AREERA POW Text

UNIVERSITY OF GUAM
College of Agriculture and Life Sciences

5 YEAR PLAN OF WORK
October 1, 1999 to September 30, 2004

Plan Option:

1862 RESEARCH
Guam Agricultural Experiment Station
and
1862 EXTENSION
Guam Cooperative Extension

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I. OVERVIEW

A. Guam and Its People Guam, an Unincorporated Territory of the United States, is located at latitude 13.28 degrees North and longitude 144.47 East. Guam, the largest of 16 islands in the Mariana archipelago in the Western Pacific, is approximately 3,600 miles West/Southwest of the Hawaiian Islands. The remaining islands in the Mariana archipelago are collectively embodied under one governmental system known as the U.S. Commonwealth of the Northern Mariana Islands (CNMI).

The population of Guam was estimated in 1998 to be approximately 150,000 which includes non-immigrant aliens, nationals from the Freely Associated States of Micronesia, and members of the U.S. Armed Forces and their dependents. The ethnic backgrounds of the people on island include: Chamorros (native islanders), Caucasians, Filipinos, Micronesians, Japanese, Chinese, Koreans, Vietnamese, Thai, Indians, and Polynesians. The composition of ethnicity on island is approximately 44% Chamorros, 24% Caucasians, 22% Filipinos, and 10% others.

Guam's Land Grant Status - On June 22, 1972 the United States Congress, through Public Law 92-318, designated the University of Guam as a member of the 1862 Land Grant institutions. The University of Guam now joins over 80 other land grant

institutions found throughout the U.S. including those in the fifty states, the District of Columbia, the U.S. territories of American Samoa, Northern Mariana Islands, Puerto Rico and Virgin Islands, and the U.S. Freely Associated States of Micronesia.

In recognition of the University's land grant status, the Guam Legislature, through P. L. 13-47, assented to the federal provisions dealing with the research and extension functions of a land grant institution. In addition, the Legislature provided for the transfer of agricultural extension and research personnel formerly with the Department of Agriculture, Government of Guam, to the University of Guam. Subsequently, in March 1974, the University Board of Regents created the College of Agriculture and Life Sciences (CALS) to facilitate the tripartite functions of the College including research, extension and teaching.

At the time it received its land grant status, the University of Guam was granted a $3 million endowment, in lieu of land, to provide college level agricultural and related education programs. The endowment fund generates interest for use in program operational needs. Aside from the endowment fund, the University of Guam also became eligible to receive annual federal formula funds to help support a research entity (Agricultural Experiment Station) and an outreach education program entity (Cooperative Extension).

As a Land Grant Institution, the University of Guam is part of a national network of institutions of higher learning offering formal education in agriculture and related fields with Cooperative Extension and Agricultural Research Station entities. As such, the University has access to a dynamic informational resource base.

In addition, the American Samoa Community College, the College of Micronesia, the Northern Marianas College, the University of Guam, and the University of Hawaii collaborate in an association aimed at addressing shared regional concerns that are social and economic in nature. This association is known as the Agricultural Development of the American Pacific or by its acronym ADAP. The ADAP receives annual financial support from appropriated U.S. federal funds.

The Agricultural Experiment Station conducts research for the advancement and protection of the island's agriculture and related fields. The Cooperative Extension translates and delivers technical information as well as conduct informal (non-college) education programs to farmers, homemakers, families, youths and the community.

In 1997, after many years of residing in temporary facilities, the entire staff, faculty and administrators of the College moved into a new facility that provides office spaces, laboratories and classrooms. Aside from a few on-campus research sites, the College has experiment stations in various villages on island including Malojloj-Inarajan, Ija-Inarajan, Barrigada, and at the border of Dededo and Yigo.

The present day program components of CALS include the following:

1. Agricultural Experiment Station (AES) - The research programs of AES are concentrated in such disciplines as Agricultural Engineering, Animal Science, Entomology, Vegetable Horticulture, Ornamental Horticulture, Plant Pathology, Pomology, Soil Science, and Turf Science.

2. Cooperative Extension (CE) - Community outreach educational programs offered by the Guam Cooperative Extension touch a wide range of areas including: 4-H and Youth Development, Agriculture and Natural Resources, Community Resources Development, and Consumer and Family Sciences (formerly known as Home Economics).

3. Resident Instruction (RI) - Students enrolled in the College's academic program can pursue a Bachelor of Science (BS) in Agriculture, and/or a Bachelor of Arts (BA) in Consumer and Family Sciences. In conjunction with the College of Education, CALS also offers secondary teaching specialty areas in agriculture and in consumer and family sciences. A Master of Science (MS) in Environmental Science is also offered jointly with the other graduate faculty from the College of Arts and Sciences and other Graduate units on campus.

Mission Ð The mission of the College of Agriculture and Life Sciences (CALS), in partnership with public and private sectors, is to improve economic, environmental and social conditions for the people of Guam and the Western Pacific region by providing creative and integrated research, education, and extension programs in agriculture and related sciences.

II. PLAN OPTION

The submission of this AREERA Plan of Work accounts for both the University of Guam's 1862 Research and 1862 Extension programs.

A. Research Ð The organizational structure of the Guam Agricultural Experiment Station is typical to that of most major land grant institutions. The station has laboratory facilities on campus as well as off-campus. The professionals (scientists) of the station are recruited under the University professorial ranking system. Station scientists also have academic appointments as well as extension specialist appointments. Station scientists, along with extension professionals, help form the teaching pool for the College's academic programs in agriculture and environmental science.

AES Mission - To conduct applied, adaptive and basic research in agriculture, and on issues pertaining to family well being, youth development, human health/nutrition, consumerism, human resource development and the environment.

B. Extension Ð The organizational structure of the Guam Cooperative Extension is atypical as compared to most 1862 extension organizations. The island's political structure gives rise to this uniqueness. While the island's territorial government is that that of a typical state structure of executive, legislative and judiciary branches of

government, it does not have a county or municipal government system. As such, the function of the Guam Cooperative Extension is operated solely out of the University. The professionals (specialists) of the cooperative extension are recruited under the University professorial ranking system. Extension professionals also have academic appointments. Extension professionals, along with station scientists, help form the teaching pool for the College's academic programs in agriculture and environmental science. Extension professionals also provide the teaching pool for the College's academic program in Consumer and Family Sciences.

Extension Mission Ð The Guam Cooperative Extension enables the multicultural community of Guam to make informed decisions through non-formal education programs based on research and identified local needs. The typical extension professional also functions as a quasi field (county) agent.

The non-formal education programs of the Guam Cooperative Extension provide community-wide outreach educational opportunities in agriculture, family well being, human health/nutrition, consumerism, 4-H and youth development, human resource development, and environmental stewardship.

III. PROJECTED RESOURCES

The Hatch and Smith-Lever formula funds and their respective Government of Guam matching funds will be utilized to maintain the regular operations of the University of Guam Agricultural Experiment Station and the Cooperative Extension. The funds will principally support the salary of the more permanent personnel and day to day operations of the agricultural experiment station and the cooperative extension.

The Agricultural Experiment Station consists of professionals, paraprofessionals, support staff and administrators. The station professionals carry research scientist, teaching and extension responsibilities. The paraprofessionals are station personnel that assist professionals in carrying out the more mundane aspects of research.

The Guam Cooperative Extension consists of professionals, paraprofessionals, support staff and administrators. The extension professionals carry extension specialist, field agent and teaching responsibilities. Depending on academic background and training, paraprofessionals carry the title of extension associates or extension assistants and assist professionals in the more routine extension duties.

Table 1 depicts the overall FTE requirements of the Agricultural Experiment Station and the Cooperative Extension. Table 2 depicts the financial requirements of the Agricultural Experiment Station and the Cooperative Extension.

PLANNED PROGRAMS

A. National Goal 1: An agricultural system that is highly competitive in the global

economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing and marketing.

1. Statement of Issue

Guam's agricultural production is limited to small-scale farming operations. The extremely vulnerable and limited local market for perishable products faces recurring feast or famine cycles. Market forces encourage over production when prices escalate due to limited supply. The lack of market and production information also contributes to the fluctuation. When the supply exceeds demand and prices drop, farmers tend to immediately decrease production. Guam's tropical environment allows immediate planting in response to market conditions. Farmers believe that export to markets outside of Guam is the ideal solution to this problem.

Quarantine restrictions due to insect and disease problems on Guam prohibit export of fresh plant and most animal products. However, with light processing and packaging, value added products can be alternatives to exporting fresh agricultural products.

There are very few farmlands on island that are privately owned. This can be attributed to the approximately 2/3 of the total landmass being held by both the local and federal governments. However, lands dedicated to agricultural production through the Chamorro Land Trust Commission's agricultural land lease program provides strong incentives to increase production levels that could support small scale processing and other value added activities targeting export markets. The increase in volume and diversity of products could open up markets for products that could not otherwise be exported.

Sustainable production and processing technologies must be identified, adopted and promoted to ensure long term viability. Genetic material suitable for production on Guam, which have the necessary traits for light processing and meet the requirements of the target markets must be identified or developed. Infrastructure to support both production and processing must be developed to insure sustainability and competitiveness of Guam farms and products.

2. Performance Goal(s)

To develop a balanced research program aimed at strengthening the production of (a) tropical fruits and vegetables crops, and (b) tropically suitable poultry and livestock breeds and aquaculture species.

To develop an agricultural production support research program in farm management, marketing, agricultural engineering and soils.

To support a research program that generates market and production related information for use as a decision-making tool for the farmers of Guam.

To develop and demonstrate sustainable agricultural production systems.

To improve crop marketing through value-added product schemes.

3. Output Indicators

Vibrant, well-rounded research programs in horticulture, animal science, aquaculture, soils science, agricultural engineering and agricultural economics that provide results towards a greatly enhanced production of tropical corps and farmed animals.

A functional and useful market information system.

A functional and useful agricultural information dissemination system that supports sustainable agricultural production practices.

A collaborative research and extension program.

4. Outcome Indicators

Increased value of agricultural products.

New varieties (cultivars), animal species and/or value-added schemes incorporated into farm production practices.

The number of farmers and other clientele adopting more efficient cultural practices including irrigation, plant nutrient and soil management.

The number of farms reporting a decrease in production associated costs.

The adoption of the Market Information System.

The number of crops with measured yield levels for typhoon damage assessments.

The number of farm budgets prepared.

The number of grants received in support of the research.

The number of active collaborations with off island researchers.
The number of both peer and lay reviewed publications.

The number of workshops and community interaction.

The upgrade in computer technology and capability.

The increased in library and information holdings.

The number of established linkages and partnerships with other public and private institutions.

The number of established linkages with companies and individuals.

The number of exchange programs between institutions, USDA, and other interested cooperators.

5. Key Program Components

To conduct research aimed at improving: (1) tropical fruit and vegetable production; (2) the use of irrigation water and fertigation/chemigation systems; (3) the use of soil amendments in the region; (4) poultry and shell egg production; (4) hog production; and (5) aquaculture through investigations of culture methods, species diversification and aquatic farming systems.

To develop an agricultural market information system (MIS) for Guam and the American Affiliated Pacific.

To continue the research program on the economics of agricultural production in the Mariana Islands.

To establish external linkages with other institutions in the Pacific region, western region, nationally and international.

To establish an exchange of scholars between UOG and off island institutions.

To develop strategic alliances with government agencies, industry and other sources of funding to support research and scholarly activities.

To adapt appropriate technologies and conduct demonstrations in small-scale re-circulating aquaculture systems.

To conduct demonstrations and training on improved sustainable agricultural practices for existing and new agricultural enterprises.

To develop and assist others in the production of educational materials or demonstrations regarding horticultural crops, livestock and poultry, and aquaculture.

6. Internal and External Linkages

Agricultural experiment station scientists and agricultural extension specialists will collaborate to address the above stated, i.e. having each issues reviewed by all disciplines to ensure all aspects of the issues are addressed.

Collaborative activities with on-island government officials and private sector professionals to involve them in either actual projects or input on program design.

Interaction with other regional land grant programs in the region including the Northern Marianas College, College of Micronesia, American Samoa Community College and the University of Hawaii will continue to occur as supported by the ADAP (Agricultural Development in the American Pacific).

7. Target Audience

Farmers/growers and related small business in program development to ensure broad dissemination and understanding of new technologies. The Pacific Basin Resource Conservation and Development Council's agricultural products processing committee to be involved in the planning and implementation of educational programs. Collaborative projects with personnel support and expertise from Natural Resource Conservation Service, University of Guam Research Faculty, Extension and other industry professionals to help develop and promote the production of value-added farm products.

8. Program Duration

The above program components are intended to occur on a continuing basis until such time that the current state of the island's and regional agricultural production activities have a greater foothold in the market.

9. Allocated Resources

Please refer to Tables 1 and 2 (pages 7 and 8 respectively) in section II of this plan for a breakdown of the FTE and funding allocation for Goal 1.

10. Education and Outreach Programs

Initial educational efforts will concentrate on increasing awareness of sustainable production and value-added activities and their potential for gaining access to export markets. Workshops, media presentations and one on one-contacts will be the primary method of information dissemination. Volunteers will be trained to extend the educational programs to the farming community and the general public.

B. National Goal 2: A safe and secure food and fiber system. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education.

1. Statement of Issue

As a tropical paradise, Guam's year round summer like condition makes for a natural haven for economic pests of agriculture. Unlike temperate areas which have cold spells

that naturally “check” pest populations, Guam’s weather only makes for prolific pest growth and recurrences.

To combat pest problems, farmers/growers almost always resort to the use of pesticides. This practice often leads to the use of varying pesticides as other pesticides appear to become ineffective in dealing with a particular insect or disease problem.

To assist farmers/growers in the marketing of safe agricultural products, research needs to focus in finding new or alternative methods to safely and economically deal with pests. At the same time, farmers/growers need to be provided an outreach education program on all aspects of pesticide use and alternative methods to combating pest problems.

2. Performance Goals

To develop a multi-faceted plant protection and urban entomology as well as plant pathology research program for Guam and the region.

To develop an integrated pest management (IPM) awareness program for Guam and the region in cooperation with Guam EPA and other regional regulatory agencies, centered on chemical pesticides usage, their environmental impact and possible alternatives.

3. Output Indicators

A research program that is responsive to finding solutions and alternative methods to dealing with economic pests of agriculture on Guam and the region.

An extension education program that is responsive to the educational needs of farmers/growers, homeowners, plant nursery and golf course operators, and the general public in dealing as well as understanding the effects of economic pests of agriculture on Guam and the region.

4. Outcome Indicators

Number of successful bio-control introductions for pest control.
Number of control strategies developed for plant pests.

Number of control strategies developed for urban insect pests.

Number of grants received in support of projects.

Number of active collaborations with regional researchers.

Number of both peer and lay reviewed publications.

Number of clients attending pesticide training courses and their grades.

Number of bulletins produced.

Number of bulletins requested and distributed on IPM topics.

Number of demonstrations on IPM practices.

Results of pesticide usage surveys.

5. Key Program Components

Maintain the internationally known bio-control research program within the experiment station.

Continue a diversified plant pathology research program.

Reactivate and improve the research program on cultural and pesticide control of insect pests of commercial crops, household plants and turf grasses.

Continue research into control of urban insect pests such as termites, cockroaches and mosquitoes.

Conduct pesticide application workshops in private and commercial pest control.

Produce and assist others in the production of educational materials or demonstrations regarding the IPM practices of pest monitoring, cultural control and biological control.

6. Internal and External Linkages

Agricultural experiment station plant pathologist and entomologists and extension entomologist will collaborate to address the above stated. Input and interaction from the station and extension agricultural economists will also be obtained for feasibility purposes.

Collaborative activities with on-island government officials and private sector professionals to involve them in projects and program design.

Interaction with other regional land grant programs in the region including the Northern Marianas College, College of Micronesia, American Samoa Community College and the University of Hawaii will continue to occur as supported by the ADAP (Agricultural Development in the American Pacific).

Collaboration with pesticide manufacturers will also continue to further the development of special needs pesticide use on tropical crops that are not listed for use in most agricultural pesticides.

7. Target Audience

Farmers, growers, ornamental nursery operators, golf course superintendents, pest control operators, government agencies and homeowners.

8. Program Duration

This is an on-going continuous program.

9. Allocated Resources

Please refer to Tables 1 and 2 (pages 7 and 8 respectively) in section II of this plan for a breakdown of the FTE and funding allocation for Goal 2.

10. Education and Outreach Programs

The Guam Cooperative Extension currently takes the lead role in the Pesticide Applicator Training (PAT) through a memorandum of understanding with the Guam Environmental Protection Agency. Extension professionals develop supplemental educational materials for this program with input from research scientists.

Pesticide guides are also developed and workshops conducted for clientele. A comprehensive Cucurbit Pesticide Guide has been completed and a new guide for Tomatoes, Eggplant and Bell Peppers is currently in the making.

C. National Goal 3: A healthy, well-nourished population. Through research and education on nutrition and development of more nutritious foods, enable people to make health-promoting choices.

Statement of Issue

When compared to the U.S. population the residents of Guam have a higher incidence rate and earlier onset of chronic diseases including, diabetes, hypertension, obesity and cancer. Thirty percent (30%) of all deaths each year are attributed to diabetes, heart disease, or cerebral-vascular disease. The local dietary patterns reflected in studies completed since 1991 show low consumption of vitamin A, folate, and some minerals especially calcium. Protein intake is at 1.5 to 2 times the recommended levels. Total fat intake is above the recommended 30% level. Furthermore, even though the percentage of calories from carbohydrates was close to the 55-60% recommendation, more than 10% was from refined sugar. For children and adults alike the carbohydrate source most frequently identified was fruit flavored drinks including soft drinks. In addition, a higher percentage of children ages 11-14 had excess weight for height than is reported for same age children in the United States.

The prenatal health of women and methods of infant feeding are areas in which local

research has proven helpful in the development of effective education materials and strategies. What little data is available for adult women suggests a breastfeeding initiation rate of 25-30%. Guam also has an increasing incidence of infant mortality and low birth weight. Smoking and inadequate prenatal care are both known to contribute to these negative birth outcomes. Furthermore, there are increasing rates of adolescent pregnancy. Many of these adolescents and adult women do not have insurance coverage, and therefore do not have prenatal care. Access to health care will decrease further as welfare reform is implemented.

Guam has incidence rates of hepatitis, tuberculosis, and sexually transmitted diseases that exceed those of the United States. The hospital facility on Guam is not prepared to provide for the care of these patients, so many of them are cared for at home. The nutritional implications for prevention and management of these diseases need to be addressed.

Guam's performance plan addresses the following areas of concern: a) the need to increase objective data regarding nutrient intake in this region; b) the need to improve nutrition education materials and methodologies available on Guam especially for pregnant and lactating women and teens, adults and children at risk for chronic and communicable disease; and c) the need to train more professionals in the field of human nutrition and consumer and family science.

2. Performance Goal(s)

To generate and disseminate research on issues that impact human resource development, food safety, nutrition and related fields.

To continue to provide educational opportunities for a healthful lifestyle on such issues as improving the quality of diet, the quality of food, and the number of food choices.

To promote health, safety, and access to quality health care.

3. Output Indicators

Research on human resource development, nutrition and food safety, and related fields will be established and the results will be disseminated to stakeholders, appropriate and targeted audiences.

The level of nutrition and health knowledge of professional and paraprofessional practitioners will increase through collaborations with public and private organizations and through demonstrations and workshops.

4. Outcome Indicators

The number of established research projects in human resource development (families-at risk, youth at risk, human development, etc.).

The number of publications, presentations at conferences, national organizations, regional conferences.

The number of funded research projects.

The number of collaborative research projects, established partnerships among professionals, volunteers, private and public organizations.

Number of workshops offered.

The number of participants who completed training.

The percentage of participants who showed improvement through various levels of training.

The number of persons completing non-formal nutrition education programs on better management of health risk factors (e.g., obesity, hypertension, etc.) and the number of these persons who plan to adopt one or more recommended nutrition practices to reduce health risks.

The total number of persons who actually adopt one or more recommended nutrition practices to reduce health risks.

The total number of persons completing non-formal nutrition education programs that provide dietary guidance to consumers and the total number of these persons who plan to adopt one or more recommended Dietary Guidelines.

5. Key Program Components

Develop a research program dealing with human nutrition, health and issues concerning meal management, food safety or family economics.

Develop an applied research program dealing with community planning, program need assessments, evaluation studies and secondary data analysis that can address issues concerning families and youth at risk.

To conduct workshops on food safety and nutrition education.

Increased collaboration with the university community, public and private agencies and organizations.

Demonstrations, hands-on experience on meal preparation, handling, processing and food storage.

6. Internal and External Linkages

Internal collaborations with Agriculture and Natural Resources and 4-H Youth Development will strengthen the Team Nutrition - “Singko Kada Diha” (Five every day) collaboration which has been established with representatives from education, the hospital, supermarkets, fitness centers, the Hotel and Restaurant Association, and public health. In its first year team nutrition has provided training for school food service personnel, school aides, teachers, parents, and students in all 51 schools on Guam. A monthly newsletter is produced and distributed to each school. A school gardening project will complement this program.

The main strategies for external linkages include: a) strengthen existing collaborations with the Department of Public Health (Chronic Disease unit, the WIC program and Food Stamp Program), Department of Education, Department of Defense Education Authority, Guam Memorial Hospital Authority (Island-wide Breastfeeding Coalition, land grant colleges of the region, Ministries of Health in the region, and the Guam Diabetes Association and Task Force; b) strengthen collaborations with the Colleges of Nursing and Health, Physical, Education, and Dance to prepare professionals for careers in human nutrition; and c) to form partnerships with regional entities such as the Secretariat for the Pacific Community (formerly the South Pacific Commission) to strengthen research efforts related to the pacific diet.

7. Target Audience

Families and individuals, especially pregnant and lactating women and adults and children at risk for chronic and communicable diseases.

8. Program Duration

This is an on-going program.

9. Allocated Resources

Please refer to Tables 1 and 2 (pages 7 and 8 respectively) in section II of this plan for a breakdown of the FTE and funding allocation for Goal 3.

10. Education and Outreach Programs

Monthly EFNEP based classes held at WIC clinic sites in support of WIC Farmer’s Market Program.

In-school youth EFNEP focusing on 4th and 5th grades students.

Periodic nutrition and food safety training for child care providers.

Semi annual training for school food service personnel.

Quarterly training for WIC paraprofessional staff.

Periodic workshops in food selection and preparation for senior citizens.

Periodic conferences addressing chronic disease reduction and management.

Periodic distribution of diabetes newsletter to several hundred members of community.

Periodic distribution of breastfeeding information letter to medical professionals.

National Goal 4: Greater harmony between agriculture and the environment. Enhance the quality of the environment through better understanding of and building on agriculture's and forestry's complex links with soil, water, air, and biotic resources.

1. Statement of Issue

Guam is a tropical island. It has a land area of approximately 200 square miles and a population of approximately 150,000. The economy is based upon tourism, the military, retailing and transportation. The northern half of the island is a raised limestone plateau where most of the population lives and which is the location of its sole-source aquifer. Most of the population in the southern part of the island lives along the shoreline. The southern half of the island is the location of all of the surface water on the island. It is vegetated with sword grass and scrub forests. The southern interior is largely uninhabited, steeply sloped, covered with highly erodable volcanic soils and subject to dry season burning. The island is normally blessed with abundant rain that is distributed in a wet and a dry season.

The primary environmental problems addressed by the College of Agriculture and Life Sciences can be grouped into seven sets of issues. The first issue is water quality and quantity. The sole source aquifer is under the center of population and most of the agricultural activity on-island. Almost all agriculture irrigation is done with potable water from public mains. The public is concerned about contamination of its drinking water source and competition for drinking water with agriculture. The second issue is the maintenance of soil fertility and controlling of soil erosion. Tropical soils lose fertility rapidly without the use of proper agricultural practices and soil erosion threatens to kill the coral reefs that surround the island. The third issue is the toxicity of the pesticides used on-island. The farmers and the public want less toxic alternatives. The fourth issue is management of organic wastes. An isolated island environment limits the choices of waste disposal and amplifies the problems arising from their disposal. The fifth issue is one of bio-diversity. Introductions of exotic species, extinction of indigenous species and habitat loss are all current problems on Guam. The six issue is public policy. The public policies of Guam do not place an emphasis upon environmental protection. Finally, there is a lack of knowledge specific to dealing with tropical environmental problems within

the U.S. regulatory framework and a lack of transfer of the technology and educational materials that have been developed in the Mainland U.S.

2. Performance Goal(s)

To annually increase producer adoption of agricultural production practices that conserve and/or protects surface and groundwater supplies on or adjacent to agricultural production sites or land uses.

To annually increase producer adoption of agricultural production "best practices" that conserve, protect, and/or enhance the soil resources on or adjacent to agricultural production sites or land uses.

To annually increase producer adoption of agricultural best production "best practices" that reduce biocide use and recycle organic wastes in ways that protect the environment.

To annually increase the effectiveness of constituent and citizen participation on public policy issues affecting agricultural production, the environment, and ecosystem integrity and bio-diversity.

3. Output Indicators

The total number of persons completing non-formal education programs on sustaining and/or protecting the quantity and quality of surface water and ground water supplies.

The total number of persons completing non-formal education programs on conserving, sustaining, and/or protecting soil resources.

The total number of persons completing non-formal education programs on methods and practices that reduce the use of biocides in the environment.

The total number of persons completing non-formal education programs on methods and practices that reduce the disposal of organic waste into the environment.

The total number of persons completing non-formal education programs on public policy issues affecting agricultural production and ecosystem integrity and bio-diversity.

The number of grants received in support of collaborative research projects.

The number of both peer and lay reviewed publications.

4. Outcome Indicators

The total number of persons who plan to adopt one or more water management practices.

The total number of persons who actually adopt one or more water management practices

within six months after completing one or more of these programs.

The total number of persons who plan to adopt one or more soil conservation practices.

The total number of persons who actually adopt one or more soil conservation practices within six months of completing one or more non-formal education programs.

The number of farmers, homeowners and golf course and landscape operators adopting lower biocide use practices.

The total number of persons who plan to adopt one or more recommended practices to sustain and protect the ecosystem bio-diversity.

The total number of these persons who actually become actively involved in one or more public policy issues within six months after completing one or more of these programs.

The number of innovative solutions to environmental problems adopted by the public.

5. Key Program Components

To develop, transfer, and promote adoption of efficient and sustainable agricultural, forestry, and other resource policies, programs, technologies, and practices that protect, sustain, and enhance water, soil and air resources.

Continue our research program in the prevention of nutrient leaching, non-point source pollution and soil erosion on Guam.

Continue research into the minimization of the use of biocides in all forms of agriculture.

To develop, transfer, and promote the adoption of efficient and sustainable agricultural, forestry, and other resource conservation technologies, and practices that ensure ecosystems achieve a sustainable balance of agricultural activities and bio-diversity.

Continue the agro-forestry and native plant conservation projects.

Expand and develop the on-going turf grass research program involving golf courses, homeowners and commercial landscapers with the aim of increasing the use of environmentally sound cultural practices.

Continue and expand the on-going ornamental horticultural research program.

To develop, transfer and promote the adoption of resource conservation policies and programs and to improve decision making on public policies related to agriculture and the environment through public education and public participation in their formulation that ensure a safe and healthy environment in the region.

A strengthening of the College's environmental research capacity and the qualitative as well as quantitative output of technical information.

Initiate a research program on the biological and environmental problems of Guam and the region caused by tourism, population growth and agriculture.

Initiate a research program focused on the human and managerial components of environmental issues and problems in the region.

6. Internal and External Linkages

The Experiment Station and the Cooperative Extension Service work closely on issues of environment concern. Active cooperation occurs in nutrient recycling of hog wastes, agro-forestry, endangered species, and water quality issues. The College of Agriculture and Life Sciences works within the University with the Water and Environment Research Institute and the Marine Laboratory on environmental issues through the joint MS program in Environmental Sciences. Cooperative projects are under way with the Natural Resources Conservation Service and the Department of Defense facilities at Anderson Air Force Base and COMNAVMAR facilities. We participate in Regional Research projects on the bio-control of aphids, turf grass management and soil conservation.

7. Target Audience

Primary target audiences include the small vegetable farmers, the small hog producers, the aquaculturists, ornamental horticulturists, and golf course greens-keepers in the agricultural sector.

Through the MS in Environmental Sciences we reach the public regulatory personnel and numerous high school teachers who are students in the program.

The non-governmental organizations are serviced through our volunteer programs in the Community and Resource Development Department in the Cooperative Extension Service.

8. Program Duration

This is an on-going program.

9. Allocated Resources

Please refer to Tables 1 and 2 (pages 7 and 8 respectively) in section II of this plan for a breakdown of the FTE and funding allocation for Goal 4.

10. Education and Outreach Programs

University of Guam produces extension information on the endangered species of the island, conducts workshops on plant and animal quarantine for the region and works with the local Department of Education school system on environmental education. College of Agriculture and Life Sciences has an extension project to develop less toxic pesticide alternatives and conducts the Pesticide Applicator Training program in Guam and at other sites in the region.

College of Agriculture and Life Sciences and the College of Arts and Sciences jointly sponsor a Masters of Science in Environmental Sciences degree program for students of the region. There are approximately 20 students enrolled in the program. Student research focuses on water resource issues, endangered species and agricultural topics.

College of Agriculture and Life Sciences has an extension project in the use of hydroponics to recycle wastewater from intensive aquaculture systems. Many of the College of Agriculture and Life Sciences efforts discussed under soil protection have the benefit of also protecting water quality. Other extension water quality efforts are discussed under 3d sustainable agriculture and water quality efforts.
College of Agriculture and Life Sciences has an extension project to determine the fertility rates of local soils so that farmers can use soil tests to use the proper amount of fertilizer and eliminate over or under treatment of the soils. There is an extension project on composting plant materials and one on composting shredded waste paper. Sod production is being investigated as a means of rapidly protecting soils from erosion in high value applications. Technology transfer programs include a soils web site and a print-on-demand extension publication project.

College of Agriculture and Life Sciences faculty works closely with the Recycling Association of Guam in attempting to increase public awareness of recycling and composting. Individual faculty serve on the Guam Beautification Task Force and the Northern Guam Watershed Committee, advise the Chamorro Land Trust Commission and have several joint projects with the Natural Resources Conservation Service and the Water and Energy Research Institute.

E. National Goal 5: Enhanced economic opportunity and quality of life for Americans. Empower people and communities, through research-based information and education, to address economic and social challenges facing our youth, families, and communities.

1. Statement of Issue

Guam's performance plan addresses several areas of concern. These areas include: a) increasing rate of high school dropout and gang activity; b) increasing numbers of families in financial distress; c) increasing numbers of reported cases of abuse of children and dependent adults; d) increasing rates of sexually transmitted diseases; and e) increasing demand for professionals trained in family, consumer, and community economics. The responses to these areas of concern include research to explore the relationship between substance use and perceptions of violence by youth on Guam and

examination of how paraprofessionals can assist in addressing the needs of community members in the aftermath of a natural or manmade disaster. Extension activities are planned to provide; a) financial management education; b) education of public officials and community leaders on economic and enterprise development; and c) community decision-making and leadership development in the areas of HIV prevention planning, family empowerment, youth program leadership, volunteer management training, and youth program activities.

The high incidence of communicable diseases such as hepatitis, tuberculosis, HIV and other sexually transmitted diseases, proves a strong need to explore disease transmission attitudes and knowledge levels of persons in the region. There is a parallel trend of increasing need for hospice and respite care. The increase in the incidence of AIDS and other debilitating diseases including neurological disorders coupled with increasing incidence of abuse of the elderly and dependent adults suggests a need for education of and support for dependent caregivers.

The unemployment increase and low wage earning capacity resulting from failure to complete high school are two factors that necessitate the development of effective financial management education materials and strategies. The implementation of welfare reform contributes to increased opportunities for economic and enterprise development and support for entrepreneurs even more relevant as an extension activity.

The number of students not finishing high school in tandem with the incidence of youth crime, gang activity, adolescent pregnancy, and increased reports of child abuse emphasize the need for parenting education and youth development training as well as increased recreation and education opportunities for at risk youth and families. Research is planned to determine risk factors salient to this region. This research can help identify effective strategies for reducing these risk factors and for strengthening protective factors that are embedded in the cultures of the region.

Public media, satellite, teleconferencing, village based workshops and train the trainer education will be methods used to accomplish these program objectives. Many of the materials identified for these program efforts will only need revisions or may change into new formats such as videotapes or CD's.

2. Performance Goal(s)

To strengthen programs that enhances family life, and addresses the needs of families and youth at-risk of social problems.

To provide learning opportunities to increase family income.

To increase citizen involvement in village self-help projects and citizen participation in public policy development.

To develop outreach and program activities of the University that will be located off-

campus and in island villages for direct contact with citizens in their neighborhoods.

To develop an annual Community Development regional seminar program that will be conducted via the University's PEACESAT telecommunications system.

The 4-H learning experiences and relationships will be broaden and established to meet the needs of diverse populations of youth, volunteers, business and academic partners, and collaborating youth development organizations. This will be accomplished in a manner that anticipates change, using methods that are aligned with 4-H values.

To develop a process for recruiting and educating youth and adult volunteers for managing and recognizing their efforts as effective contributors to society.

To actively involve youth as equal partners in defining, improving, developing, and/or implementing the island's 4-H and youth development education programs.

3. Output Indicators

Sustainable lifestyles among Guam families will be increased, and individuals from families, village level organizations, and public/private service professionals will increase their knowledge and skills necessary to help families cope with the life challenges confronting Pacific island families.

Individuals/Families will increase knowledge base and skills to better manage their resources and start a home business.

Village mayors and their Municipal Planning Councils will actively solicit citizen input into decision making processes by conducting issue forums, planning workshops, need assessments and other types of activities designed to encourage such input, and island legislators and agency administrators will become more willing to collaborate with citizen based special interest groups in the development of public policy.

The Extension program will have a network of paraprofessional extension education workers located at village level offices helping with community programs (e.g., mayor offices, public health program offices, agency offices, church or village association programs, etc.).

The youth of Guam will be exposed to the learning experiences of 4-H through increased collaborations and partnerships of private and public organizations, volunteer recruitment, parental involvement, and 4-H club structures.

More youth professionals, paraprofessionals, private and public organizations, volunteers, parents will increase their knowledge and skill in developing and working in a quality youth leadership development education.

The number of partnerships established through internal and external linkages will strengthen the 4-H and youth development program.

Through the increased number of volunteers the 4-H and youth development programs will be expanded, strengthened, and increased to meet the growing challenges of the youth.

The 4-H program will see an increased number of youth providing the leadership in the youth development programs by participating in more 4-H club activities, advisory groups, leadership, and volunteer activities.

Promote and strengthen existing collaboration of Extension 4-H, Consumer Family Sciences, Agriculture, Community Resource Development, Researchers and other University departments in programming for CYFAR throughout the island.

Promote diversity and pluralism in Extension programs and staff.

4. Outcome Indicators

Number of training/workshop sessions, (b) number of collaborations, (c) number of participants who started their home business, (d) number of participants who completed the training, (e) clientele reports on increased knowledge, and (f) clientele evaluations and success stories.

Number of advisory council active, (b) number of participants in extension advisory council activities, (c) attendance at village leadership and "Futures" workshop seminars, (d) number of village projects initiated with extension assistance, (e) number of requests for program planning seminars, (f) needs assessment studies conducted, and (g) team building or effective group training events.

Number of extension education workers/volunteers recruited, (b) number of villages having project location sites, and (c) number of client contacts at these project site locations.

Number of staff and volunteer training offered, (b) number of collaboration/partnerships established, (c) number of multi-disciplinary networks established, (d) number of 4-H clubs established, (e) number of villages participating, (f) number of schools participating, (g) number of youths involved, (h) number of volunteers recruited, and (i) number of parents involved.

Establishment of a Youth Development Curricula, (b) number of youth professionals and paraprofessionals trained, (c) number of volunteers trained, (d) number of public/private agencies participating, (e) number of coalitions and networks established on youth professionalism, (f) evaluation results indicating knowledge and skills gained from training, and (g) evaluation results reporting positive attitude towards youth programs.

Number of public and private organizations participating in youth development program, (b) number of partnerships established from business sectors, (c) increased levels of funding support for youth programs, (d) number of faculty members participating across

inter-disciplinary task groups and interest groups, and (e) number of special grant projects established.

Number of volunteers recruited, (b) number of projects established due to volunteer initiative, (c) number of collaboration established, (d) the culturally diverse number of volunteers, (e) number of skill training provided, and (f) number of man-hours donated to the extension program.

Number of youth participating in committees and boards, (b) number of youth leaders in projects, and (c) number of youth taking leadership roles in any organizations due to the 4-H program.

5. Key Program Components

Workshops on life simplification, parenting skills, childcare providers, stress management, balancing work and family.

Facilitate and participate in various workshops, conferences and training opportunities sponsored by the University and other island organizations to increase learning opportunities and promote the public's capacity to address issues of cultural diversity, and the needs of women.

Workshops on clothing and textiles, arts and crafts and the use of recyclable products.

Workshops on starting a home based business.

Collaborating with the university and other agencies dealing with home business.

Workshops/seminars on managing family resources.

An Extension Program Advisory Council will be established to provide the mechanism for involving a more diverse audience in Extension program planning.

"Village Futures Seminar" series will be designed and piloted as a cornerstone event for our local Government education program.

A leadership-training institute on participatory citizen involvement will be sponsored for diverse groups of policy makers representing village, territorial and regional organizations.

Participate in seminars, conferences, and training events that promote and conduct skill training in citizen involvement methods.

Work with all levels of clientele to solicit input, brainstorm strategies, and conduct interest survey of community agencies and associations on volunteerism. Hold organizational meetings of Extension and other faculty interested in developing and

teaching a volunteer training curriculum.

Organize an initial program series of faculty and regional participants who wish to lead a selected topic session.

Focus the learning experience on children, youth and families in communities with high risk factors.

Implement the recognition model in all aspects of programming.

Conduct research to assess program impact.
Establish 4-H clubs in the villages and schools.

Develop and implement a system to identify and hire a culturally diverse staff based on identified professional competencies.

Implement an ongoing program to orient and train staff in identified professional competencies.

Strengthen the role of Extension faculty in identifying, conducting, and utilizing applied youth development research.

Strengthen partnerships among the USDA Extension Service, the National 4-H Council and state and local organizations.

Develop a system for the initiation, management and enhancement of family partnerships with 4-H programs.

Develop a system for the initiation, management, and enhancement of school, public, private, University and community partnerships with 4-H programs.

Design a 4-H volunteer development curriculum and educate professional 4-H staff of its use.

Design a volunteer development curriculum and educate professional 4-H staff in its use.

Develop a system for the recruitment, education, and recognition of diverse populations of adult and youth volunteers.

Develop volunteer position descriptions, including a skills inventory that can be used in the recruitment and education of new volunteers.

Design and disseminate an instrument that can be used to assess the skills and performance of volunteers.

Develop and implement collaborative volunteer education programs with other

organizations.

Establish 4-H as a key partner in local and regional youth service and service- learning programs.

Develop and implement an orientation and education program for professional and adult volunteer staff in which youth are viewed as equal partners in the educational process.

Involve youth in the decision making process of the cooperative extension.

Involve youth as partners in teaching and research roles.

Involve diverse populations of youth in needs assessments to determine the critical issues they face and develop new programs based on the assessments.

Encourage youth to explore the creation of a national youth leadership role and structure, including an appropriate role for collegiate 4-H members.

6. Internal and External Linkages

The collaboration of extension professionals and paraprofessionals from Community Resource Development, 4-H, Agriculture and Natural Resources, and Consumer and Family Sciences created this plan. This allows for the maximizing of resources not only in planning but also in program design and delivery and gathering of data for indicators.

In addition, collaboration with the Department of Labor, Department of Administration and the Retirement fund will assist with data collection for the research on economic satisfaction. A federal grant, Safe and Drug Free School and Community Program is funding the partnership with the Department of Education, Guam Cooperative Extension and two other units of the University of Guam to carry out the research about substance use and perceptions of violence among youth on Guam.

The disaster outreach program represents a partnership with FEMA and the Department of Mental Health and Substance Abuse. Youth development and parenting education, and caregivers training will be done in conjunction with Head-start, Guam Housing and Urban Renewal Authority, Guam Association for the Education of Young Children, Guam Caregivers Association, Department of Education, Department of Youth Affairs, Child Protective Services, Sanctuary, Department of Parks and Recreation, Department of Defense Education Agency, and the Mayor's council.

The community decision making and leadership programs will partner with the American Association of Retired Persons, Guam HIV AIDS program planning groups, Guam Housing and Urban Renewal Authority, and local schools.

7. Target Audience

Because of Guam's size the target population for Goal 5 comes from all sectors of the island population. Families with children will be a primary focus of parenting programming, while agencies serving these families will be targeted by youth development programming. All ages will be targeted by the financial management, leadership development, community decision-making and volunteer management programming.
Special efforts will be made to reach newly arrived immigrants from Asia and surrounding islands to mitigate community problems and increase their ability to successfully adjust to their new environment. At the same time, permanent, long term residents of Guam will also benefit.

Recruitment of volunteers and paid paraprofessionals from the newly immigrated population will be a high priority. This will increase the willingness of this segment of the community to participate in extension programming. Outreach to the natural leaders of all of Guam's communities will be utilized as a strategy for encouraging participation. Word of mouth advertising is more likely to be positive when local leaders are informed and knowledgeable about programs.

Education focused on economic development and quality of life issues faces challenges related to the unique cultural composite of island residents. Language groups other than Chamorro and Filipino dialects have become more prevalent over the past decade. This is due in large part to the number of new arrivals from the Freely Associated States of the Western Pacific, the countries of the Pacific Rim, Asia, and Central Europe. Consequently, many residents have a world-view not rooted in North American or Western values, yet most services and organizations are modeled after U.S. institutions. It is difficult for these groups to maintain their cultural identity in this diverse community and many are not familiar with the laws and cultural norms. This lack of familiarity contributes to a limited ability to discern the risk level of life style behaviors. Furthermore, knowledge of how to access services and manage economic resources is often limited especially for those residents coming from locations where an economy system is not as prevalent as it is on Guam. Guam's performance plan focuses extension, research and higher education resources on the task of improving life experiences and education for this rapidly growing multicultural population.

8. Program Duration

This is an on-going program.

9. Allocated Resources

Please refer to Tables 1 and 2 (pages 7 and 8 respectively) in section II of this plan for a breakdown of the FTE and funding allocation for Goal 5.

10. Education and Outreach Programs

Given the caliber of professionals with the Cooperative Extension, we are able to produce

and provide educational programs involving: family life skills, parenting, consumerism, clothing and textiles, family community leadership, community health awareness, recycling, the use of telecommunication systems, social work related programs, and 4-H and youth development activities including summer events and activities helping indigent youth.

STAKEHOLDER INPUT

In years past, the University of Guam Agricultural Experiment Station and Cooperative Extension generated stakeholder input by conducting periodic Island-wide Needs Assessment Survey and by maintaining an advisory board. While it has been awhile since a "needs assessment survey" was conducted, stakeholder input continues within various aspects of community involvement, including organizations, associations, government agencies and one-on-one contacts. The input we receive are continually considered and incorporated into our research project design and extension program development and delivery. Below is a list of the organizations and associations in which our professionals have membership and/or connection in one form or another:

Northern and Southern Guam Soil and Water Conservation Districts

Guam Resource and Conservation District Board

Association of Pest Control Operators

Golf Course Superintendent Association

Guam Department of Agriculture

NRCS, USDA

Team Nutrition (A school meals and children's nutrition group.)

Diabetes Education Workgroup

"I Familiata Finenen'a" (Translated: Our Family. A family preservation and support group.)

Guam Community College Early Childhood Education Advisory Group

Island-wide Breastfeeding Coalition

Healthy Mothers, Healthy Babies task Force

Consumer and Family Sciences and Agriculture Student Major Organizations

Women and Gender Studies Core

WIC Farmer's Market Planning Committee

Sanctuary Inc. (A home for troubled, abused and runaway youth.)

Department of Mental Health & Substance Abuse

Client and Family Services, Superior Court of Guam

Department of Public Health and Social Services

Department of Youth Affairs

Guma Mami, Inc.

Department of Education

There are plans to implement a general public stakeholder input process via the town meeting concept. The implementation timeframe for this process has been slated for the latter part of 1999. This 5-year plan of work will be updated once the "town meeting" stakeholder input has been completed.

PROGRAM REVIEW PROCESS

1. Merit Review

As new extension programs are proposed by extension faculty said programs will be sent to counterparts in other states for merit review. Comments from a minimum of three external reviewers will be obtained. While this procedure is yet to be formalized, contacts with Hawaii and other regional extension programs will be made with a development and implementation target date of Fall 1999.

2. Peer Review

In house research projects funded by formula funds - Hatch, Hatch Regional Research and McIntire-Stennis - have traditionally been peer reviewed by a minimum of three University of Guam faculty members who must concur that the research has merit before submission to the appropriate USDA, CSREES program manager. With the implementation of the new requirements for peer review, all internally funded research projects will continue to be internally peer reviewed and a second step in the review process will be added. All project proposals will be sent to a minimum of three external peer reviewers. If we do not receive at least two completed reviews, additional reviews will be requested until we have received a minimum of two outside reviews.

Special grants are reviewed by at least three University of Guam faculty members who must concur that the research has merit before being sent to five outside peer reviewers. The minimum number of completed peer review forms is three. In the case of the Tropical and Subtropical Agricultural Research (TSTAR) program, the outside reviews are then read by the Pacific Basin Administrative Group before funding decisions are made and negative reviews carry considerable weight in the allocation process.

Competitive grants are reviewed in-house as above and then further outside reviews are handled by the program selection process.

Selection of University of Guam faculty peer review members is made by the principal investigator with the concurrence of the Associate Director of the Agricultural Experiment Station. Selection of outside peer reviewers is made by the Associate Director from a list of reviewers submitted by the P.I. and from other professional contacts who are familiar with the both the region and the science involved with the proposed project.

MULTI-STATE AND INTEGRATED RESEARCH AND EXTENSION

As per the Guidelines for State Plans of Work for Agricultural Research and Extension Formula Funds, The multi-state and integrated research and extension requirements do not apply to formula funds received by Guam.

FTE Allocation	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	TOTAL		FTE Allocation	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	TOTAL
1862 RESEARCH								1862 EXTENSION						
Prof.								Prof.						
FY 2000	3.2	0.5	0.25	1	0.25	5.2		FY 2000	3	1	3	2	3	12
FY 2001	3.5	1	0.25	1.5	0.25	6.5		FY 2001	3.5	1.5	3	2	4	14
FY 2002	3.5	1	0.25	1.9	0.25	6.9		FY 2002	4	2	3.5	2.5	4	16
FY 2003	3.5	1	0.25	1.9	0.25	6.9		FY 2003	4	2	3.5	2.5	4	16
FY 2004	3.5	1	0.25	1.9	0.25	6.9		FY 2004	4	2	3.5	2.5	4	16
ParaProf.								ParaProf.						
FY 2000	0.6	0.4	0	1	0	2		FY 2000	0.5	0.5	0.5	0.5	0.5	2.5
FY 2001	0.6	0.4	0	1	0	2		FY 2001	0.5	0.5	0.5	0.5	0.5	2.5
FY 2002	0.6	0.4	0	1	0	2		FY 2002	0.5	0.5	0.5	0.5	0.5	2.5
FY 2003	0.6	0.4	0	1	0	2		FY 2003	0.5	0.5	0.5	0.5	0.5	2.5
FY 2004	0.6	0.4	0	1	0	2		FY 2004	0.5	0.5	0.5	0.5	0.5	2.5
Staff								Staff						
FY 2000	6	1	0	3	0	10		FY 2000	2	1	2	2	2	9
FY 2001	6	1	0	3	0	10		FY 2001	2	1	2	2	2	9
FY 2002	6	1	0	3	0	10		FY 2002	2	1	2	2	2	9
FY 2003	6	1	0	3	0	10		FY 2003	2	1	2	2	2	9
FY 2004	6	1	0	3	0	10		FY 2004	2	1	2	2	2	9
Admin.								Admin.						
FY 2000	0.6	0.3	0	0.6	0	1.5		FY 2000	0.4	0.4	0.4	0.4	0.4	2
FY 2001	0.6	0.3	0	0.6	0	1.5		FY 2001	0.4	0.4	0.4	0.4	0.4	2
FY 2002	0.6	0.3	0	0.6	0	1.5		FY 2002	0.4	0.4	0.4	0.4	0.4	2
FY 2003	0.6	0.3	0	0.6	0	1.5		FY 2003	0.4	0.4	0.4	0.4	0.4	2
FY 2004	0.6	0.3	0	0.6	0	1.5		FY 2004	0.4	0.4	0.4	0.4	0.4	2