

**Agricultural Experiment Station
University of Puerto Rico
Five Year Plan of Work: 1999-2004**

Planning option: This five year Plan of Work is prepared for our Institution's individual functions.

Period covered: October 1, 1999 to September 30, 2004.

Projected resources:

Year 2000

Nat'l Goal	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
Human (SY) ⁸	54	4	0	5	5
Fiscal (\$)	14,162,461	657,816	114,918	1,242,281	665,556

Formula funds should amount this year to 64% of the total financial resources available.

Year 2001

Nat'l Goal	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
Human (SY)	50	2	0	5	4
Fiscal (\$)	14,691,591	681,852	120,509	1,291,571	689,824

Formula funds should amount this year to 64% of the total financial resources available.

Year 2002

Nat'l Goal	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
Human (SY)	49	2	0	5	4
Fiscal (\$)	15,244,735	706,995	126,375	1,343,146	715,206

Formula funds should amount this year to 65% of the total financial resources available.

Year 2003

Nat'l Goal	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
Human (SY)	47	2	0	5	3
Fiscal (\$)	15,823,126	733,300	132,529	1,397,116	741,757

Formula funds should amount this year to 66% of the total financial resources available.

Year 2004

Nat'l Goal	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
Human (SY)	47	2	0	5	3

Fiscal (\$)	16,427,827	760,823	138,986	1,453,598	769,534
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Formula funds should amount this year to 67% of the total financial resources available.

Due date: July 15, 1999

Certification: _____
Dean and Director, CAS

1. PLANNED PROGRAMS

GOAL 1: AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY.

I. Statement of Issue(s)

The research program of the Agricultural Experiment Station (AES) of the University of Puerto Rico relates in one way or another to agricultural production, the long-term critical issue being targeted by the projects ascribed to this goal¹. This is not expected to change during the next five years. As stated in previous reports, the mission of AES is to conduct applied and basic research needed to achieve an economically viable agricultural sector, to strengthen the industries that process agricultural raw materials, and to stimulate rural development, while conserving our natural resources and the environment. Each individual research project has its particular short and intermediate-term critical issue(s), reviewed yearly in the commodity meetings (see Stakeholder Input Process).

Our research efforts are organized into 11 agricultural commodities³, each with its own leader. The Environment and Natural Resources commodity is ascribed to Goal 4. Each commodity group, under its leader, meets regularly to review research needs and priorities. Scientists, extensionists, professors, other University personnel, farmers, agroindustrialists, and representatives of farmers' organizations, government agencies, the Agronomists Association, and other interested groups, as well as private parties and/or individuals and the public at large, are invited.

¹ See Appendix 1, AES Active Projects, 1999.

³ AES has 11 commodities: dairy production, coffee, plantains and bananas, vegetable crops, fruit crops, ornamentals, beef production, root and tuber crops, basic grains, environment and natural resources, and sugarcane.

II. Performance Goal(s)

Output indicators:

- New germplasm is evaluated.
- New integrated pest management practices are developed.
- New fertilization and irrigation practices are developed.
- New feeding and health management practices are developed.

Outcome indicators:

- Resistance to certain pests and diseases is increased.
- Crop production and management is improved.
- Livestock production and management is improved.
- Local crop production is increased.

III. Key Program Component(s)

Provide useful, relevant agricultural research, focusing on specific problems within each AES commodity, as related to agricultural production and competitiveness.

IV. Evaluation Framework

As stated in the Statement of Issues, the mission of AES is to conduct the basic and applied research needed to achieve an economically viable agricultural sector, to strengthen the industries that process agricultural raw materials, and to stimulate rural development, while conserving our natural resources and the environment. It is under this context that the projects within this goal will be evaluated when completed. Each project will be evaluated in a different way, as stated in each proposal. Information will be collected in order to learn whether or not the expected outcomes or unexpected developments were achieved.

V. Internal and External linkages

Internal⁴ – Within the Commonwealth of Puerto Rico, AES keeps close linkages with the Agricultural Extension Service and the Faculty of Agriculture, units within the College of Agricultural Sciences (CAS) at the Mayagüez Campus of the University of Puerto Rico, as well as with the rest of the University. It may be noted that the current Associate Dean and Deputy Director of AES is an Extensionist. In fact, some extensionists lead and/or participate in AES research projects, while some AES researchers participate in Extension projects.

Close ties are maintained with the United States Department of Agriculture (USDA) personnel based in Puerto Rico (mostly at the Tropical Agriculture Research Station at Mayagüez and Isabela) and research is conducted in conjunction. Links are also maintained with the Puerto Rico Department of Agriculture and other government agencies, especially those dealing in one way or another with agriculture, natural

⁴⁴ See Appendix 2, Linkages/Partnerships.

resources, solid wastes, or any other items being researched by AES. The Dean of CAS and the Associate Dean and Deputy Director of AES meet regularly with the Secretary of Agriculture (who is an AES scientist) and with other heads of government agencies and corporations to analyze agricultural problems and receive research suggestions, based on current needs.

Good working relations are kept with the Farmers' Association, the Farmers' Federation, and private agricultural or agrochemical businesses (Ortho, Rhone Poulenc, Mycogen, Monsanto, BASF, Zeneca, Cyanamid, Bayer, etc., and, specially, their subsidiaries and intermediaries in Puerto Rico⁵), which sponsor AES professional and educational activities.

External⁶ - AES keeps close ties with USDA (for example, the National IR-4 Program) and with public and private universities throughout the United States and elsewhere, particularly institutions related to agricultural research. For example, the University of Florida and AES are partners in many Caribbean Basin Advisory Group (CBAG) projects. Partnerships with private companies and corporations are also established.

VI. Target Audiences

Extensionists, growers and farmers, scientists, agronomists, professionals in public and private agencies working with agriculture and agriculture-related areas and issues, the farmers' association and federation, other interested groups and associations, graduate, undergraduate, high school and other students, and communities and public at large.

VII. Program Duration

Long-Term (more than five years).

VIII. Allocated Resources

Human resources – This is by far the largest group of AES projects, employing approximately 81% of our scientists in 1999. This is not expected to change significantly during the next five years.

Fiscal resources – This group of AES projects are using approximately 84.5% of our fiscal resources in 1999. Although the actual amount of fiscal resources will vary, this percentage is not expected to change significantly during the next five years.

⁵⁵ Mention of the names of these companies does not imply an endorsement from AES to them or to any of their products.

⁶⁶ See Appendix 2, Linkages/Partnerships.

GOAL 2: A SAFE AND SECURE FOOD AND FIBER SYSTEM.

I. Statement of Issue(s)

AES conducts research projects that, although related to agriculture, deal mostly with food production and safety. They respond to the changing consumption habits of Puerto Ricans, the market participation of local producers and the growing consumer awareness (pesticide residues; health and environmental safety; alternate pest control; availability, post-harvest storage and processing), long-term critical issues being targeted by the projects ascribed to this goal. Each individual research project has its particular short and intermediate-term critical issue(s), reviewed yearly in the commodity meetings (see Stakeholder Input Process).

II. Performance Goal(s)

Output indicators:

- Pesticides recommended for clearance.
- New food products are developed.

Outcome indicator:

- Market acceptability of certain agricultural products (either raw or processed) is increased.

III. Key Program Component(s)

Provide useful, relevant agricultural research, focusing on specific problems within each AES commodity, as related to the safety and security of our food and fiber systems.

IV. Evaluation Framework

As stated in Goal 1, the mission of AES is to conduct the basic and applied research needed to achieve an economically viable agricultural sector, to strengthen the industries that process agricultural raw materials, and to stimulate rural development, while conserving our natural resources and the environment. It is under this context that the projects within this goal will be evaluated when completed. Each project will be evaluated in a different way, as stated in each proposal. Information will be collected in order to learn whether or not the expected outcomes or unexpected developments were achieved.

V. Internal and External Linkages

Internal - All of what was written for Goal 1 is also valid here as well, with perhaps a change of emphasis in the relative importance of the various links. For example, the University Program on Food Science and Technology (PFST), which encompasses AES Food Technology Laboratory (which in turn deals with some of the projects ascribed to this goal), employs chemists and food technologists and receive graduate students from faculties other than Agricultural Sciences. Quite appropriately, it has close links with

associations of chemists, food technologists, and nutritionists. The Director of PFST, who is a faculty member of the CAS Department of Horticulture, is a chemist.

Another link worth emphasizing is with the Department of Agriculture Agrological Laboratory, which deals, among other things, with the registration of pesticides and the concession of user's permits. AES Central Analytical Laboratory works closely with it.

External – AES, and, in fact, the University of Puerto Rico keep close ties with the USDA (for example, the National IR-4 Program) and with public and private universities throughout the United States and elsewhere, particularly institutions related to agricultural research. For example, the University of Florida and AES are partners in many CBAG projects. Partnerships with private companies and corporations are also established.

VI. Target Audiences

Extensionists, growers and farmers, scientists, agronomists in general, other professionals in public and private agencies working with agriculture and agriculture related areas and issues, the farmers' association and federation, other interested groups and associations, graduate, undergraduate, high school and other students, and communities and public at large.

VII. Program Duration

Long-term (more than five years).

VIII. Allocated Resources

Human resources – The projects ascribed to this goal have employed five percent of our scientists in 1999, approximately. This is not expected to change during the next five years.

Fiscal resources – Likewise, the projects under this goal are using around four percent of our fiscal resources. This is not expected to change during the next five years.

GOAL 3: A HEALTHY, WELL NOURISHED POPULATION.

I. Statement of Issue(s)

AES is not currently performing, and does not intend to perform in the near future, any scientific research in this area.

II. Allocated Resources

Human resources – No scientists are working under this goal, nor is it expected to occur during the next five years. However, an administrative project, *Occupational Safety*

and Health, and Environmental Management, led by a non-teaching professional, is classified under this goal.

Fiscal resources – This one project is spending 0.6% of the fiscal resources this year. This is not expected to change significantly during the next five years.

GOAL 4: GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT.

I. Statement of Issue(s)

In contrast to the other ten commodities, Environment and Natural Resources has as its purpose, not solely to further agricultural production and competitiveness, but to achieve production while promoting a balance between agriculture and the environment. The work under this commodity is focused on tropical ecosystems. Emphasis is given to Water Pollution Control, Integrated Pest Management, and Sustainable Agriculture, long-term critical issues being targeted by the projects ascribed to this goal. Each individual research project has its particular short and intermediate-term critical issue(s), reviewed yearly in the commodity meetings (see Stakeholder Input Process).

II. Performance Goal(s)

Output indicators:

- New sustainable agricultural practices are developed.
- Germplasm alternatives for erodible soils are recommended.
- New agricultural uses for sludges are developed.
- New agricultural waste management practices are developed.
- New erosion control practices are developed.

Outcome indicator:

- Quality of agricultural and non-agricultural soils improves.
- Sustainable agriculture spreads.
- Non-point pollution from agricultural sources decreases.
- Integrated management of agricultural chemicals spreads.
- Soil erosion decreases.

III. Key Program Component(s)

Provide useful, relevant research on Environment and Natural Resources, particularly as related to agriculture, focusing on specific problems within this commodity, and within all other commodities.

IV. Evaluation Framework

As stated in Goal 1, the mission of AES Puerto Rico is to conduct the basic and applied research needed to achieve an economically viable agricultural sector, to strengthen the industries that process agricultural raw materials, and to stimulate rural

development, while conserving our natural resources and the environment. It is under this context that the projects within this goal will be evaluated when completed. Each project will be evaluated in a different way, as stated in each proposal. Information will be collected in order to learn whether or not the expected outcomes or unexpected developments were achieved.

V. Internal and External linkages

Internal – AES commodity, Environment and Natural Resources has lately been particularly linked to the PR Administration of Solid Wastes, as well as to the PR Department of Natural Resources and Environment. However, it must be noted that it keeps close links with agricultural oriented organizations and institutions, as its goals are not geared to the natural resources *per se*, but to their relation with agricultural production and competitiveness. Most of the scientists working under this AES commodity are agronomists, soil scientists, and chemists.

External – AES keeps close ties with the USDA (for example, the National IR-4 Program) and with public and private universities throughout the United States and elsewhere, particularly institutions related to agricultural research. For example, the University of Florida and AES are partners in many CBAG projects. Partnerships with private companies and corporations are also established.

VI. Target Audiences

Extensionists, growers and farmers, scientists, agronomists, other professionals working in public and private agencies with agriculture and agriculture-related areas and issues, the farmers' association and federation, other interested groups and associations, graduate, undergraduate, high school and other students, and communities and public at large.

VII. Program duration

Long-term (more than five years).

VIII. Allocated Resources

Human resources – Although the number of scientists year in 1999 amounts to five (seven percent of our scientists), 20 scientists work part or all of their time in one or more projects under this goal. This is not expected to change during the next five years.

Fiscal resources – The projects under this goal are spending about seven percent of this year's fiscal resources. This is not expected to change significantly during the next five years.

GOAL 5: ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS.

I. Statement of Issue(s)

Farming is critical for maintaining the quality of life in Puerto Rico, because of its high multiplier effect and the lack of other alternative employment opportunities in rural areas. Several AES research projects address the long-term critical issue Quality of Life, which, although thoroughly related to agricultural production, fits better under this goal. Each individual research project has its particular short and intermediate-term critical issue(s), reviewed yearly in the commodity meetings (see Stakeholder Input Process).

The economic well-being of individuals, families and communities is an important component of what has been conceptualized as quality of life. Our program is directed to providing the socioeconomic research required to formulate alternatives that can potentially enhance both the economic well-being and the quality of life in rural areas, including the improvement of the efficiency of agricultural development in these areas.

II. Performance Goal(s)

Output indicators:

- Effect of changes in the international and local market conditions for the Island's products with respect to the economic situation of producers, particularly of starchy and vegetable crops, are documented.
- Local dimensions of community food systems are assessed.
- New marketing and distribution alternatives for regional production are recommended.
- Cost effective and environmentally sound techniques for processing agricultural products, coffee in particular, are developed.
- Agriculture's contributions to local employment opportunities in the targeted region are evaluated.

Outcome indicators:

(Economic well being [at targeted municipalities])

- Average/median family income increases.
- Percent of families below poverty level decreases.
- Percent of farm operators' income derived from agriculture increases.

(Quality of life)

- Employment opportunities in the locality increase.
- The number of civic organizations dealing with the socioeconomic problems of rural communities or providing sociocultural alternatives for these areas increases.

(Viability of farming)

- The agricultural gross income of the targeted region increases.
- The number of establishments processing agricultural products from the region and in compliance with environmental standards increases.

-The number of farms and the amount of land in farms is maintained or increased.

III. Key program Component

Provide useful, relevant agricultural research, focussing on specific problems within each AES commodity, as related to quality of life.

IV. Evaluation Framework

As stated in Goal 1, the mission of AES is to conduct the basic and applied research needed to achieve an economically viable agricultural sector, to strengthen the industries that process agricultural raw materials, and to stimulate rural development, while conserving our natural resources and the environment. It is under this context that the projects within this goal will be evaluated when completed. Each project will be evaluated in a different way, as stated in each proposal. Information will be collected in order to learn whether or not the expected outcomes or unexpected developments were achieved.

V. Internal and External linkages

Internal - All statements under Goal 1 are valid here as well, with perhaps a change of emphasis in the relative importance of the various links. AES keeps close working relations with the Agricultural Extension Service and the Faculty of Agriculture. The Agriculture Extension Service is a vital link for achieving the long term- goal of enhancing economic well being and quality of life in rural areas. Both are units within the CAS at the Mayagüez Campus of the University of Puerto Rico. Also, linkages are kept with the rest of the University.

In addition, scientists working under this goal participate in several community organizations, serving as resources in their area of expertise and sharing with them information and results from their studies. These organizations include: *Diálogos de Autogestión Comunitaria*, *Instituto Agrológico y Cultural Cooperativo de Barranquitas*, and meetings with representatives of the credit cooperative movement in the Island.

The Dean of CAS and the Associate Dean and Deputy Director of AES meet regularly with the Secretary of Agriculture (who is an AES scientist) and with other heads of government agencies and corporations to analyze agricultural problems and receive research suggestions, based on current needs.

Good working relations are maintained with the Farmers' Association, the Farmers' Federation, and with private agricultural or agrichemical businesses, which sponsor AES educational and professional activities.

External –AES keeps close ties with the USDA (for example, the National IR-4 Program) and with public and private universities throughout the United States and elsewhere, particularly institutions related to agricultural research. For example, the University of

Florida and AES are partners in many CBAG projects. Partnerships with private companies and corporations are also established.

VI. Target Audiences

Extensionists, growers and farmers, scientists, agronomists, other professionals in private and public agencies working with agriculture and agriculture-related areas and issues, the farmers' association and federation, other interested groups and associations, graduate, undergraduate, high school and other students, and communities and public at large.

VII. Program Duration

Long-term (more than five years).

VIII. Allocated resources

Human resources- The projects ascribed to this goal have employed approximately seven percent of our scientists in 1999. This is not expected to change during the next five years.

Fiscal resources – The projects ascribed to this goal spend about four percent of our fiscal resources this year. This is not expected to change significantly during the next five years.

2. STAKEHOLDER INPUT PROCESS

As stated in Statement of Issue of Goal 1, all of our 120 research, non administrative projects are ascribed to one of eleven commodities (dairy production, coffee, plantains and bananas, vegetable crops, fruit crops, ornamental crops, beef production, root and tuber crops, basic grains, environment and natural resources, and sugarcane). Each commodity has a leader, usually an AES scientist or an Extension specialist, who will be in charge of developing the strategic plan of his/her commodity, to be submitted to the Administration, while reviewing the long-term (which, being long-term, tend to stay unchanged), intermediate and short-term critical issues targeted by the individual projects, the particular commodity and, consequently, the particular goal.

To develop such a plan, the leaders must invite, receive, evaluate and synthesize the input of many groups and individuals, what is known as stakeholders, such as scientists, extensionists, other UPR personnel, farmers, agroindustrialists, representatives of farmers organizations, of the different government agencies, of the Agronomists Association, and of other interested groups, as well as private parties and individuals and public at large. This is done annually in a meeting convened with that particular purpose, where the active projects are discussed and then evaluated by the participants. Suggestions on how to improve them are invited and received, as well as suggestions on what to research next, or

any urgent necessity that may have arisen. This and the availability of personnel and financial resources will set the path for shifts in priorities or new research proposals for the upcoming years.

The preliminary Strategic Plan is usually divided up by crops (except, of course, beef, dairy, and environment and natural resources), ranked in order of importance. This ranking may be agreed upon depending on the economic input of the particular crop to the economy of Puerto Rico, the urgency of the need or needs of that particular crop, what has already been done and what is left to be done, the financial costs of such proposed research, or any other factor that may be considered relevant by the participants. Then, within each crop, each problem, need or situation is ranked, again in order of importance and/or urgency. Within each problem, need or situation, proposed strategies are listed, as well as scientific personnel who may do the job and a proposed schedule. This plan is sent to all the participants (and to people who did not necessarily participate but whom the commodity Leader feels that they should know about it) to be evaluated and reviewed.

These meetings are open to everybody, but of course, many people or groups do not realize their importance. It is up to the commodity Leader to write letters of invitation or personally invite the identified stakeholders, and to convince them of the meeting's importance. Many farmers do show up, as the Leader may have met them personally as part of his/her job, or is in close contact with somebody (like the Extension specialist or County Agent) who has. Furthermore, the meetings usually take place in an area as accessible as possible to the farmers. Many scientists and extensionists also participate. Other groups or individuals seem to be less interested or to have other priorities. Nonetheless, some, like the Farmers' Association, the Farmers' Federation, the College of Agronomists or the Puerto Rico Department of Agriculture, do send representatives, at least as observers. All this depends also on the particular commodity. Some commodities are larger or more inclusive than others; some seem to be perceived as more important than others.

3. PROGRAM REVIEW PROCESS

Every AES proposal or request for extension, formula funded or otherwise, goes through a thorough merit review process⁷ following the *Administrative Manual for the Hatch (Experiment Station) Act as Amended* (see section C.3, page 7, Projects Supported with Regional Research Funds). The review committee is made up of AES Assistant Deputy Director for Research, the concerned Department Chair⁸ and the concerned commodity Leader or Leaders, or, in the case of these last two, their representatives. Each individual evaluates and rates the various proposals before they are submitted to the proper authority for approval. If any of the members of the review committee are on the proposal

⁷⁷ See Appendix 3, Evaluation of Hatch Proposal.

⁸⁸ The College of Agricultural Sciences is made up of seven Integrated Departments: Animal Industry, Horticulture, Crop Protection, Agronomy and Soils, Agricultural Economics and Rural Sociology, Agricultural Engineering, and Agricultural Education.

being submitted, they do not participate in the evaluation process, but send the proposal to a qualified scientist.

It may be noted that AES runs 2-year projects known as SP (Special Projects), whose main purpose are to study the feasibility of promising and innovative research ideas. The development of these projects helps the review committee evaluate and rate a more elaborate research proposal based on the findings of these small grants.

Appendix 1 - UPR-AES Active Projects, 1999

APPENDIX 1 – UPR-AES ACTIVE RESEARCH PROJECTS, 1999

HATCH

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader And Department</i>
1	H-94 (S-9)	Plant genetic resources conservation and utilization	B. Brunner Horticulture
1	H-173	Control of weeds in crops of economic value	N. Semidey Crop Protection
1	H-188	Pigeonpea (<i>Cajanus cajan</i>) breeding	A. Bosques Agronomy & Soils
1	H-216	Evaluation of selected insect control practices in crops of economic importance	A. Armstrong Crop Protection
1	H-247	Evaluation of nematode control practices in crops	D. Oramas Crop Protection
1	H-273	Development of dwarf fruit trees	A. Cedeño Horticulture
1	H-282	Population dynamics and economic threshold levels on important insects and crops in Puerto Rico	A. González Crop Protection
1	H-285	The biology of selected insects of economic importance in Puerto Rico	E. Abreu Crop Protection
5	H-293	Economic evaluation of selected crop and livestock enterprises in Puerto Rico	J.L. Troche Agric. Economics
1	H-329	Coffee diseases in Puerto Rico and their control	R. Rodríguez Crop Protection
1	H-351 (W-150)	Genetic improvement of beans (<i>Phaseolus vulgaris</i> L.) for yield, pest resistance, and food value	J. Beaver Agronomy & Soils
4	H-362	Mobility, transport and leaching of nitrate and phosphate in selected Puerto Rican soils	W. Lugo Agronomy & Soils
1	H-369	Bacterial diseases on major crops and ornamental plants in Puerto Rico	M. Zapata Crop Protection
4	H-371 (S-257)	Classifying soils for solute transport as affected by soil properties and landscape position	V. Snyder Agronomy & Soils
2	H-372 NRSP-4	A national agricultural program to clear pest control agents for minor uses	N. Acín Crop Protection
1	H-373	Development of improved management practices for Arracacha and Taro production in Puerto Rico	C. Ortiz Agronomy & Soils
1	H374	Development of cost-effective technologies for the production of selected tropical ornamentals	G. Ruiz Horticulture

1	H-375	Evaluation of purebred and cross-bred dairy bull for beef production	A. Casas Animal Industry
2	H-377	Postharvest storage of oranges and chironjas in Puerto Rico	G. Fornaris Horticulture
5	H-378 (S-259)	Rural labor market in the global economy	E. Droz Agric. Economics
1	H-379	Characterization of citrus tristeza virus in Puerto Rico and control by mild strain cross protection	R.L. Rodríguez Crop Protection
1	H-380	Evaluation of crossbred dams for beef production in Puerto Rico	A. Casas Animal Industry
1	H-381	Evaluation of grass silage in diet of dairy cows; and low-cost dry cow feeding systems in a tropical environment	T. Ruiz Animal Industry
1	H-382 (S-262)	Diversity and interactions of beneficial bacteria and fungi in the rhizosphere	E. Schroder Agronomy & Soils
1	H-384	Improvement of agronomic practices for sugarcane (<i>Saccharum officinarum</i> L.) production in Puerto Rico	J.L. Rodríguez Agronomy & Soils
4	H-385 (S-271)	Solid-phase extraction techniques for pesticides in water samples	R. Montalvo Crop Protection
5	H-386 (S-276)	Rural restructuring: causes and consequences of globalized agricultural and natural resources systems	V. Carro Agric. Economics and Rural Sociology
1	H-387 (S-264)	Microirrigation of horticultural crops in humid regions	L.E. Rivera Agronomy & Soils
5	H-388 (NE-185)	Commodities, consumers, and communities: local food systems in a globalizing environment	V. Carro Agric. Economics and Rural Sociology
4	H-389 (S-280)	Mineralogical controls on colloid dispersion and solid-phase speciation of soil contaminants	N. Cavallaro Agronomy & Soils

COMMONWEALTH

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader and Department</i>
4	C-415	The insect fauna of Puerto Rico	R. Franqui Crop Protection
2	C-498	Development of non traditional food products from tropical fruits	F. Fernández Food Tech. Lab.
5	C-499	Analysis and retrieval of economic data on major agricultural commodities in Puerto Rico	M. Cortés Agric. Economics and Rural Sociology

CBAG

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader and Department</i>
4	CBAG-57 94-34135-0289	Decision support systems for vegetable production	F. Beinroth Agronomy & Soils
1	CBAG-58 95-34135-1697	Managing weeds in yam through alternative agronomic practices	M.L. Lugo Crop Protection
1	CBAG-59 95-34135-1667	Resistance of <i>Cucurbita</i> species to sweetpotato whitefly and silverleaf	L. Wessel-Beaver Agronomy & Soils
4	CBAG-60 96-34135-3025 98-34135-6523	Utilization of sewage sludge compost as a soil amendment in the tropics	G. Martínez Agronomy & Soils
1	CBAG-61 96-34135-3027 98-34135-6527	Enhancement of biological control for management of silverleaf whitefly in vegetables	A. Pantoja Crop Protection
1	CBAG-62 96-34135-3026 98-34135-6522	Biocontrol of the burrowing nematode and the banana root borer in plantain	R. Vargas Crop Protection
1	CBAG-63 96-34135-2777	Breeding snap and red kidney beans for golden mosaic resistance and heat tolerance	J. Beaver Agronomy & Soils
1	CBAG-64 97-34135-4715	Role of semiochemicals in host location and recognition by <i>Aprostocetus haitiensis</i>	R. Franqui Crop Protection
1	CBAG-65 97-34135-4717	Evaluation and quality assessment of tropical-type sweet potato	C. Ortiz Agronomy & Soils
1	CBAG-66 97-34135-4716	New coffee drying techniques: the thin layer and the spouted-bed systems	L.R. Pérez Alegría Agric. Engineering
1	CBAG-67 97-34135-4714	Improving production and aerobic stability of silages under tropical environments	A.A. Rodríguez Animal Industry
1	CBAG-68 97-34135-4712	Epidemiology and control of pigeon pea witches' broom	R.L. Rodríguez Crop Protection
1	CBAG-69 98-34135-U6518	Volatile semiochemicals for biological control of <i>Cosmopolites sordidus</i>	H. Reyes Crop Protection
4	CBAG-70 98-34135-U6518	Magnesium availability to banana and plantains in highly weathered soils	V. Snyder Agronomy & Soils
1	CBAG-71 98-34135-U6518	Effect of controlled water regimes on pumpkin growth	E. Román-Paoli Agronomy & Soils
2	CBAG-72 98-34135-U6518	Modified atmosphere packaging for a tropical fruit mixture	C. Harper Agric. Engineering

SPECIAL GRANT FUNDS

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader And Department</i>
2	SGF-10 99-34050-7357	Pesticide impact assessment research and data analysis	N. Acín Crop Protection
1	SGF-11 97-34135-4777	A physical dairy cow model for evaluating sprinkler and fan cooling systems	F. Pérez Agric. Engineering
2	SGF-12 97-EPIS-1-0054	Plantains and bananas: A review of changes in crop yield and quality of pesticides	M. Cortés Agric. Economics and Rural Sociology
2	SGF-13 98-34050-6280	Crop profile development for coffee, plantains and bananas, mangoes, calabaza and yams	N. Acín Crop Protection

INTERNATIONAL PROJECTS

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader And Department</i>
1	IP-008	Improvement of bean production in Honduras through breeding for multiple disease resistance	J. Beaver Agronomy & Soils

MCINTIRE STENNIS

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader And Department</i>
4	PR-MS-009	Soil water relations in forest, grassland and agroforestry ecosystems in Puerto Rico	V. Snyder Agronomy & Soils
4	PR-MS-010	Germplasm alternatives for land reforestation on highly erodible soils of Puerto Rico	R. Ramos Agronomy & Soils

BARD

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader And Department</i>
4	BARD-2 US 2794-96	Characterization post-tillage soil fragmentation and rejoining	V. Snyder Agronomy & Soils

COOPERATIVE PROJECTS

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader And Department</i>
1	Z-01	Soybean breeding nursery-University of Iowa	S. Cianzio Agronomy & Soils
1	Z-19	Soybean nursery – AGRIPO SEEDS	P. Márquez Agronomy & Soils
1	Z-23	Rice research between LSU, University of Arkansas, Texas A&M University and University of Puerto Rico	L. Avilés Agronomy & Soils
1	Z-38	Bean Winter Nurseries	J. Beaver Agronomy & Soils
2	Z-79	Donations to support pesticide research	N.M. Acín Crop Protection
1	Z-88	Pro-frijol	J. Beaver Agronomy & Soils
1	Z-90-C 95-34135-1858	Development of rapid and sensitive serological techniques for the detection of geminiviruses in the Caribbean area	L. Rivera Crop Protection
1	Z-91-C 95-34135-1859	Development of biological control techniques for management of the pepper weevil	C. Cruz Crop Protection
1	Z-94*	Molecular and biological characterization of whitefly transmitted geminiviruses for the development of engineered resistance	J. Bird Crop Protection
1	Z-97-C 96-34135-2779	An evergreen blueberry production system for tropical and subtropical climates	B. Brunner Horticulture
1	Z-98	Study of feeding practices leading to low milk production by dairy cows in Puerto Rico	T. Ruiz Animal Industry
5	Z-99-C 96-34135-2773	Hemispheric integration and its implications for Caribbean Basin agriculture	C. Alamo Agric. Economics and Rural Sociology
4	Z-100	Biological control of aquatic grasses in Puerto Rico	E. Abreu Crop Protection

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader And Department</i>
1	Z-103-C <i>97-34134-4604</i>	Meat gastro-intestinal parasitic worms resistant to deworming drugs	J. Fernández Animal Industry
1	Z-104-C <i>97-34135-4747</i>	Short-vined tropical pumpkins: Improvement, seed production and cultural systems	L. Wessel-Beaver Agronomy & Soils
1	Z-105	Tomato integrated management	A. Pantoja Crop Protection
1	Z-107	Evaluation of hybrid citrus root-stocks for fruit yield and quality and resistance to <i>Diaprepes</i>	R. Franqui Crop Protection
1	Z-108	Winter nursery – Soya	L. Avilés Horticulture
4	Z-110	Nitrate content reduction in municipal solid waste compost areas utilizing forage plants	J. Villarrubia Agronomy & Soils
1	Z-111	Subsurface drip irrigation for crop production in Puerto Rico	E. Román Paoli Agronomy & Soils
4	Z-112	Post-tillage soil structure and pore space dynamics	V. Snyder Agronomy & Soils
1	Z-113-C	Developing new sources of resistance to bean golden mosaic virus in common bean	J. Beaver Agronomy & Soils
1	Z-114-C	Development of tomatoes resistant to whitefly-transmitted geminiviruses	E. Román Paoli Agronomy & Soils
1	Z-115-C	Inheritance to heat tolerance in cattle: Confirmation of a major gene	D. Cianzio Animal Industry
1	Z-116-C	Ecology and epidemiology of bacterial wilt on ornamental propagative stock	M. Zapata Crop Protection
4	Z-117-C	Using climate forecasts to improve tomato production in Florida and Puerto Rico	F. Beinroth Agronomy & Soils
2	Z-120	Improvement of the shelf life and quality of mango, passion fruit and genip schnapps	J. Huertas Rum Pilot Plant
1	Z-121	Preliminary studies relating to the evolution and biosystematics of <i>C. moschata</i> and <i>C. argyrosperma</i>	L. Beaver Agronomy & Soils
1	Z-122	Grain seed production in cooperation with commercial seed companies	L. Avilés Horticulture
1	Z-123	Development of a mechanical harvester for taniers	F. Pérez Agric. Engineering
2	Z-124	Magnitude of the residue on plantains	R. Inglés Crop Protection

1	Z-125	Rice winter nursery	L. Avilés Horticulture
1	Z-126	Comparison of poultry litter and soybean meal as a supplemental protein source for weanling cattle grazing tropical grass pastures	A. Casas Animal Industry
1	Z-127	Corn and soybean nurseries –Monsanto Caribe, Inc.	P. Márquez Horticulture
1	Z-128	Siembras de habichuelas soya para incremento de semillas y germoplasma	P. Márquez Horticulture

SPECIAL PROJECTS

<i>National Goal</i>	<i>Project Number</i>	<i>Title</i>	<i>Project Leader And Department</i>
1	SP-297	Isolation, separation and identification of allelochemicals from pigeon pea leaves (<i>Cajanus cajan</i> (L.) Millsp) and surrounding soil	R. Montalvo Crop Protection
1	SP-298	Evaluation of supplementation strategies to rear dairy replacements	J. Pantoja Animal Industry
1	SP-300	Cassava flesh darkening	F. Pérez Agric. Engineering
2	SP-303	Behavior and residues of Aldicarb in plantains and processed foods in Puerto Rico	R. Montalvo Crop Protection
1	SP-304	Detection of banana streak virus in Puerto Rico	R.L. Rodríguez Crop Protection
1	SP-305	Technological packages for the production of selected vegetable crops in Puerto Rico	S. Martínez Horticulture
1	SP-306	Virus diseases of spiny coriander (<i>Eryngium foetidum</i> L.) in Puerto Rico and their control	L.R. Santiago Crop Protection
1	SP-308	Evaluation of “Cayena Lisa” pineapple clones	P. Márquez Horticulture
1	SP-309	Evaluation of a system for in-line measurement of Brix degree and ethanol content	J. Huertas Pilot Rum Plant
1	SP-311	Technological compendium for corn production	E. Acevedo Agronomy & Soils
1	SP-312	Evaluation of <i>Brachiaria brizantha</i> cv. “Marandu” with rhizomatous perennial peanut under three N levels	C. Cardona Agronomy & Soils
1	SP-314	Plant density effect on corm and cormel yields in taniers	F. Acevedo Agronomy & Soils

1	SP-315	Evaluation of promising tanager hybrids	A. Bosques Agronomy & Soils
1	SP-316	Optimization of protoplast production and plant regeneration from Tannia (<i>Xanthosoma sagittifolium</i> (L.) Schott)	J. Gill Horticulture
1	SP-317	Control of cassava green mites (<i>Mononychellus caribbeanae</i>)	E. Abreu Crop Protection
1	SP-318	Does muriate of potash fertilizer cause elevated Cl ⁻ levels in grazed forage tissue?	D. Sotomayor Agronomy & Soils
1	SP-319	Biocontrol of web blight (WB) of bean by plant growth promoting rhizobacteria	R. Echávez Crop Protection
4	SP-320	N availability in soils amended with municipal solid waste compost	D. Sotomayor Agronomy & Soils
1	SP-321	Screening of head lettuce varieties adapted to high temperatures under hydroponic conditions in Adjuntas	J. Gill Horticulture
1	SP-322	Study of the factors affecting the production of cabbage in the central mountainous region of Puerto Rico	S. Martínez Horticulture
1	SP-323	Evaluation of corn, sorghum and grass germplasm for silage production in the humid region of Puerto Rico	C. Cardona Agronomy & Soils
4	SP-324	Use of organic amendments for the management of plant-parasitic nematodes and for the enhancement of natural biological control agents	J.A. Chavarría Crop Protection
1	SP-325	Management of replacement dairy cattle in PR: From birth to first calving	J. Moyá Animal Industry
1	P-326	Publications	A. Rodríguez Crop Protection
1	SP-327	Papaya mosaic virus as an expression vector of papaya ringspot virus	M. Ferwerda-Licha Crop Protection

NEW CBAG PROJECTS, TO BEGIN SEPTEMBER 1999

- ✓ **Nitrogen availability in vegetable systems amended with biosolid-yard waste compost. Goal 4.**

David Sotomayor

- ✓ **Organic amendments for the management of phytonematodes: Enhancing natural biological control. *Goal 4.***

José A. Chavarría

- ✓ **Induced systemic resistance in mango (*Mangifera indica*) against *Colletotrichum gloeosporioides*. *Goal 1.***

Lydia I. Rivera

- ✓ **Turfgrass introduction and evaluation. *Goal 1.***

César Cardona

**1999 UPR-AES Multidisciplinary, Multinstitucional,
Multistate Linkages/Partnerships**

Contact Scientist	Topic	Partner
Dr. Victor Snyder	Soil pore space evolution and transport properties	University of Utah
Dr. Friedrich Beinroth	Decision support systems for vegetable production	University of Florida
Dr. Linda W. Beaver	Sweetpotato whitefly and silverleaf	University of Florida
Dr. Gustavo Mart nez	Sewage sludge compost	Interamerican U. of Puerto Rico; Professional Services Group (a private company)
Dr. Alberto Pantoja	Silverleaf whitefly in vegetables	University of Florida, Private farmers
Dr. James Beaver	Golden mosaic resistance and heat tolerance in snap and red kidney beans	Swiss Development Corporation, USDA-Tropical Agriculture Research Station
Dr. Rita L. Rodr guez	Pigeon pea witches' broom	University of Florida
Mrs. Nilsa Ac n	Pest agents clearing for minor uses	National IR-4 Program
Dr. Vivian Carro	Rural restructuring and globalized systems	Cornell University
Mrs. Nilsa Ac n	Pesticide impact assessment	National Agricultural Pesticide Impact Assessment Program
Mrs. Nilsa Ac n	Crop profiles	National Agricultural Pesticide Impact Assessment Program
Dr. Rita Rodr guez	Banana streak virus	Private farmers
Dr. John Fern ndez	Parasitic worms in goats	University of Florida
Mr. Pedro M rquez	Evaluation of pineapple clones	PR Department of Agriculture
Dr. Bryan Brunner	Blueberries evaluation for the tropics	University of Florida

Contact Scientist	Topic	Partner
Dr. James Beaver	Multiple disease resistance in common beans	Escuela Agrícola Panamericana El Zamorano, Honduras; Departments of Agronomy and of Phytopathology, University of Nebraska; Centro de Investigaciones Agropecuarias del Suroeste, San Juan de la Maguana, Dominican Republic
Dr. David Sotomayor	Effects of muriate of potash fertilizer in grazed forage tissue	Private farmers
Dr. Silvia Cianzio	Soybean breeding - University of Iowa	University of Puerto Rico's Agricultural Experiment Station
Mr. Edwin Abreu	Biological control of aquatic weeds	PR Department of Natural Resources, US Army Corps of Engineers
Dr. Linda W. Beaver	Short vine tropical pumpkins	University of Florida
Dr. Rosa Franqui	Hybrid citrus rootstock and <i>Diaprepes abbreviatus</i>	USDA-Agricultural Research Service
Dr. Jos Villarrubia	Pastures and NO ₃ -N cleaning	PR Administration of Solid Wastes
Dr. Elvin Román	Subsurface drip irrigation	University of Puerto Rico's School of Engineering
Dr. Victor Snyder	Post tillage soil structure and pore space dynamics	Utah State University; Agricultural Research Organization (A.R.O.), Israel
Dr. James Beaver	Golden mosaic resistance in common bean	Department of Horticultural Sciences, University of Florida
Dr. Elvin Román	Resistance to whitefly transmitted geminiviruses in tomatoes - University of Florida	University of Puerto Rico's Agricultural Experiment Station
Dr. Danilo Cianzio	Heat tolerance in cattle	University of Florida

Contact Scientist	Topic	Partner
Dr. Friedrich Beinroth	Climate forecasts	University of Florida
Dr. Javier Huertas	Shelf life and quality of certain fruits	PR Department of Agriculture
Dr. Linda Beaver	Evolution and biosystematics of <i>Cucurbita</i>	Smithsonian Institution
Mr. Lucas Avil s	Seed production	Private seed companies
Dr. Fernando P rez	Tanier harvest equipment	PR Department of Agriculture
Mr. Pedro M rquez	Soybean winter nursery	Agripo Seed Co.
Mr. Lucas Avil s	Rice winter nursery	Louisiana State University, University of Arkansas, Texas A&M
Dr. James Beaver	Bean winter nursery	Department of Crop and Soil Sciences, Michigan State University; Department of Plant Sciences, North Dakota University; Department of Horticulture, University of Nebraska; USDA-Agricultural Research Service
Dr. James Beaver	Disease resistant and abiotic stress tolerant Andean beans	International Bean Research Network (Profrijol), Guatemala City
Mr. Rodrigo Ech vez	Web blight resistance in common bean lines	International Bean Research Network (Profrijol), Guatemala City
Dr. Lydia Rivera	Serological techniques for the detection of geminiviruses	University of Florida
Dr. Carlos Cruz	Biological control of the pepper weevil	University of Florida
Mrs. Carmen Alamo	Hemispheric integration and its implications of Caribbean basin agriculture	University of Florida
Dr. Alberto Pantoja	IPM program development	Private farmers

APPENDIX 3 – EVALUATION OF HATCH PROPOSAL

EVALUATION OF HATCH PROPOSAL

- A. TITLE:
 - B. PRINCIPAL INVESTIGATOR:
 - C. PROPOSAL CONFORMS TO GUIDELINES FOR PROPOSAL PREPARATION AND SUBMISSION AS REQUESTED BY AES: (Guidelines included)
 YES _____ NO _____
 IF NO, EXPLAIN WHY PROPOSAL DOES NOT MEET REQUIREMENTS
 - D. PROPOSAL CONFORMS TO HIGH PRIORITY RESEARCH AREAS AS STATED BY AES STRATEGIC PLAN: YES _____ NO _____
 - E. NAME OF PEER REVIEWER: _____
 - F. DATE REVIEWED: _____
- RECOMMENDED FOR FUNDING: YES _____ NO _____

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EVALUATION CRITERIA FOR RESEARCH PROPOSAL	SCORING*
=====	
1. Objectives and Research Analysis	_____
2. Operational Plan Analysis	_____
3. Duplication of Research	_____
4. Probability of Success	_____
5. Impact of Proposed Research	_____
6. Overall Rating	_____

*Please score each criteria from 1 to 10
 10 is the highest score; 1 is the lowest score

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COMMENTS (If necessary use the back side of this sheet.)

8. This information assumes that the personnel eligible for retirement intend, in fact, to retire. However, it is not known for sure. Furthermore, under the current fiscal situation, we must assume that many of the retirees will not be replaced. It is also possible that future administrations decide to move scientists from one goal to another.