

PROJECT PREPARATION GRANT (PPG)**APPLICATION FORM**

1. PPG title	Accessing new ornamental plant markets by reducing phytosanitary issues through participatory research and extension: The Clean Stock Program
2. Theme 1, 2 and/or 3	Capacity building for public and private organizations, notably with respect to market access.
3. Starting date	March 2009
4. Completion date	August 2009
5. Requesting organization(s)	<p><i>Centro Agronómico Tropical de Investigación y Enseñanza</i> <i>Turrialba, Cartago</i> <i>30501</i> <i>Costa Rica</i> <i>Tel: +506-2558-2607</i> <i>Contacto: Tamara Benjamin, e-mail: tamara@catie.ac.cr</i></p> <p><i>Purdue University</i> <i>Department of Entomology</i> <i>West Lafayette, IN</i> <i>47907</i> <i>Tel: 765-494-5983</i> <i>Cliff Sadof, E-mail: csadof@purdue.edu</i></p>
6. Proposed consultant(s)	A list of members of the technical teams from Purdue University and CATIE is found in Appendix 2 .
7. PPG background and rationale	Description of the PPG background and rationale is found in Appendix 3 .
8. Resultant project objectives	<p>Main Objective</p> <p>To write a proposal that will focus on minimizing the phytosanitary risk of the exported ornamental crops, <i>Codiaeum</i> sp., <i>Schefflera</i> sp., <i>Cordyline</i> sp., <i>Alpinia</i> sp. <i>Chrysanthemum</i> sp. and Heliconia to maintain access to the US market and open up new markets based on certified, high quality products.</p> <p>Specific Objectives</p> <ol style="list-style-type: none"> 1. Gather baseline information from Costa Rican ornamental growers, United States Department of Agriculture-Animal Plant Health Inspection Services (USDA-APHIS), and the Ministry of Agriculture-Phytosanitary Services (MAG-SFE) to better understand the phytosanitary issues involved and focus producer training and participatory research. 2. Characterize the agroecology and socioeconomics of the production systems in the study.
9. PPG outputs	1. Report on the characterization of the ornamental producers, crops, and market chains in Costa Rica

	<ol style="list-style-type: none"> 2. Report on the phytosanitary risks associated with ornamental production in Costa Rica 3. Report on the background and justification of the phytosanitary problem 4. Work plan and activities elaborated 5. Budget and timeline of activities outlined 6. Development of the project proposal to reduce phytosanitary risks in ornamental plant production
10. PPG activities	<ol style="list-style-type: none"> 1. Describe the agroecology and socioeconomics of the ornamental crops and their market chains. <ul style="list-style-type: none"> • Conduct a survey of a subset of ornamental farms that contain the crops with phytosanitary problems. • Characterize the production costs and mitigation measures of the production systems. • Conduct workshops for ornamental producers as well as government, university and non-government professionals associated with the ornamental sector on the characteristics of these farms and markets. • Create a data base with information collected for the diverse sources that can be accessed via a geodatabase interface. 2. Describe the phytosanitary condition of the ornamental crops described in the study. <ul style="list-style-type: none"> • Analyze the interception database from Costa Rica and the USA to identify the key pests and the quarantine situation. • Conduct workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the phytosanitary conditions of the crops. 3. Definition of the project's background and justification. <ul style="list-style-type: none"> • Review all documentation and databases that justify and elucidate the quarantine problems of these crops. 4. Development of the project work plan and expected activities to carry out the proposal. <ul style="list-style-type: none"> • Conduct workshops with people involved with the project including producers, government inspection workers, USDA personnel, researchers, and others to receive feedback on the logical framework of the project. 5. Construction of a proposal budget and activities timeline. <ul style="list-style-type: none"> • Create a detailed budget and activities timeline for the proposal. 6. Final reviewed proposal ready to be submitted to the STDF secretary.

	<ul style="list-style-type: none"> • Conduct workshops with people involved with the Project including producers, government inspection workers, USDA personnel, researchers, and others to receive feedback on the proposal. <p>Detailed work plan for the outputs can be found in Appendix 4</p>
11. Timetable	Detailed Timetable can be found in Appendix 5 .
12. Private/public sector co-operation	A close relationship will be forged between the Federation of Ornamental Plant Growers in Costa Rica and the researchers and government organizations working on the project to insure the success of the program.
13. Budget	The proposed budget for the PPG is US\$30,000, a detailed breakdown of the proposed uses of the funds can be found in Appendix 6 .
14. Non STDF contributions	Most of the technical team will provide in kind contributions for their time spent on developing the proposal. Office space and other physical infrastructure will be provided by both Purdue University and CATIE.

Appendix 1: Supporting letters (see attached PDF files)

1. United States Department of Agriculture/Animal and Plant Health Inspection Services (USDA/APHIS)
2. Costa Rica Ministerio de Agricultura-Servicios Fitosanitarios del Estado (MAG-SFE)
3. Federación de Productores Ornamentales de Costa Rica
4. Costa Rica Ministerio de Comercio Exterior (COMEX)

Appendix 2: Curriculum Vitae and record of achievements of Technical Teams

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Appendix 3: Description of PPG background and rationale Ornamental Production in Costa Rica

Costa Rica (CR) exports annually more than US \$ 180 million in ornamental plants, flowers, and foliage to different countries around the world. Some of the most important ones include *Dracaena* sp., *Codiaeum* sp. (Croton), *Schefflera* sp., *Cordyline* sp., *Alpinia* sp. (Ginger), *Chrysanthemum* sp. and a variety of heliconia flowers. Nearly 50% of total ornamental exports are shipped to North America, mainly to the United States of America (USA), which represents more than US \$80 million (PROCOMER, Banco Central de Costa Rica 2006). Ornamental exports account for approximately 10% of all agricultural exports from the country. This industry supports both large and medium sized businesses; in 2006 there were 235 registered businesses that exported more than US \$12,000 as well as improving the quality of life of small ornamental producers which sell to the exporting enterprises. Ornamental production provides a stable source of income and generates work in rural communities and surrounding urban areas with low socioeconomic indices.

Within the context of globalization, international trade represents a phytosanitary risk for agriculture due to the possible translocation of pests to importing countries. The opening of markets and new trade agreements has forced countries to apply a series of sanitary and phytosanitary measures to protect human health as well as the health of natural and agricultural ecosystems, which can be threatened by the introduction of animals, plants, pathogens, residuals, and contaminants through imports. Under the specific case of CAFTA-DR (Central America and Dominican Republic Free Trade Agreement with the USA), the existing norms under the Sanitary and Phytosanitary Measures Agreement and the Technical Trade Obstacles Agreement of the World Trade Organization (WTO) have been ratified. Also, the International Trade Nursery is pushing for revisions of the international standards for the protection of plants due to problems caused by invasive species (Mack *et al.* 2000).

In response to the previously mentioned phytosanitary pest interceptions, agricultural products at the entrance of international ports represent a large problem for the importing country. Interceptions affect agricultural supply chain economics through rejections at the port of entry or by forcing the company to pay the costs of fumigation. The use of fumigation also reduces the plant quality, has an environmental cost due to the chemicals that are used, and can have an impact on an exporting country's image. The importing country is also affected, not just from the introduction of unwanted pests but also economically due to the interception cost being passed on to the importer. For example, in the USA only 2% of all goods that enter the ports of entry are inspected but shipments contaminated with quarantined pests constitute an annual loss of \$350 billion dollars (GAO 2006). According to the Animal and Plant Inspection Service (APHIS) between October, 2006 and September, 2007 there were more than 1500 interceptions due to plants coming from Costa Rica. Many of these crops are intercepted on a continual basis and have been shown to increase in numbers

over time. The products that are most frequently intercepted are *Dracaena* sp., *Codiaeum* sp. (Croton), *Schefflera* sp., *Cordyline* sp., *Alpinia* sp. (Ginger), and heliconia, all ornamentals. In the month of September of 2006, around 80% of the interceptions that were reported were registered for these plants or flowers (APHIS 2007).

Solutions and Alternatives

To reduce the risk of pest dispersal on a global level, a series of international rules have been established. A requirement in the proposed changes to international standards for plant protection will be to include programs that reduce quarantined pests on exported crops, which are formally known as Clean Stock Programs (CSP). These programs established in producer countries must be supported by scientific results that guarantee the drastic reduction of pest abundance before being exported. The implementation of a CSP with scientific support can reduce the entrance of quarantine pests to foreign markets by reducing populations in the field before harvesting as well as increasing inspection before packing.

An important example of this is the CSP developed for the ornamental plant, *Dracaena*, in Costa Rica, the first country in the world to implement such a program. For three years an interdisciplinary and inter-institutional team from the Ministry of Agriculture (SFE-MAG), National Production Council (CNP), Ministry of Foreign Trade (COMEX), the United States Department of Agriculture (USDA/APHIS), as well as two university and research institutions (CATIE and Purdue University) has worked towards changing a regulation in the USA that limits the size of plants that can be exported. Through scientific research, increased inspections, and producer awareness and training successful results have been attained. The producers have been integral in the process and are now trained to identify problems without having an agronomist come to their farm. Some have also been trained in participatory research and are able to conduct their own small trials on their farms. In conjunction with the government, producers have achieved a reduction in interceptions on *Dracaena* plants coming from farms associated with the program and lowered the phytosanitary risks. The success of the program has opened up the door to changing a USA regulation to be able to export this ornamental plant in larger sizes.

Positive results have also been achieved in Costa Rica for other crops, such as The Cantaloupe and Watermelon Inspection and Certification Programs, which are exported to the United States. These programs have been in place since the beginning of the 1990's and have reduced the levels of interceptions on shipments of these fruits at foreign ports. The Customs and Protection Division of the new Homeland Security Department of the USA decided to include these products in a system that speeds up importation. The percentage of inspections on these fruit is only 0.5% due to such low interception levels. Similar results have been obtained for chayote, pineapple, and litchi.

Clearly alternatives to reduce pest problems before shipping to ports of entry need to be explored to reduce interception rates at importing countries. Although many of the technological advances to reduce phytosanitary problems are focused on the packing plant before shipment, the reduction of pests can also be conducted in the field. However, the challenge is more difficult. Field conditions oftentimes change from one farm to the next. Environmental fluxes in the year cause deviations on pest populations. Management practices are variable and can also impact their numbers. On top of phytosanitary issues producers must also compete in an increasingly complex market. They are no longer only trying to maintain a high quality product to guarantee their competitiveness in the market but they are also required to reduce the phytosanitary risk from these crops.

Due to the increasing challenges to produce a quality product and meet changing international regulations, there is a need to improve the manner that information is transferred to producers. To be able to understand and implement the technological changes, producers must be well trained and capable to adapt to the innovative processes that are required to compete on the global market; so that they may be able to seek out better possibilities for success and permanence in the dynamic arena. It is with this sense that the focus of this proposal is to optimize resources by strengthening the active participation of the producers, which will help generate proposals that take into account necessary changes for production but meet the ever stringent phytosanitary regulations of the global market. These strategies should be accompanied with adequate research and development plans to ensure that the technological innovations can be inserted into the rural economy in markets with high levels of competition (Barrio 2006, Chiriboga 2003, FAO, 1997, Mora 2007, Sepúlveda 2005).

This project will focus on training producers to strengthen production potentials while meeting international phytosanitary standards. Improvement of social, economic, and cultural capitals involved in the agricultural supply chain will be used as measures of success. It will be necessary to focus training processes that provoke changes and improve adoption rates of the new technological components. Inspectors as well as producers should be trained to produce ornamental plants and flowers that meet the international market phytosanitary regulations. Research validation will be conducted by means of participatory research with the producer since this instrument has the highest probability of success to implement new technologies. These methodologies will allow the producer to determine what are his or her abilities and needs to be able to insert themselves successfully in the dynamic global marketplace. The final result will be to have producers sufficiently capable of developing in conjunction with researchers sustainable strategies that guarantee the production of high quality material while reducing phytosanitary risks.

To be able to develop and implement a successful and effective program a series of field trials and research studies will be needed to provide the scientific support necessary to open up new markets. Characterization studies are necessary to understand who the producers are, what management

practices they are using, what environmental conditions separate the different areas of production, the interception database, as well as the current supply chains. The information collected in the characterization studies will be used to refine a final proposal for the ornamental industry in Costa Rica. Improving trade relations and the opening up of markets is dependent upon the information that is obtained focusing on areas where changes can be made to reduce phytosanitary risks and improve production systems making them more sustainable.

The efficient development and implementation of a Clean Stock Program should reduce phytosanitary risks but also maintain current markets as well as open up possibilities to explore new markets and products. At the same time countries such as Costa Rica can recover their image due to years of high interception rates of quarantine pests on exports crops. Additionally, the development of a CSP in other crops will continue to place CR as a world leader in the plant phytosanitary certifications by complying with the exportation requirements necessary to enter the USA markets. The CSP will continue to be used as a model for other exports crops not just in Costa Rica but in other countries around the world.

Institutional Support

The combined action between different key stakeholders including the Costa Rican government, the US Department of Agriculture/APHIS, the civil society, the private sector, and research and extension organisms has been recognized as being a very effective mechanism to achieve technological advances being incorporated into agricultural supply chains (Alburquerque 2004). This along with the eventual free trade agreement with the United States and the eventual negotiation with the European Union has been the impulse needed to join efforts between a variety of Costa Rican institutions including the Ministry of Foreign Trade (COMEX) and the Phytosanitary Services of the State (MAG-SFE), as well as others including the Animal and Plant Health Inspection Service of the United States of America Department of Agriculture (USDA/APHIS), the Tropical Agriculture Center for Higher Education and Research (CATIE), and Purdue University.

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Appendix 4: Work Plan

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>Expected Outcome 1: Describe the agroecology and socioeconomics of the ornamental crops and their market chains.</p>	<p>Actual situation of the crops in the study are identified and characterized</p>	<p>Diagnostic study of the actual situation of the ornamental plant farms</p>	<p>Availability of specialists in the areas of entomology, ecological agriculture and socioeconomics. Available resources</p>
<p>Activity 1: Conduct a survey of ornamental plant farms that contain the crops with phytosanitary problems.</p>	<p>An inventory of the ornamental farms has been conducted. Information has been collected and recorded from the survey. Ornamental farms are characterized agroecologically.</p>	<p>Elaboration of the survey Report of the results of the survey Agroecological characterization report</p>	<p>Availability of specialists in the areas of entomology and ecological agriculture. Availability of transportation and necessary resources.</p>
<p>Activity 2: Characterize the production costs and mitigation measures of the production systems.</p>	<p>Ornamental plant farms are socioeconomically characterized. Production costs and quarantined measures are quantified. Ornamental plant supply chains are identified.</p>	<p>Report of the socioeconomic characterization including production costs and mitigation measure. Analysis of the supply chain from farm to consumer in the USA</p>	<p>Availability of specialists in the areas of socioeconomics. Availability of transportation and necessary resources.</p>
<p>Activity 3: Conduct workshops for ornamental producers as well as government, university and non-government professionals associated with the ornamental sector on the</p>	<p>Stakeholders are involved in the process and informed of the results.</p>	<p>Workshop held with key stakeholders. Report from workshop.</p>	<p>Availability of experts in training, agroecology, ecophysiology,</p>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
characteristics of these farms and markets.			entomology, and socioeconomics Key stakeholders available to participate Availability of transportation, venue and necessary resources
Activity 4: Create a data base with information collected for the diverse sources that can be accessed via a geodatabase interface	Information from previous studies have been recorded and included in the database	Database report An interface has been developed for consultations	Availability of necessary resources Availability of specialists in information systems All of the information has been collected
Expected Outcome 2: Describe the phytosanitary condition of the ornamental crops described in the study.	Actual phytosanitary and quarantine situation is known and described.	Information included in the project proposal.	Availability of phytosanitary specialists Availability of the governmental sector to provide information Availability of necessary resources
Activity 1: Analyze the interception database from Costa Rica and the USA to identify the key pests and the quarantine situation.	Key pests and quarantine statistics for the ornamental plants are identified	Report with the analysis and included in the project proposal.	Availability of phytosanitary specialists Availability of the governmental sector to

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
			provide information Availability of necessary resources
Activity 2: Conduct workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the phytosanitary conditions of the crops.	Key stakeholders from the supply chain, technicians, researchers, governmental sectors are aware of the quarantine situation and given information on the key pests Key pests are defined.	Workshop held with key stakeholders. Report from workshop.	Availability of experts in training, agroecology, ecophysiology, entomology, and socioeconomics Key stakeholders available to participate Availability of transportation, venue and necessary resources
Expected Outcome 3: Definition of the project's background and justification.	Characterization of production and the phytosanitary situation of the ornamental plants are defined and described.	The project's background and justification are completed.	Availability of transportation and necessary resources Availability of specialists in the different areas of the project. Information, documentation and databases are available
Activity 1: Review all documentation and databases that justify and elucidate the quarantine problems of these crops.	Databases analyzed Bibliographic information and documentation are gathered and	The information that has been gathered, will be written, analyzed and included in the project	Availability of transportation and necessary resources

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
	written.	proposal.	<p>Availability of specialists in the different areas of the project.</p> <p>Availability of stakeholder to provide information and participate in the process</p>
<p>Expected Outcome 4: Development of the project work plan and expected activities to carry out the proposal</p>	<p>Objectives, expected outcomes, work plan and specific activities are defined.</p>	<p>Objectives, expected outcomes, work plan and specific activities are described and included in the project proposal.</p>	<p>Availability of transportation and necessary resources</p> <p>Availability of specialists in the different areas of the project and key stakeholders to provide information and participate in the process</p>
<p>Activity 1: Conduct workshops with people involved with the Project including producers, government inspection workers, USDA personnel, researchers, and others to receive feedback on the logical framework of the project.</p>	<p>The reviewed logical framework that includes the work plan, specific activities, and developed objectives is developed and finalized.</p>	<p>List of participants at the workshops.</p> <p>Report from the workshop.</p>	<p>Availability of transportation and necessary resources</p> <p>Availability of specialists and key stakeholders of the project to provide information and participate in the process</p>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>Expected Outcome 5: Construction of a budget and activities timeline for the proposal.</p>	<p>Budget and activity timeline has been finalized and justified.</p>	<p>The budget and activity timeline has been incorporated into the project proposal.</p>	<p>Availability of transportation and necessary resources</p> <p>Availability of specialists and key stakeholders of the project to provide information and participate in the process</p>
<p>Activity 1: Create a detailed budget and activities timeline for the proposal.</p>	<p>An Excel spreadsheet with all the details of the budget has been developed and reviewed.</p> <p>An activity timeline with all the specific activities and who is responsible has been developed and reviewed.</p>	<p>The budget and activities timeline has been included in the project proposal.</p>	<p>Availability of transportation and necessary resources</p> <p>Availability of specialists and key stakeholders of the project to provide information and participate in the process</p>
<p>Expected Outcome 6: Final reviewed proposal ready to be submitted to the STDF secretary.</p>	<p>The proposal has been approved by all members of the project and is ready to be presented.</p>	<p>Project presented to the STDF secretary of the WTO in the time established.</p>	<p>Availability of transportation and necessary resources</p> <p>Availability of specialists and key stakeholders of the project to provide information and participate in the process</p>

NARRATIVE SUMMARY	INDICATORS	MEANS OF VERIFICATION	ASSUMPTIONS
<p>Activity 1: Conduct workshops with people involved with the Project including producers, government inspection workers, USDA personnel, researchers, and others to receive feedback on the proposal.</p>	<p>The ornamental plant sector, governmental organizations, researchers, and other key stakeholders have been involved in the Project proposal development and are aware and support it.</p>	<p>List of stakeholder participation in the workshop. Reports from workshop. Letters of support from the keystakeholders lending their approval to the project proposal.</p>	<p>Availability of transportation and necessary resources Availability of specialists and key stakeholders of the project to provide information and participate in the process</p>

Appendix 5: Timetable

ACTIVITY	RESPONSABLES	2009					
		March	April	May	June	July	August
Expected Outcome 1: Describe the agroecology and socioeconomics of the ornamental crops and their market chains.	H. Castillo, M. Linkimer, T. Benjamín, E. Hidalgo, C. Sadof, K. Gibson, M. Marshall, J. Beckerman	X	X	X	X		
Activity 1: Conduct a survey of ornamental plant farms that contain the crops with phytosanitary problems.	M. Linkimer, T. Benjamin, E. Hidalgo	X	X				
Activity 2: Characterize the production costs and mitigation measures of the production systems.	H. Castillo, T. Benjamin		X	X	X		
Activity 3: Conduct workshops for ornamental producers as well as government, university and non-government professionals associated with the ornamental sector on the characteristics of these farms and markets.	M. Linkimer, H. Castillo				X		
Activity 4: Create a data base with information collected for the diverse sources that can be accessed via a geodatabase interface	M. Linkimer	X	X	X	X	X	
Expected Outcome 2: Describe the phytosanitary condition of the ornamental crops described in the study.	E. Hidalgo, M. Linkimer, T. Benjamín, J. Beckerman, C. Sadof, J. Holland	X	X	X	X		
Activity 1: Analyze the interception database from Costa Rica and the USA to identify the key pests and the quarantine situation.	M. Linkimer, J. Holland	X	X	X			

ACTIVITY	RESPONSABLES	2009					
		March	April	May	June	July	August
Activity 2: Conduct workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the phytosanitary conditions of the crops.	H. Castillo, M. Linkimer, T. Benjamín, E. Hidalgo, C. Sadof				X		
Expected Outcome 3: Definition of the project's background and justification.	H. Castillo, M. Linkimer, T. Benjamín, E. Hidalgo, C. Sadof, J. Holland, K. Gibson, M. Marshall, J. Beckerman			X	X	X	X
Activity 1: Review all documentation and databases that justify and elucidate the quarantine problems of these crops.	H. Castillo, M. Linkimer, T. Benjamín			X	X	X	
Expected Outcome 4: Development of the project work plan and expected activities to carry out the proposal	H. Castillo, M. Linkimer, T. Benjamín, E. Hidalgo, C. Sadof, J. Holland, K. Gibson, M. Marshall, J. Beckerman			X	X	X	X
Activity 1: Conduct workshops with people involved with the Project including producers, government inspection workers, USDA personnel, researchers, and others to receive feedback on the logical framework of the project.	H. Castillo, M. Linkimer, T. Benjamín, E. Hidalgo, C. Sadof, J. Holland, K. Gibson, M. Marshall, J. Beckerman						X

ACTIVITY	RESPONSABLES	2009					
		March	April	May	June	July	August
Expected Outcome 5: Construction of a budget and activities timeline for the proposal.	H. Castillo, M. Linkimer, T. Benjamín, E. Hidalgo, C. Sadof, J. Holland, K. Gibson, M. Marshall, J. Beckerman				X	X	
Activity 1: Create a detailed budget and activities timeline for the proposal.	H. Castillo, M. Linkimer, T. Benjamín					X	
Expected Outcome 6: Final reviewed proposal ready to be submitted to the STDF secretary.	H. Castillo, M. Linkimer, T. Benjamín, E. Hidalgo, C. Sadof, J. Holland, K. Gibson, M. Marshall, J. Beckerman			X	X	X	X
Activity 1: Conduct workshops with people involved with the Project including producers, government inspection workers, USDA personnel, researchers, and others to receive feedback on the proposal.	H. Castillo, M. Linkimer, T. Benjamín, E. Hidalgo, C. Sadof, J. Holland, K. Gibson, M. Marshall, J. Beckerman						X

Appendix 6: Budget

Description	Cost (US\$)
Personnel Services	
Socioeconomic and supply chain characterization	6000
Agroecology characterization and database construction	9000
Entomology specialist for quarantine pest database	3000
Total for Personnel Services	18,000
Travel	
Domestic Travel	
Vehicle rental	4000
Daily Subsistence Allowance and Lodging	2000
International travel	
Three trips Indianapolis to San Jose, Costa Rica (airfare, DSA, and incidentals)	4500
Total Travel	10,500
Workshops	
Characterization and Interception Database Workshop	500
Proposed Project Workshop	500
Total Workshops	1000
General Operating Expenses	
Communication (internet, telephone, fax)	300
Office supplies (photocopies, ink for printers, paper, etc)	200
Total General Operating Expenses	500
Project Total	30,000

Appendix 7: Terms of Reference for Consultants

CONSULTANT I

1. RATIONALE:

There is a need to write a proposal that will focus on minimizing the phytosanitary risk of the exported ornamental crops, *Codiaeum* sp., *Schefflera* sp., *Cordyline* sp., *Alpinia* sp. and heliconia to insure and maintain access to the US market and open up new markets based on certified, high quality products. To be able to achieve this goal it is necessary to understand the phytosanitary issues involved in the current situation. It is required to gather baseline information of different actors of the ornamental agricultural chain in order to have a strong background that justifies the project proposal. Also, it is indispensable to characterize socioeconomically the ornamental supply chain to gain knowledge of the agricultural system, as well as identify the social and economic keys which will be used in the development of the project work plan and expected activities.

2. OBJECTIVES:

- A. Gather baseline information from Costa Rican ornamental supply chain stakeholders and government institutions to better understand the phytosanitary issues involved.
- B. Socioeconomically characterize the ornamental plant production systems in the study.

3. OUTPUTS:

- A. Report on the socioeconomic characterization of the ornamental farms in Costa Rica.
- B. Report on the ornamental plant supply chain in Costa Rica.
- C. Workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the socioeconomic characterization of ornamental plants and their supply chain.
- D. Final proposal including background, rationale and work plan written and reviewed.

4. SPECIFIC TASKS AND RESPONSIBILITIES:

- A. Make a socioeconomic characterization of the ornamental production supply chain.
 - Conduct a survey on a subset of ornamental farms that contain the crops that have had phytosanitary problems.
 - Characterize the production system in terms of production costs and mitigation measures.
 - Characterize the supply chain production system in terms of socioeconomic conditions.
 - Carry out workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the socioeconomic characteristics of these farms.
 - Create a data base with information collected for the diverse sources.
 - Write a report on the socioeconomic conditions of the ornamental crops described in the study.

- B. Collaborate in the workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the phytosanitary conditions of the crops by presenting the results from the study.
- C. Contribute to the definition of the project's background and justification.
 - Review all documentation and databases that justify and elucidate the quarantine problems of these crops.
 - Help write portions of the background and justification for the final proposal.
- D. Contribute to the development of the project work plan and expected activities to carry out the proposal.
 - Collaborate in the workshops which will include producers, government inspection workers, USDA personnel, researchers, and others to receive feedback on the logical framework of the project.
 - Help write portions of the necessary proposal for its completion in August 2009.

5. QUALIFICATIONS REQUIRED

- M.Sc. in an area related to Rural Development, preferably with experience in the socioeconomic impact of tropical agricultural supply chains.
- Professional experience in phytosanitary and quarantine conditions of tropical crops.
- Familiarity with the ornamental production areas in Costa Rica.
- Professional experience in agroecology, mainly in application of participatory research techniques, extension, and training processes.
- Strong verbal and written communication skills.
- Highly organized with ability to multi-task.
- Experience managing large datasets.
- Computer proficient.
- Ability to work a flexible schedule which includes extensive travel through the country.
- Fluency in Spanish highly desirable.

6. TOTAL DURATION OF THE CONSULTANCY:

From May to August 2009.

CONSULTANT II

1. RATIONALE:

There is a need to write a proposal that will focus on minimizing the phytosanitary risk of the exported ornamental crops, *Codiaeum* sp., *Schefflera* sp., *Cordyline* sp., *Alpinia* sp. and heliconia to insure and maintain access to the US market and open up new markets based on certified, high quality products. To be able to achieve this goal it is necessary to understand the phytosanitary issues involved in the current situation. It is required to gather baseline information of different actors of the ornamental agricultural chain in order to have a strong background that justifies the project proposal. Also, it is indispensable to characterize the agroecological components of the ornamental productions system to be able to identify key areas which will be used in the development of the project work plan and expected activities.

2. OBJECTIVES:

- A. Gather baseline information from Costa Rican ornamental growers, United States Department of Agriculture-Animal Plant Health Inspection Services (USDA-APHIS), and the Ministry of Agriculture-Phytosanitary Services (MAG-SFE) to better understand the phytosanitary issues involved.
- B. Agroecologically characterize the productive systems in the study.

3. OUTPUTS:

- E. Report on the agroecological characterization of the ornamental farms in Costa Rica
- F. Report on the phytosanitary risks associated with ornamental production in Costa Rica.
- G. Workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the agroecological characterization and the phytosanitary conditions of the crops.
- H. Final proposal including background, rationale and work plan written and reviewed.

4. SPECIFIC TASKS AND RESPONSIBILITIES:

- E. Make an agroecological characterization of the ornamental crops and production system.
 - Conduct a survey of a subset of ornamental farms that contain the crops that have had phytosanitary problems.
 - Characterize the production system in terms of agroecological conditions.
 - Carry out workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the agroecological characteristics of these farms.
 - Create a data base with information collected for the diverse sources that can be accessed via a geodatabase interface.
- F. Write a report on the phytosanitary conditions of the ornamental crops described in the study.
 - Analyze the interception database from Costa Rica and the USA to identify the key pests and the quarantine situation.

- Collaborate in the workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the phytosanitary conditions of the crops by presenting the results from the study.
- G. Contribute to the definition of the project's background and justification.
- Review all documentation and databases that justify and elucidate the quarantine problems of these crops.
 - Help write portions of the background and justification for the final proposal.
- H. Contribute to the development of the project work plan and expected activities to carry out the proposal.
- Collaborate in the workshops which will include producers, government inspection workers, USDA personnel, researchers, and others to receive feedback on the logical framework of the project.
 - Help write portions of the necessary proposal for its completion in August 2009.

5. QUALIFICATIONS REQUIRED

- Ph.D. or M.Sc. in an area related to Environmental Science, preferably in Tropical Agriculture.
- Professional experience in phytosanitary and quarantine conditions of Tropical Crops.
- Familiarity with the ornamental production areas in Costa Rica.
- Professional experience in agroecology, mainly landscape ecology and insect ecology.
- Strong verbal and written communication skills.
- Highly organized with ability to multi-task.
- Experience managing large datasets.
- Computer proficient.
- Ability to work a flexible schedule which includes extensive travel through the country.
- Fluency in Spanish highly desirable.

6. TOTAL DURATION OF THE CONSULTANCY:

From March to August 2009.

CONSULTANT III

7. RATIONALE:

There is a need to write a proposal that will focus on minimizing the phytosanitary risk of the exported ornamental crops, *Codiaeum* sp., *Schefflera* sp., *Cordyline* sp., *Alpinia* sp. and heliconia to insure and maintain access to the US market and open up new markets based on certified, high quality products. To be able to achieve this goal it is necessary to understand the phytosanitary issues involved in the current situation. It is required to gather baseline information of different actors of the ornamental agricultural chain in order to have a strong background that justifies the project proposal. Also, it is indispensable to characterize the pest component of the ornamental production systems to be able to identify research areas which will be used in the development of the project work plan and expected activities.

8. OBJECTIVES:

- C. Gather baseline information on the pest complexes for the target ornamental crops and their status regarding quarantine issues for the U.S. market.
- D. Develop a work plan to minimize the abundance of quarantine pests on the target ornamental crops.

9. OUTPUTS:

- I. Report on the pest situation for the target crops on the ornamental farms in Costa Rica.
- J. Workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the pest situation and their management strategies.
- K. Final proposal including background, rationale and work plan written and reviewed.

10. SPECIFIC TASKS AND RESPONSIBILITIES:

- I. Write a report on the pest situation for the ornamental crops described in the study.
 - Compare the information on the interception reports, the knowledge of the growers and the pest abundance on selected farms and packing houses.
 - Collaborate in the workshops for ornamental producers as well as governmental, university and non-governmental professionals associated with the ornamental sector on the pest situation on the crops by presenting the results from the study.
- J. Contribute to the definition of the project's background and justification.
 - Review literature on the economical importance of the pest complex from the perspective of quarantine insects.
 - Help write portions of the background and justification for the final proposal.
- K. Contribute to the development of the project work plan and expected activities to carry out the proposal.
 - Use literature review and professional experience to propose a work plan to reduce pest abundance on the target ornamental crops

- Collaborate in the workshops with producers, government inspection workers, USDA personnel, researchers, and others to receive feedback on the logical framework of the project.
- Help write portions of the necessary proposal for its completion in August 2009.

11. QUALIFICATIONS REQUIRED

- Ph.D. or M.Sc. in an area related to Environmental Science, preferably in Applied Entomology.
- Professional experience in phytosanitary and quarantine conditions of Tropical Crops.
- Familiarity with the ornamental production areas in Costa Rica.
- Professional experience in agroecology, mainly landscape ecology and insect ecology and management.
- Strong verbal and written communication skills.
- Highly organized with ability to multi-task.
- Computer proficient.
- Ability to work a flexible schedule which includes extensive travel through the country.
- Fluency in Spanish highly desirable.

12. TOTAL DURATION OF THE CONSULTANCY:

From March to August 2009.