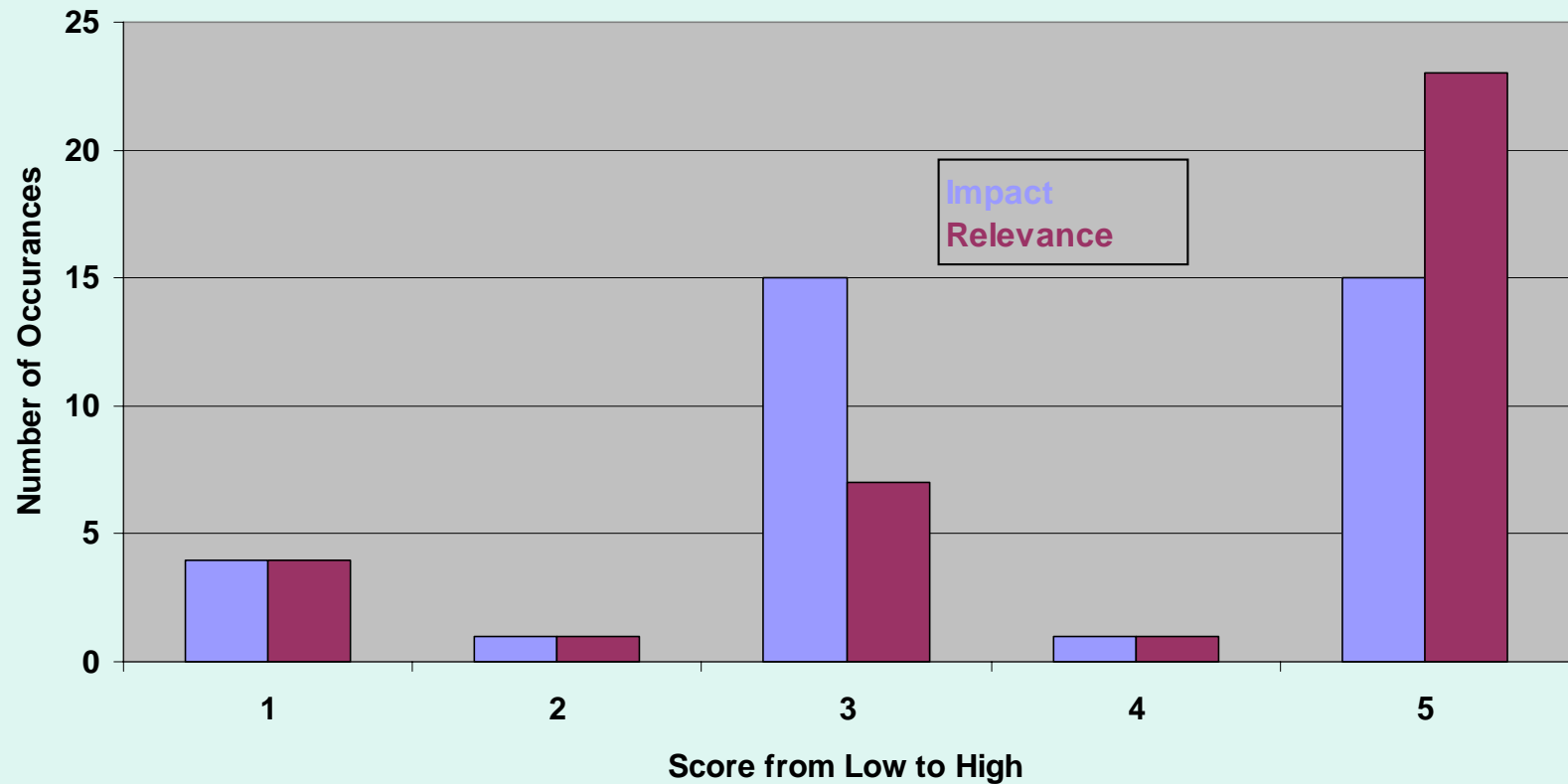
"While the success rate was relatively good for this problem area, questions were raised about the proper role of ARS in developing new products or improving existing processes. This role was accepted by the review panel when there was strong industry support and evidence of commercialization or strong potential towards commercialization. However, product development in absence of strong commercial draw is more difficult to justify for future resource priority."

"The Team was impressed with the productivity of this National Program. Clearly the opportunity to transform research into economic activity is evidenced by the large number of CRADAs generated in this National Program. Finally, the Team compliments the National Program for its efforts to engage stakeholders in defining the research program that should be supported with public funding through ARS."

Component 1 I = 3.46 R = 3.71

Component 2 I = 3.21 R = 3.74

General Observations

1. Have stakeholders used the information, technology, or research?
2. Should ARS compare organic and conventionally produced crops?
3. Should ARS be engaged in training for use of methods?
4. What is a service function versus a research function for ARS?
5. What is precompetitive research?