A SCIENCE ROADMAP FOR AGRICULTURE

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Science Roadmap Preparation

Developed by the
ESCOP Science Roadmap Task Force

Objectives:

- Plot future research opportunities of science-for-agriculture
- More carefully decide research directions and institutional investments, especially when developing goods and services using public funds

Task Force

- 24 scholars, representing diverse disciplines and geographic areas
- Charged by ESCOP to look forward 10 to 20 years
- Chart the major directions of agricultural science

Effort included:

- Prioritizing stakeholder needs
- Determining scientific feasibility using current methods and tools
- Predicting positive impacts of successful research outcomes
- Setting forth seven Challenge Areas, each with four Objectives

Seven Challenge Areas

- Develop new and more competitive crop products and new uses for diverse crops and novel plant species.
- Develop new products and new uses for animals.
- Reduce the risks of local and global climatic change on food, fiber, and fuel production.

Seven Challenge Areas (cont.)

- Provide the information and knowledge needed to further improve environmental stewardship.
- Improve the economic return to agricultural producers.
- Strengthen our communities and families.
- Ensure improved food safety and health through agricultural and food systems.

Roadmap will:

- Assist decision-makers and advocates for the research and education system
- Help mobilize and plan the allocation of resources for future program areas

Caveats

- Not a comprehensive description of everything to be accomplished in agricultural research
- Current agricultural research agenda must be continued into the future
- Maintenance research must be sustained to protect past gains
- Basic research must be supported if agriculture is to be well served by science

Analysis of Current Scientific Capacity and Estimates of Future Needs

Developed by the
ESCOP Planning Committee

Objectives:

- Identify appropriate mix of expertise required to meet challenges
- Pursue federal budget increases to obtaining that expertise

Methods:

- Estimated current effort on each challenge/ objective using CRIS's SY & FOS database
- Requested 45 directors in 1862 & 1890 institutions to estimate appropriate mix of FOS's to address each challenge/objective
- 22 directors responded, representing all regions and range of rural & urban areas

Methods (cont.):

- Converted estimates to % of objective total to normalize for total SY's
- Calculated mean, maximum, minimum & standard deviation for each FOS
- Calculated challenge/objective totals using SY estimates

Results:

- Total additional SY's needed is 5179
- 73% increase over current total of 7064
- Critical needs in molecular biology, nutrition & metabolism, engineering, economics, genetics & breeding, and sociology
- New expertise in bioethics, biosystems modeling, logistics and transportation

Federal Budget Requests and Justifications

Developed by the
ESCOP Budget and Legislative Committee

Cost Analysis

- FOS's grouped into 6 areas:
  - Biological Sciences
  - Nutrition / Epidemiology
  - Ecology / Environmental Sciences
  - Physical Sciences
  - Engineering / Earth Sciences
  - Social Sciences
- CRIS expenditure data compiled for each

Cost of FOS's ($000/SY, % Fed, % State)

Biological Sciences	$469	38%	35%
Nutrition/Epidemiology	$507	33%	42%
Ecology/Environ Sci	$333	17%	52%
Physical Sciences	$386	23%	51%
Engineering/Earth Sci	$394	17%	55%
Social Sciences	$337	24%	52%
Average Cost	$404	25%	48%

Cost of Additional SY Needs

- Total cost for 5179 is ~$2.104 billion
  - 30% from federal ~$625 M
  - 43% from state ~$921 M
  - 27% from other ~$558 M

Highest FOS's

- Molecular Biology $202 M
- Nutrition/Metabolism $170 M
- Engineering $150 M
- Economics $146 M
- Genetics/Breeding $136 M
- Biochem/Biophysics $119 M

Competitive Grants Program Needs

- Increase needed to fund all high quality proposals

NIH	69%	$1,537 M
NSF	67%	$1,000 M
USDA-NRI	187%	$ 206 M
USDA-IFAFS	411%	$ 468 M