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# Ecologically –Based Participatory IPM in a Global Context: the IPM CRSP Model

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## Abstract

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The IPM CRSP develops and implements approaches to IPM that help raise the standard of living and improve the environment in countries around the world. The IPM CRSP model is based on (1) participatory IPM, (2) networking, (3) capacity/institution building, (4) research and technology development and (5) technology transfer. Regional programs in Central Asia, East Africa, West Africa, Latin America/Caribbean, Eastern Europe, South Asia and Southeast Asia address problems of a specific region and the global themes, invasive species, information technology and databases, regional diagnostic laboratories, insect transmitted viruses, and impact assessments deal with universal issues. Major crop emphasis is on vegetables and fruits.

**Key words:** Plant protection, technology transfer, networking.

## Introduction

There is a desperate need to develop sustainable agricultural systems. Integrated Pest Management (IPM) technology development and transfer is a major component in sustainable agricultural systems. In spite of the progress made in the development and transfer of IPM technology there continues to be a global need. Pests (insects, diseases, weeds, vertebrates, etc.) respect no borders and spread through plant and animal migration, wind, water, and by human activity, including trade in plant and animal products. Concerns over bio-security and invasive species are global issues that require IPM attention in both developed and developing countries. The last 15 years has witnessed an increase in IPM research and capacity building around the world, supported by USAID and other bi-lateral donors, FAO, national governments, non-governmental organizations, international agricultural research centers, universities, and other organizations. Much has been learned, both about IPM tactics and about approaches to IPM research, diffusion, and building institutional capacity. This paper reports on the lessons learned and the impact of the first phase of the IPM Collaborative Research Support Program (CRSP) (1992-2004) and on how the new IPM CRSP (2005-2009) will build on lessons learned in the first phase to accelerate production and adoption of IPM knowledge on a global basis.

The IPM CRSP is a (United Sates Agency for International Development) USAID funded project that is a consortium of U.S. universities working with host country national programs and other stakeholders to promote IPM globally. The program is coordinated and managed by Virginia Tech University, Blacksburg, Virginia, USA. The overall purpose of the IPM CRSP is to develop and implement a replicable approach to IPM that will help reduce: (a) agricultural losses due to pests, (b) damage to natural eco-systems including loss of biodiversity, and (c) pollution and contamination of food and water supplies. This paper reports on the lessons learned and the impact of the first phase of the IPM Collaborative Research Support Program (CRSP) (1992-2004) and on how the new IPM CRSP (2005-2009) will build on lessons learned in the first phase to accelerate production and adoption of IPM knowledge on a global basis.

The IPM CRSP, in its first phase, developed and helped to institutionalize IPM programs around the world, resulting in impacts on agricultural productivity and profitability, consumer health, and environmental quality. It helped to diagnose pest problems, develop and disseminate IPM strategies, and train IPM professionals. For example, IPM CRSP research identified key pests in Uganda (coffee wilt pathogen), Philippines (onion root knot nematode), Mali and Bangladesh (tomato leaf curl geminiviruses), the Caribbean (pepper gall midge), and Central America (snowpea leafminer), to name just a few. The proper identification of the snowpea leaf miner led to the lifting of the US quarantine of Guatemalan snowpeas for export. This IPM CRSP intervention led to increased trade and improved farm level pest management practices. Pesticide applications were reduced, insect and disease populations decreased, and yields rose.

Country programs were established at sites in South and Southeast Asia, East and West Africa, Latin America and the Caribbean, and Eastern Europe. The adoption of IPM strategies developed on the CRSP increased the profits of farmers in targeted regions. Some of the crops involved were eggplants, onions, cabbage, snowpeas, green beans, olives, potatoes, and sorghum. Profits have increased from 15 to over 200 percent, averaging around 50 percent on the target crops. These farm-level profit increases have led to market-level economic benefits as well, poverty reduction, and environmental improvements.

Institutional impacts of the IPM CRSP were also substantial. Seventy-five students received training at the MS and PhD levels in: Agricultural Economics, Plant Pathology, Entomology, Weed Science, Nematology, Rural Sociology, and related fields.

The IPM model employed in phase I of the IPM CRSP included: 1) Participatory IPM, 2) Networking, 3) Institution Building, 4) Private Sector Involvement, 5) Research – Technology Development, and 6) Technology Transfer.

## Participatory Integrated Pest Management (PIPM) Process

The goal of PIPM is to increase incomes for the whole population while reducing health and environmental risks

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associated with pest management. Achieving this goal requires good science, farmer involvement, and recognition of the myriad factors that influence farmer decision-making.

The successful development of IPM programs requires an understanding of agricultural systems and all of the stakeholders involved in the chain from the producer to the consumer. Successful IPM programs require interactions among scientists, public and private extension, farmers, policy makers and other stakeholders. The process of participation is the most important contribution to IPM program development.

The IPM CRSP experience has shown that a successful Participatory IPM exercise; 1) provides a solid scientific base for the research program, 2) identifies possible solutions to pest problems, 3) facilitates the spread of IPM strategies, 4) identifies suitable sites for experimental work, and 5) correctly determines the taxonomic status of pests and their natural enemies.

## Technology Development

IPM technology development by the IPM CRSP has stressed the necessity of a close link between the farmers and the research program, thus the participatory nature of IPM research. A systems approach has been followed integrating information of various types (technical, economic, climatic, biological etc.) and based on an understanding of pest population dynamics, markets, and policy constraints. Developing IPM packages has involved the employment of multidisciplinary and multiinstitutional teams, virtually all of the critical stakeholders. Certain crops require more research for tactic development prior to technology transfer. For example, extensive research has been conducted on rice and this information can be readily transferred to farmer where as for vegetables much of the needed information to develop control tactics is lacking. Thus, the IPM CRSP with its emphasis on vegetables has emphasized a strong research program prior to the transfer of technology. The research has been participatory and conducted on farmer's fields which has shortened the time from research to technology transfer to the farmer. This approach has proven effective at all IPM CRSP sites globally.

## Technology Transfer and Adoption

Participatory IPM research, through its involvement of farmers, marketing agents, and public agencies, is designed to facilitate diffusion of IPM strategies. However, widespread IPM adoption requires careful attention to a host of factors that can spell the difference between a few hundred farmers adopting IPM locally and millions adopting it over a large area. The IPM CRSP has tested several approaches to promote transfer of IPM technology.

The ease of transferring technology depends on the environmental sensitivity of the technologies, and on environmental, cultural and other sources of diversity with countries. To speed diffusion of IPM, a multifaceted approach is needed in which all agencies are utilized: 1) Traditional public extension agencies, 2) private for profit, and 3) private non profitable entities. The "one size fits all" concept does not work in IPM. Instead, a multifaceted approach is needed because of differences in 1) local public extension capabilities, 2) resources, 3) education and 4) socio-economics.

The two primary questions that must be addressed in any country hoping to increase the adoption of IPM practices are: 1) which public and private institutional mechanisms can be strengthened and used to speed up the diffusion of IPM knowledge, and 2) what is the optimal mix of approaches for spreading IPM knowledge? Because some IPM knowledge can be conveyed in simple messages while other IPM knowledge requires more complex engagement of farmers, and because of the strengths and weaknesses of various institutional mechanisms, no single approach or institution is likely to be sufficient.

## Regional Spread of IPM Technology

Regionalization among Asian IPM CRSP sites has been a way to transfer IPM technology from one country to another. Grafting of bacterial wilt resistant rootstocks with scions of popular, but wilt susceptible eggplant varieties, was implemented by the IPM CRSP Bangladesh team. After dramatically higher yields and profits were obtained, as compared to the farmers' practice of using non-grafted plants, the IPM CRSP Philippines site sent a team member to learn the grafting technique from Bangladeshi scientists. At present, grafted eggplants are also being produced in the Philippines and will have a major impact on the economics of eggplant production there as well.

## Networking

Strong networks are a basic element in a successful Participatory IPM approach. Participatory IPM involves all stakeholders and the mechanism that provides for the participation of all stakeholders is the networks. The network approach provides a pool of expertise to meet the unique problems existing at each site such as technology development, technology transfer, gender issues, policy instruments, export and quarantine problems etc. U.S. universities, host country partners, IARCs, NGOs etc. working at each site provide the needed range of disciplinary expertise. The makeup of the multi institutional teams differs from site to site depending on the constraints. The networks have been a major reason for the success of the IPM programs at each regional site. In Ecuador, for example, linkages with INIAP, FORTIPAPA, PROEXANT, Eco-Salud, Fundacion Maquipucuna, PUCE-IRD-Quito, ESPE-Quito, CIP, FAO, IFPRI, Soils CRSP, Vicosa University, Brazil ESPOCH, MAG-Carchi, PROMSA (World Bank Agricultural Technology and Training Project) and other agencies strengthened the pool of expertise in support of project objectives.

## Government Policy

Government policies can encourage or discourage the development and adoption of IPM technologies. Thus, policy analysis is often an integral part of a successful IPM program.

If policies create barriers to IPM adoption, such that there is little economic incentive to adopt, there may be little return to IPM technology development and transfer. The establishment of policies supporting the economic incentives of IPM practices is critical to the success of IPM programs. Policy analysis with respect to IPM technology transfer is a relatively new science and much more must be done in this area. There is a need for greater interaction between policy makers and economists that are engaged in policy research.

## Conclusions

The development and transfer of IPM technologies is a complex and dynamic process. New pest constraints and approaches to solving those constraints are constantly in

development. A key to successful IPM programs is the participation of all stakeholders. In the end, the final evidence of success is the extent of farmer adoption and the economic returns achieved by the farmer. Using the ecologically-based participatory method approach to IPM program development the IPM CRSP has successfully promoted the adoption of profitable vegetable and fruit pest management strategies at all global sites. One important lesson that has been learned is that one size doesn't fit all when it comes to IPM technology development and transfer, due to site specificity of economic, social, institutional, and agro-ecological factor. Therefore, a participatory approach that follows a basic set of principles is the best way to ensure globalization of IPM.


## الملخص

**هنريشس، أ.أ. 2006. النهج التشاركي في المكافحة المتكاملة للآفات المبني على أسس بيئية على المستوى الدولي: نموذج "كريسب" في المكافحة المتكاملة للآفات. مجلة وقاية النبات العربية. 24: 182-184.**

يطور برنامج دعم التعاون البحثي في مجال المكافحة المتكاملة للآفات ويستخدم اتجاهات في المكافحة المتكاملة تسهم في رفع مستوى المعيشة وتحسن البيئة في الدول حول العالم. ويرتكز هذا البرنامج على (1) النهج التشاركي في المكافحة المتكاملة للآفات، (2) تأسس شبكات الاتصال، (3) بناء القدرات/المؤسسات، (4) تطوير البحوث والتقاني و(5) نقل التقانات. وتتصدى البرامج الإقليمية في آسيا الوسطى وشرق أفريقيا، وغرب إفريقيا، وأمريكا اللاتينية/الكاريبي، وأوروبا الشرقية، وجنوب آسيا وجنوب شرق آسيا للمشكلات الخاصة بالمنطقة والمواضيع العالمية، كالأنواع الغازية، تقنية المعلومات وقواعد البيانات المختبرات الإقليمية للتشخيص، الفيروسات المنقولة بالحشرات، وتقديرات التأثير. وينصب معظم التركيز على محاصيل الخضار وثمار الفاكهة.



**كلمات مفتاحية:** وقاية نبات، نقل التقانات، شبكات الاتصال.



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