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Sustainable Agriculture in Texas

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The Development and Implementation of a Pilot Test
for Sustainable Agriculture in South Texas -
A National Public Service Project

I. Introduction.

The proposed project is being submitted by James R. Coppedge, USDA, ARS, to the USDA National Public Service Task Force for consideration by the Environmental Corps Sub-Group.

II. Concept.

It is proposed that we demonstrate, through pilot test in South Texas the feasibility of agricultural production systems which are sustainable. This program would require the mentorship of qualified USDA and university scientists, and the efforts of enlistees in the Environmental Youth Corps (EYC) to produce crops typical for the area, on a commercial scale (10-20 acres per crop), using only biological and cultural controls of insect and disease pests. The scientists would provide the leadership for the program and the EYC members would be involved in the production, release, and evaluation of the bio-intensive management systems.

III. Social Problems to be Solved.

Damage caused by insect disease and weed pests continues to be a major limiting factor in agriculture and forestry. In the past, pesticides have been used extensively because they are easy to use and relatively inexpensive. However, excessive dependence on pesticides can result in toxicity to non-target organisms, environmental complications including contamination of water resources, pesticide residues on foods and feeds at consumption, and health risk to pesticide applicators. Pest control methods that are not selective destroy non-target organisms, often leading to crop damage from pests that otherwise would have been controlled naturally.

ARS and other agricultural scientists have made outstanding progress in a number of pest systems in South Texas that offer opportunities for achieving pest control at a low cost and in an environmentally sound manner. Some of these technologies are in use by producers today while many more are not. It is the nature of biologically based or other pest specific procedures that they are more effective on a large area basis. Commonly, for farmers, consultants, and pest management organizations to adopt new insect or disease control practices, it is necessary to demonstrate on a commercial scale that the strategy is effective, practical, and safe. The purpose of the proposed project to demonstrate on a commercial scale that biological and cultural control strategies can be used to manage many of the insect and disease pests which are currently the target of multiple synthetic pesticide applications.

Additionally, the rates of unemployment and poverty in South Texas are among the highest in the nation. If we can successfully manage most of the economic pests on crops in this area by mass producing and releasing beneficial organisms at cost comparable to the cost of multiple pesticide applications, we would be providing the stimulus for an emerging light industry and additional jobs. Biological control organisms are very target specific, that is they tend to work only on a particular pest. There are many biological or biologically derived pest management systems for fruits, vegetables, and fiber crops. They depend on the production and sale of living insects or micro-organisms as biological control agents. A major constraint to their implementation stems from their specificity; markets are small and sometimes local. They require skilled labor and management. Today there is a struggling group of producers of biological control agents (a market of about \$25 million per year, nationwide).

Demonstrations of efficiency combining public research resources and farmer education could provide the encouragement needed to foster the development of the commercial structure to develop this approach to more sustainable crop production systems.

IV. Approaches.

The Animal and Plant Health Inspection Service (APHIS) has a center of excellence in biological control near Mission Texas. This center is located on Federally owned land at Moor Air Base (not active militarily since WWII). They have the expertise, equipment space and starter colonies for the production of numerous biological control agents. They also have approximately 100 acres of irrigated land on this base which they are willing to dedicate to this project. The Agricultural Research Service and Texas A&M University Weslaco Center have some 25 scientists at Weslaco, Texas, (approximately 30 miles away) dedicated to biological control and sustainable agriculture.

This group of scientists is anxious to conduct such pilot tests so we now have most of the components needed for this ambitious project except the resources needed to hire a pool of talented, trainable, and dedicated employees. The Environmental Youth Corp could provide this needed assistance.

If funded, the initial step in this project would be to begin planning a farming scheme that would be consistent with that of commercial producers. The South Texas area grows a wide variety of crops,

therefore, it would take several years to research the various potential crop combinations. A typical crop sequence could be melons and onions (January) followed by cotton and corn (April) followed by melons and cabbage (September). The second step would be to identify the key insect and disease pest that could infect each crop and to select the biological control agents or cultural techniques that could be used to effectively manage the pest. Appropriate biocontrol agents would then be secured for the potential pest populations.

The main activity required additional help would begin in the early spring (February). This would involve setting up field cages (6 ft wide 12 ft long) with host plants and target insect species. The pest insect populations would be established in the cages. Next we would introduce specific parasites, predator or insect specific pathogens and allow them to establish on the pest insects. There would also be a need for laboratory preparation of insect specific pathogens.

The workers would monitor crops frequently under the mentorship of APHIS, ARS, and TAMU scientists and as number of pests approach economic thresholds, biocontrol control agents from the field nurseries would be distributed throughout the test fields. It is anticipated that we may not have the available technology to manage every pest on the crops with biologically based techniques, however; this project would identify the gaps and help focus and intensify the efforts of research scientists to fill the gaps. Under no circumstances would synthetic insecticides or fungicides be used. Since the crops would be produced on Federal land, and there would be no intent to market them, yield losses would not be a concern.

Crop production in South Texas is essential year-round. Consequently, this project once started would continue year-round. We plan to hold 3-4 field days per year inviting producers, USDA representatives, local dignitaries, the press, as well as interested political leaders. We feel representative Kika de la Garza would have a special interest in such a project.

As mentioned previously, this project will require the services of the Environmental Yourth Corp. We estimate that 20 of these employees are needed for mass production, release, and evaluation of the biological organisms, as well as for general farm maintenance (irrigation, etc.).

We feel the program would be the most effective if we held frequent seminars for the corps members and explained crop production, pest problems, biological control, and their contribution to sustainable agriculture. There are approximately 25 senior research scientists in the Weslaco-Mission Texas area who could lead such seminars. Additionally, we would encourage the corps members to (when appropriate) harvest the food crops and distribute them to needy families.

IV. How will this work with existing program?

There are no conflicting programs. There are individuals and organizations which do crop consulting, but we would not conflict with them. There are some small producers of biological control agents in the area. We feel our efforts would be beneficial to them (potentially expanding their business) rather than be detrimental. In fact, we believe they would be valuable collaborators.

VI. Residential or non-residential.

We suggest that the program be residential and that we provide a \$350.00 per month housing allowance for each employee. This is the average cost of a one bedroom furnished apartment in the area according to our survey. Based on our conversation with educators in the area, we could anticipate that 80-85% of the corp members would be hispanic and over 50% would be female.

VII. Size and Sites of Pilot Test.

We propose that in the intial years the pilot test include a total of 100-150 acres divided by cropping purpose into 10-20 acres blocks. We feel at least in the intial stages the research can be done at the APHIS Biocontrol Center at Moore Base, approximately 17 miles north of Mission, Texas. Alternatively, the program could be conducted at Rio Farms (a non-profit farm near Weslaco) or Hobitzelle Farms of Texas A&M University. The program could be expanded in time to include whole commerical farms or a commerical production area. The number of corps members needed for assistance would need to increase proportionately.

IX. Growth Scenario.

As previously mentioned, the program could grow by expanding in the South Texas area or similar such projects could be initiated in other food crop production areas across the U.S.

Additionally, the USDA, EPA, and FDA have recently joined in an initiative to reduce pesticide residues on food, especially foods consumed by children. There is a general USDA initiative underway to develop large area approaches to pest management as opposed to field to field management. Most scientists feel that this change in approach would significantly reduce the amount of synthetic pesticides used on foods and fiber. The pilot tests needed to demonstrate the feasibility of area-wide management will be labor intensive, consequently, the EYC could play a valuable role in these multi-agency programs.

X. Management Structure Needed.

This project could be managed under the existing structure at the USDA. The project could be under the general leadership of the Departmental IPM Working Group.

The local (South Texas) management structure would be as indicated below:

Project Leader (APHIS Scientist)

Mass Production Leader (APHIS) (5 EYC)

Biological Control Agent Release Leader (APHIS) (5 EYC)

Pest Insect Evaluation Leader (ARS or TAMU) (5 EYC)

Biocontrol Evaluation Leader (ARS) (5 EYC)

The local (South Texas) management structure would be as indicated below.

XI. Staff Needed.

From our initial estimates, the project would require the equivalent of 2.0 APHIS scientists and 1.5-2.0 ARS and Texas A&M scientists. We would plan to take advantage of expertise in the local area from throughout the different agencies, however, there would not be a need for outside consultants.

Approximately 20 EYC employees would be needed.

XII. Cost.

The following costs are estimated on a per year basis.

	<u>Cost/Year</u>
1. Labor Workers 20 EYC	\$435,000*
2. Supervisors 4.0	240,000
3. Land Preparation - farm Maintenance	30,000
4. Equipment - supplies rearing materials	100,000
5. Transportation (EYC employee from pickup points to duty) 2 vehicles	20,000
6. Miscellaneous	<u>25,000</u>
 Total	 \$850,000

*Estimate cost per EYC employee = \$21,750/year. \$10,000 minimum wage, \$4,200 housing allowance, \$2,100 health insurance, \$4,750 educational award, \$200 child care (\$50-55/wk/child-estimated that 1 in 5 will need child care services) and \$500 miscellaneous.

XIII. Funding Sources: USDA-APHIS

USDA-ARS and TAMU = \$415,000
Grant from National Public Service
Corp \$435,000

XIV. Partnerships.

USDA-APHIS
USDA-ARS
Texas A&M University
Texas Agricultural Extension Service
USDA-Cooperative State Research Service
Rio-Grande Valley Fruit and Vegetable Growers Association
National Cotton Council
University of Texas at Edinburg and Brownsville
Texas A&I University
Texas Association of Agricultural Consultants
Valley Research and Development Council
Audobon Society
United Farm Workers
Wildlife Corridor

XV. Creating and Maintaining.

It is anticipated at most of the EYC employees would take advantage of the 9,500 education award at the end of 2 years of service. We hope to stimulate these individuals to pursue careers in agriculture in general, and specifically, in sustainable agriculture. Bio-intensive pest management is intrinsically more management intensive than chemical technique so we expect opportunities for technically trained people to improve. If we draw from the labor pool in South Texas, 80-85% will be Hispanic, over 50% will be females, and most of them will be from low to mid-income families.

XVI. Special Training and Supervision Issue.

The EYC employees will be under the supervision of qualified scientists (approximately 5 EYC employees per scientist). The employees will be given a 2-day orientation course on the project and public service. The employees will be given frequent seminars to keep them abreast of current activities in the program. Also, at some point in their training, we would like to provide an opportunity for them to visit the Beltsville Agricultural Research Center, APHIS headquarters in Hyattsville, and appropriate officials in Washington, D.C.

XVI. Timeline.

- o November 1, 1993 -- draft action plan for coming crop year
- o November 15, 1993 -- identify potential pests and start lab colonies
- o January 15, 1994 -- begin selection of EYC employees
- o January 22-24, 1994 -- EYC employee orientation
- o February 1, 1994 -- start pest and beneficial insect population in field cages
- o March 1, 1994 -- Begin monitoring field crops and release beneficials as necessary
- o May 15, 1994 -- First Field Day
- o June-August -- continue to monitor crops and release beneficial insects
- o August 1994 -- Plant Fall Crops - start new colonies of biocontrol organisms
- o August 1994 -- Second Field Day
- o October 1994 - Third Field Day
- o December 1994 - Wrap-up 1994 activities and draft plan for 1995

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