Integrated Pest Management in San Pablo, Guatemala

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Abstract

In the farming village of San Pablo, Guatemala (SP), shortcut solutions are taken to combat agricultural pests and diseases. In collaboration with the Guateca Appropriate Technolgoies Summer School (Guateca) offered by California Polytechnic State University, San Luis Obispo (CP), we plan to implement integrated pest management (IPM) as a solution to the current methods of agriculture in the community.

Currently in SP, pesticides are utilized to eradicate agricultural infestations and infections from local pests and pathogens. At a cost to profit, health, and yield, pesticides are an inadequate and inefficient solution. IPM knowledge is not well known in SP and Internet access is limited to a cafe located in the center of the village. Fortunately, IPM has become a wildly used method of pest management in the United States and developed countries, lending to a significant amount of information that is readily available on the Internet. To disseminate IPM appropriately, we have developed a model to create, store, and sustain the knowledge locally in SP.

Results will be seen directly through the scope of the stored IPM knowledge base, and indirectly through increased profit, health, and yield for the farmers.

Team Members

Principal Investigator - Peter Schwartz: Guateca coordinator, Professor of Appropriate Technology for the World's People courses at CP, will oversee the dissemination of the project and act as a liaison between CP and SP.
IPM Specialist: Will work with students and local farmers in SP to establish IPM solutions.
Rory Aronson: Mechanical Engineering student at CP, part of the original project team.
Analia Pribyl: Graphic Design student at CP, part of the original project team.
James Hall: Math student at CP, part of the original project team.
Sadie Jones: Liberal Studies student at CP, part of the original project team.
Arianna Metcalfe: Biology student at CP, part of the original project team.
SP Students: Students studying many disciplines will partake in the implementation of IPM practices ad contribute to the wiki website.
SP Farmers: Will provide knowledge to the students, help write articles on the wiki website, and participate in the implementation of IPM practices.

Research Plan

Project Design:

Based on the research completed in the Appropriate Technologies class in the Fall of 2011, it was determined that the best means to disseminate IPM knowledge is to create a website database where the people of SP can access IPM information. Information can then be printed and posted to a physical message board in the town center, and ideas will propogate through word of mouth from there. The website will be populated with approp:riate information that will come from research completed as part of Guateca.

Challenges:

The challenges to be encountered in the project include finding permission to build the physical message board, gaining social acceptance within the community, and ensuring the quality of posts on the wiki website. Solutions to these challenges will come in the form of persistence with the program, as well as utilizing supportive and influential SP community members.

Relationship of Challenge to Sustainability:

The relationship is best conveyed through the definition of IPM. The following is a definition from the EPA.

> Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, property, and the environment.
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> IPM is not a single pest control method but, rather, a series of pest management evaluations, decisions and controls. In practicing IPM, growers who are aware of the potential for pest infestation follow a four-tiered approach. The four steps include:
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> - **Set Action Thresholds** Before taking any pest control action, IPM first sets an action threshold, a point at which pest populations or environmental conditions indicate that pest control action must be taken. Sighting a single pest does not always mean control is needed. The level at which pests will either become an economic threat is critical to guide future pest control decisions.
> - **Monitor and Identify Pests** Not all insects, weeds, and other living organisms require control. Many organisms are innocuous, and some are even beneficial. IPM programs work to monitor for pests and identify them accurately, so that appropriate control decisions can be made in conjunction with action thresholds. This monitoring and identification removes the possibility that pesticides will be used when they are not really needed or that the wrong kind of pesticide will be used.
> - **Prevention** As a first line of pest control, IPM programs work to manage the crop, lawn, or indoor space to prevent pests from becoming a threat. In an agricultural crop, this may mean using cultural methods, such as rotating between different crops, selecting pest-resistant varieties, and planting pest-free rootstock. These control methods can be very effective and cost-efficient and present little to no risk to people or the

environment.

- **Control** Once monitoring, identification, and action thresholds indicate that pest control is required, and preventive methods are no longer effective or available, IPM programs then evaluate the proper control method both for effectiveness and risk. Effective, less risky pest controls are chosen first, including highly targeted chemicals, such as pheromones to disrupt pest mating, or mechanical control, such as trapping or weeding. If further monitoring, identifications and action thresholds indicate that less risky controls are not working, then additional pest control methods would be employed, such as targeted spraying of pesticides. Broadcast spraying of non-specific pesticides is a last resort.

Interdisciplinary Aspects:
The interdisciplinary aspects will come from the structure of the group: students from various majors will bring influences from different disciplines of study. It is expected that Agriculture, Engineering, Business, Liberal Arts and other students will be actively involved in researching IPM solutions as part of the Guateca program.

Results:
The results of the project will be seen both directly and indirectly. The most important direct measure of the success of the project will be the reduction of pests and diseases through the implementation of the researched IPM methods. Higher yields and profits will serve as empirical data. Success will also be measured by the number and quality of IPM posts on the project website. With 10 students contributing during Guateca, it is expected to have over 80 local plants, pests, and diseases thoroughly researched and documented on the website after the first summer of Guateca. Indirect results will be the increased health of the farmers, soil, and plants.

Schedule:
A tentative outline for the project is to begin the week after arrival in SP, starting first with the construction of the message board and installation of the dedicated IPM computer. The computer will take one day to setup, requiring one student. The message board will take three days to construct, including travel to acquire the materials. At the end of the first week, students will begin working with the IPM specialist, interviewing SP farmers to assess the current situation, including: crops, pests, pest management methods, and available resources. Gathering the information should take one week. After the initial assessment, each student will be assigned a problem and will be tasked with researching alternative IPM solutions, relying on the specialist to refine the found solutions to be more specific for SP. Each student will have one week to complete a specific problem. By the end of the Guateca summer program, each student will have researched and documented eight IPM solutions to problems found in SP farms.

Budget

The budget is broken into two areas of usage: $1,000 for IPM dissemination infrastructure in SP, and $14,000 for the hiring of an IPM specialist during the two months of Guateca. The IPM specialist is integral to the start up of the project and will not be needed in years to come. The infrastructure is necessary for the lasting impact sought after by our project.

Item Description	**Cost**
Message board materials (wood, coarkboard, and nails)	$100
Dedicated IPM computer	$600
Dedicated IPM color printer, ink, and paper	$300
IPM specialist stipend	$10,000
IPM specialist transportation	$1,000
IPM specialist housing	$2,000
IPM specialist food	$1,000
Total	**$15,000**