



IPM and farmer's health

This issue of the Spider Web Newsletter examines how farmers, NGOs and government agencies, are integrating health activities into Integrated Pest Management programs across Asia. These activities have been initiated and supported by the FAO Programme for Community IPM in Asia, with financial support from the Government of Norway. Helen Murphy, the FAO Community Health Consultant, is the guest author for this issue.

Why is health important?

Most farmers recognize that pesticides are not good for their health. In fact they will readily admit to numerous illness episodes, which they routinely treat with home remedies. But to survive, they feel pesticides are a necessary evil, something which is required in order to make a living from agriculture

Meanwhile most of the existing data on the health effects of pesticides is derived from health care facilities. The majority of reported cases are serious poisonings from suicide-intended ingestions. Occupationally related poisonings are consistently under-reported. For instance, global reviews of hospital data estimate 3 million cases per year, 2 million of which are suicides. Only 700 thousand are occupationally related¹. Yet agriculture worker surveys estimate occupational rates 36 times higher. From his 4 Asian country surveys², in 1990 Jeyaratnam estimated that up to 25 million pesticide-related illnesses could be occurring per year in developing countries among a work force of 830 million agriculture workers³. This is based on 3% of farmers recalling an illness episode over the past year. Recall surveys from other countries find still larger proportions at 4.5% in Costa Rica, 9% in Indonesia, and up to 10% in Bolivia.

¹ World Health Organization and United Nations Environmental Program. *Public Health Impact of Pesticides Used in Agriculture*. Geneva. 1990. *The International Program on Chemical Safety at WHO is currently updating these figures.

² Jeyaratnam J, Lun K C, Phoon, W O. Survey of acute pesticide poisoning among agricultural workers in four Asian countries. *Bulletin of the World Health Organization*. 65 (4) 521-527. 1987.

³ Jeyaratnam, J. Acute pesticide poisonings: A major global health problem. *World Health Stat. Q.* 43:139-144, 1990. * Figures are based on 3%

Because information on occupationally related poisonings come from special studies or recall surveys, policy makers can rationalize that these are only 'unusual situations' and not representative of reality. In addition, the agro-chemical industry can claim that the harmful effects are only due to misuse.

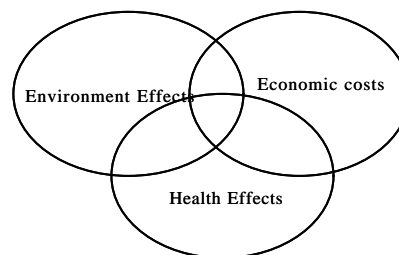
Furthermore, the data that does exist is rarely shared with the stakeholder farmer-user. So they continue to use toxic products with a vague awareness that they are harmful. Without alternatives to pesticides or an understanding that what they are experiencing are in fact related to pesticides, a decision to protect their own personal health cannot be made.

What is the IPM health component?

To raise a healthy crop, the farmer must also be healthy. In this way farmers are also part of the IPM ecological paradigm. Knowledge-based IPM crop management without the use of toxic chemicals protects the health of farmers and their families, the natural environment, and has economic advantages. Health therefore has become a decision making issue when farmers consider reducing the use of pesticides within their IPM crop management strategy.

The Health Component of the FAO Programme for Community IPM in Asia aims to address two issues: i) lack of surveillance data on the magnitude of occupationally related pesticide poisonings and ii) putting this information in the hands of farmers in conjunction with viable alternatives to chemically dependent crop management.

Considerations on use of Pesticides





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Activities which have been designed under the Health Component enable farmers to assess the adverse effects of pesticides on their own personal health; this complements IPM training activities, which enable farmers to assess the adverse impacts of pesticides on the environment. Financial assistance for the Health Component, in addition to IPM training in a number of countries, has been provided by the Government of Norway.

Three types of studies make up the Health Component depending on the country's needs, resources and individual programs. They are as follows:

- I. Farmer Self-Surveillance on the incidence of Pesticide Poisoning
- II. Farmer-to-Farmer Health Studies
- III. School Children's Health Studies

The primary purpose of all three activities is educational. By conducting their own studies, farmers and their children will have a first hand understanding of the health effects of pesticides. In addition, valuable data is generated. Because those stakeholders who are the most experienced and affected by pesticides gather the data, the information is highly valid and closer to reality than scientific studies conducted by outsiders.

I. Farmer Self-Surveillance on the Incidence of Pesticide Poisoning

Rationale: A farmer self-surveillance system was created because reliable data on the incidence of mild to moderate occupationally related pesticide poisoning does not exist. The only source of pesticide poisoning data is from health facilities. These figures represent only a small fraction of pesticide poisoning for a number of reasons. First, only a small number of severe poisonings present to the health care system. These usually are suicide attempts. The bulk of cases - milder, occupationally related - will not necessarily report to the health care system due to costs, inaccessibility of services, or fear of reporting and loss of employment. Finally, those few farmers that do present themselves for treatment are often misdiagnosed because pesticide poisoning mimics other health problems. Therefore the magnitude of occupational pesticide poisoning is so

underestimated that it cannot effectively inform policy.

Surveillance systems also do not provide feedback to their client communities. Commonly the data is seen as the domain of the health care system and upper level policy makers. Rather than being analyzed and used at a local level, the data migrates only up to central government institutions. As a result, communities from which the data are derived are not aware of the magnitude of pesticide poisoning nor are they given the opportunity to take preventive action or develop community solutions.

Therefore, the FAO/Community IPM program developed a system for farmers to self-report the acute effects of pesticide poisoning not necessarily seen by the health care system. This data is kept within the community and is shared among farmer groups and with local health authorities.

Description of the surveillance system:

After each spray session, the farmer fills out a single-sheet form that is primarily pictorial. (See Fig.1). He or she circles the sign or symptom experienced during or up to 24 hours after spraying.

Fig. 1 Self Surveillance Form



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Other written information includes identifiers such as name, address, date, gender, pregnancy status if female, number of tanks used, crops, and pesticides used. Any other symptoms experienced but not on the picture can be added. The numbers of mild moderate and severe signs or symptoms (S&S) are totaled as well as the illness category - a mild, moderate, severe or non- illness event.

Weekly the forms are collected and tabulated. Monthly the data is summarized and graphed for community inspection and discussion. The local doctor adds the number of pesticide poisoning cases seen that month as well.

The following parameters are tracked monthly:

- Average spray events per farmer
- Average number mild, moderate, severe S&S per spray
- Number or percent of spray events associated to no illness, mild, moderate, or severe illness
- Number of cases seen in the local health facility

The reporting system has an automatic impact evaluation built into the design. By looking at the spray frequency trends and the choice of pesticides used, we will know if monthly reporting on acute effects changes farmers' behavior. Controls matched by crops are interviewed weekly on spray frequency and pesticide choices to rule out other crop related reasons to change these above parameters.

Results: In September 2001, a community of 50 farmers in North Vietnam completed a yearlong surveillance pilot. IPM graduates managed the data collection, analysis and monthly community meetings. The local doctor served as a resource person and provided data on the cases seen at the community health facility. Data from the first month pilot revealed the following:

- 4.2 average spray events per farmer (mode 5)
- 34% use a cocktail of 3 or more pesticides/tank
- A Ib (highly hazardous) banned chemical was used in 28% of the spray events

- Up to 10% of spray operations were associated to verifiable signs of neurotoxicity
- 2% of the spray operations were asymptomatic, 25% associated to mild effects and 73% moderate effects (observed signs and subjective symptoms combined).

In Thailand, the Ministry of Public Health, Department of Occupational Medicine has plans to adopt this system to gather community based information on the number of pesticide poisoning cases not seen by their health care system. A pilot project is being planned in a few high pesticide using sentinel sites. The project will be a collaborative effort among the agriculture, health and education sectors. Under the supervision of schoolteachers and village non-formal education staff, a school class will gather the forms weekly, and do the monthly data analysis. Agriculture and health personnel will attend the monthly community meetings. The raw data forms will be forwarded to the local health care facility that will add the information to their own surveillance data.

II. Farmer to Farmer Health Studies

Rationale: Under an earlier IPM project in Indonesia, two studies documented the human health risks of pesticide use:

a) The first was conducted among Javanese shallot farmers and demonstrated that 21% of all spray operations were associated to 3 or more signs and symptoms of acute pesticide poisoning. Spraying on a weekly basis, use of class Ia, Ib and II pesticides (extreme, high and moderately hazardous products as classified by the World Health Organization⁴), applying more than one organophosphate cocktail concentrate, and skin exposure especially though clothing soaked in pesticides were all risk factors for illness⁵.

⁴ International Programme of Chemical Safety. The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification 1998-1999. WHO/PCS/98.21.

⁵ Kishi M. et al. Relationship of pesticide spraying to signs and symptoms in Indonesian farmers. *Scan J Work Environ Health* 1995;21:124-33.



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b) The second study looked at the acute and reproductive hazards among women. It was conducted with women vegetable farmers in Sumatra. While the study could not document adverse reproductive outcomes, high rates of acute health effects were again demonstrated. Over two-thirds of the women developed 2-5 symptoms of pesticide poisoning after spraying (19% six or more) and 33% had one or more observed sign. These rates were higher than that found in Java because the women used a greater number of more toxic products. Three quarters were using a neurotoxin, and all but one used at least a category II, Ib or Ia chemical. An average of 4 products were mixed together as a spray cocktail; 40% used 5-9 pesticides in one tank. All the women's skin was contaminated, 85% had observed respiratory exposure, and 22% had direct oral contact⁶.

While the Java study did have some impact on the Indonesian pesticide policy, this did not necessarily reach the small-scale farmer. For instance, on returning to the Java study site 4 years later, we found that the same hazardous risk behaviors were still practiced. Furthermore banned, hazardous products were still in use.

As a result, we changed the application of health studies to target farmers' personal pesticide policy as opposed to only that of the government. Three test activities made us realize this approach was not only appropriate but also efficient and more meaningful to farmers:

- i. The Sumatra study findings were presented to all the respondents in community meetings. As a result, the 161 women sprayers organized themselves into Farmer Field Schools. The control group (a pesticide free rice growing community) declared their desire to keep their village pesticide free.
- ii. A community of 1,000 shallot farmers conducted their own personal inventory

⁶ Murphy HH, Sanusi A, Dilts R, Djajadisastra M, Hirschhorn N, Yuliatingsih S. (1999) "Health Effects of Pesticide Use Among Indonesian Women Farmers: Part 1: Exposure and Acute Health Effects." *Journal of Agromedicine* Vol 6, Issue 3. pg 61-85.

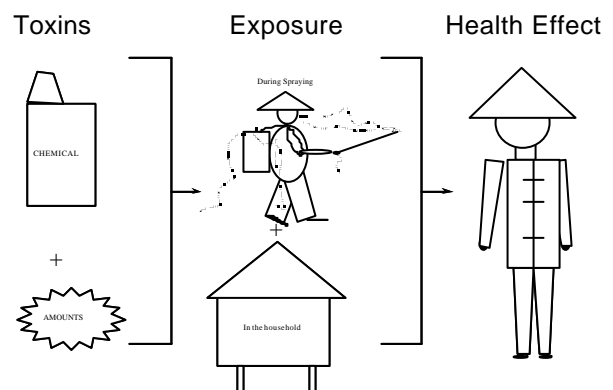
of signs or symptoms of pesticide poisoning experienced over the previous 2 weeks. The IPM alumnae who conducted the exercise claimed that this community as a result did not spray their harvest in the following month.

- iii. A self-survey among *paraquat* users in Sumatra regarding how they handle it and its health effects was conducted in 3 field meetings among 90 corn producers. The results were tallied on the spot, question by question, explaining the rationale of each. Although many of them claimed they had had industry *paraquat* handling training in the past, they had never understood its specific risks and hazards (pulmonary fibrosis, dermatitis).

Methods for Farmer-to-Farmer Health Studies:

In the spirit of IPM experiential learning models, the epidemiological health study methods were put into the hands of farmers for more instantaneous community application. The Javanese and Sumatran study design was broken up into 5 distinct community surveys that farmer groups could conduct among themselves. The risk factors demonstrated in the Javanese study are presented graphically to the farmers as follows:

The toxicity of the product (Ia, Ib, II) + spraying frequently + oral, respiratory, and especially skin exposure + unsafe household storage and disposal of pesticides = a high probability of pesticide poisoning.





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These components make up the 5 surveys that farmers conduct among themselves or within their communities. They are as follows:

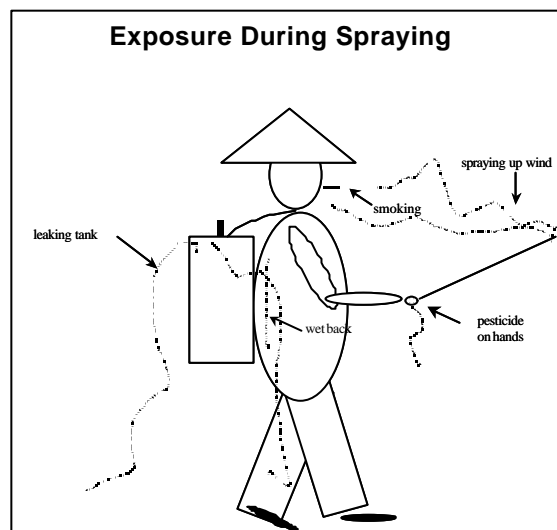
1. Pesticides used during spray sessions (and during household surveys or in local pesticide shops) are classified by brand and common name, hazard level, and chemical family.
2. Quantification of yearly spray frequency, total liters of pesticide solution exposure, and numbers of pesticides used per tank are calculated.
3. Farmers are observed during spray sessions to identify routes of pesticide exposure and personal protective equipment (PPE) used during a real spray session.
4. Farmer households are observed to identify hazardous child, food, water, and live stock pesticide storage and disposal practices.
5. Farmers interview and examine each other before, after and 24 hours after a spray session using a panel of 32 signs and symptoms of pesticide poisoning on a body map form.

Once the participating farmers collect the data, they analyze and present the results back to those that they interviewed and the rest of the community in the following educational format.

1. Pesticides. Pesticide classification by hazard level groups is presented to the community so they can understand which products are most harmful to their health (see Table 1 on next page). Pesticide classification by the major chemical families is also presented. This is used to teach farmers how different pesticides affect their bodies, e.g. the organophosphates/ carbamates affect the peripheral nervous system, organochlorines- the central nervous system, and pyrethroids have local effects at usual doses (Table 2).

2. Amounts Used: The amounts of pesticide solution used per year are presented as an average per farmer. These figures are then compared to the reduced amounts that would be used if the community and or individual farmers adopted IPM methods. The health and economic savings are discussed. (Table 3).

3. Exposure During Spraying: Pesticide contamination of the various body parts is colored in red. The pictures will demonstrate spraying up wind, leaking tanks, wet clothing, smoking and other routes of exposure. We emphasize the importance of skin as the most critical exposure, especially during mixing and through wet clothing. Groups identify what types of personal protective equipment (PPE) they observe in use. Discussions on why so little is used consistently reveal that PPE is too hot, too cumbersome, unavailable and too expensive. It thus become clear to the participants that safe practices through the use of PPE is not a practical way to prevent pesticide poisoning in Asia.





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Table 1 Pesticide Classification by hazard group

WHO Hazard Levels	# / % of farmers using	Trade (common name)
Ia (extremely hazardous)	25/100%	Folidol (<i>methyl parathion</i>)
Ib (highly hazardous)	15/60%	Monitor (<i>methamidophos</i>)
II (moderately hazardous)	25/100%	
* Only one	1/4%	Thiodan (<i>endosulfan</i>)
* Two	15/60%	Furadan (<i>carbofuran</i>)
* Three	5/20%	Gramoxone (<i>paraquat</i>)
* All four	4/20%	Decis (<i>deltamethrin</i>)
III (slightly hazardous)	3/12%	Malate (<i>malathion</i>)
IV (unlikely if used safely)	5/20%	Delfin (BT)

Table 2 Pesticide Classification by Chemical Family

Chemical family	# / % of farmers	Trade (common name)
Organophosphates (Op)	25/100%	
* Only one	5/20%	Folidol (<i>methyl parathion</i>)
* Two	15/60%	Monitor (<i>methamidophos</i>)
* All three	5/20%	Malate (<i>malathion</i>)
Carbamates (C)	12/48%	Furadan (<i>carbofuran</i>)
Organochlorines (Oc)	15/60%	Thiodan (<i>endosulfan</i>)
Pyrethroids (Py)	25/100%	Decis (<i>deltamethrin</i>)

Table 3. Amount Of Pesticide Solution Sprayed By Farmers

Average Farmer	a. Tank size	b. tanks /session	c. ♦ sessions per week	d. ♦ # weeks per season	e. session/season (c*d)	f. seasons per year	Days per year exposed (e*f)	Liters exposure per year a*b*e*f
1.crop								
2.crop								
Last year								
rice	15	10			4	2	8	1200
beans	15	5	3	12	36	4	134	10800
Total							142	12000
With IPM								
rice	15	10			0	2	0	0
beans	15	5			3	2	6	450
Total							6	450

























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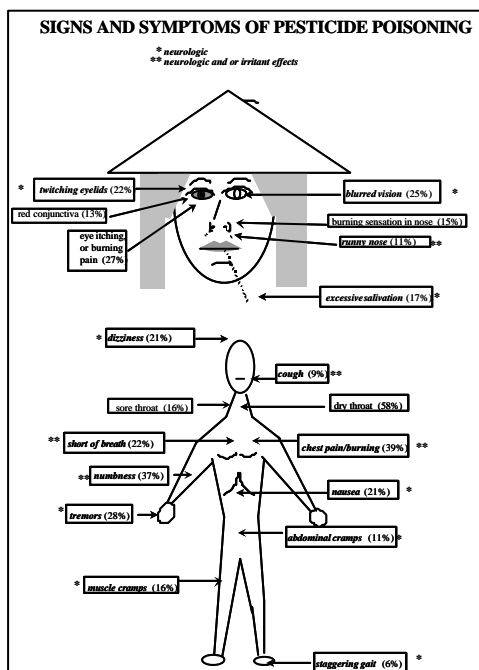
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4. Household Storage and Disposal: A picture of a typical house is drawn showing the safe and unsafe storage and disposal methods found during the survey. The surveyed households are then analyzed by child, food, water and livestock safety, as demonstrated below.

Unsafe =  Safe = 	Storage	Disposal
Child 	 	 
Food 	 	 
Water 	 	 
Animal 	 	 

5. Signs and Symptoms: are usually displayed on a body map drawn by the farmer data collectors. We highlight the signs and symptoms that are a product of nervous system toxicity with reference back to the table on pesticides by chemical family. Farmers are warned that if they notice any of these effects they should stop spraying immediately and take a full bath with soap.



Use of Studies: These farmer-to-farmer studies are designed for integration into Farmer Field Schools or as a follow-up activity.

- Both Indonesia and Vietnam IPM graduates conduct health studies as a means to motivate new farmers to join Farmer Field Schools.
- The Vietnamese studies will be used as a means to measure the impact of community IPM where it has been implemented. A follow-up survey with the same sample is planned in two years.
- When farmers join Farmer Field Schools in Cambodia they do a self-assessment in the classroom, looking at their previous season pesticide use, acute effects, spray practices and household storage and disposal practices of pesticides. Then as homework, they evaluate one neighbor. This serves as a rationale to start their farmer field school training and to sustain non-chemical crop management practices.

Results: Farmer-to-farmer studies have been completed in Indonesia, Cambodia and Vietnam. The data highlights are summarized below:

Indonesian Farmer to Farmer Study among 60 Shallot Farmers, East Java 1999:

- Pesticides were applied 25 times per season to shallots
- 20 formulations were being used of which 13 were WHO Class II (moderately hazardous) and 2 were Class Ib (highly hazardous)
- 67% of the farmers were using leaking tanks, thus soaking their clothing
- Serious signs post spray event: 2% reported they had a seizure
- Moderate signs or symptoms post spray event: tremors (50%), gait disorders (27%), blurred vision (18%), diarrhea (13%) vomiting (8%), nausea (35%)

Cambodian Situational Analysis on Farmers Perception of the Health Effects of Pesticides on Their Health (n=210)

1. There was evidence that significant pesticide poisoning was occurring.
 - 67% report 3-5 signs or symptoms potentially associated to pesticide use



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- per spray operation; another 22% reported 6-10.
- 35% reported an episode of vomiting shortly after applying pesticides that indicates moderate poisoning.
 - From 1-5% reported a serious episode of poisoning (seizure and loss of consciousness respectively)
 - Close to 50% have sought medical care for poisoning.
2. Cambodian farmers were using highly hazardous products, which are well-documented risk factors for pesticide poisoning.
- 43% were using extremely hazardous products (Ia),
 - 52% were using an extreme or highly hazardous product (Ia or Ib)
 - 84% were using a moderate to extremely hazardous product (Ia, Ib or II)
 - Many of these products have been banned and are not longer available in neighboring countries.
 - Most were imports, as reflected by their labeling in Vietnamese and Thai. This was an indication that Cambodia is serving as a dumping ground for old stocks that these neighbors can no longer sell in their own countries.
3. The Cambodian farmer had no idea what he/ she was using, its appropriate dose, indication, handling procedure, or human health hazards.
- Labels were illegible for the Khmer farmer.
 - 99% of the respondents have not received technical information from an informed source.
 - 63% did not feel pesticide handling and storage could be a health hazard.
4. Farmers were exposed to multiple doses on multiple occasions through a season; another documented risk factor for pesticide poisoning.
- Crops were sprayed up to 20 times per season
 - Up to 5 different products were mixed together and applied to a single crop per spray session
5. Prolonged dermal exposure was occurring. Hands and feet were likely heavily contaminated as few use boots and no one reported using gloves. 92% wore unwashed, contaminated clothing to spray, which amplifies skin exposure.

- Dermal exposure is the most important route of entry and an important risk factor for pesticide poisoning.
6. Pesticide use was on the incline with 64% reporting more reliance on pesticides.
 7. Children were directly or indirectly being exposed. Close to 50% of the respondent farmers reported that they allowed their children to apply pesticides.

Vietnam Farmer-to-Farmer Baseline Study (n=480) to Measure the Impact of Community IPM

- At least 17.5% of farmers had moderate pesticide poisoning on a single spray event observation as revealed by the easily observed sign of 'staggering gait'. Another 2% vomited on site and possibly 2 passed out and 3 had a seizure.
- 41% of the entire 480 farmers were using a highly toxic product (Ib) and in one community 88%.
- 100 farmers were using *methamidophos* (Monitor and Filtox), which has been formally banned by the government.
- Most farmers were heavily contaminated by their pesticide solution through wet clothing, hands and feet; some of which is attributed to leaking tanks.
- Protective equipment was rarely used as elsewhere in Southeast Asia due to the costs and impracticality of such materials in this hot climate.
- Family members and livestock were also being exposed to pesticides through hazardous pesticide storage and disposal practices in farmer households.

III. School Children's Health Studies

Rationale: The farmer-to-farmer health studies were also designed for use in schools that are doing IPM for a number of reasons. First, we are educating a future generation who will be the primary beneficiaries of good personal health, a preserved natural environment, and a sound food-producing economy. Next, children can have an influence on protecting the health of their parents by making them aware of the health hazards of pesticides. In addition, the data generated from these studies remain in the community and will be used by the community for decision-making. Finally, conducting these studies in schools is an exceedingly rich non-formal educational experience. The surveys increase their skills in:



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- math
- art
- language
- teamwork
- critical thinking
- interviewing
- observation
- public speaking

Teachers experientially also learn the methods and results of non-formal education.

Methods for school children's health studies. Students perform each of the 5 topics in class through creative games and or competing teams. Then as homework, they practice collecting the information with their parents or a farmer neighbor. The following morning in their working groups they discuss, analyze and present their data for the class at large. Once the information has been gathered on each of the 5 topics, they summarize it on flip charts in the form of pictures, tables or graphs and present it to their parents and community.

Below is an example the methods used to train children to collect data on the household survey and signs and symptoms of pesticide poisoning:

Household storage and disposal practices:
This exercise involves a great deal of teamwork, calls for critical thinking and math skills. It generates heated discussions among the participants.

1. It starts with a scavenger hunt. Each team must collect 10 items: something round, from a plant, smelling good, long/sharp, a wrapper... etc
2. Then each team must build a household compound on a flip chart with the scavenger hunt materials
3. They then draw in where: pesticides/tank are stored, food is stored, prepared and consumed, water source, storage, where consumed, animal pens, and pesticide disposal sites.
4. Finally the class analyzes each house to determine if pesticide storage and disposal is: child, food, water, livestock safe

5. Homework: Each student must draw their own household showing the sites specified in step 3.
6. Next day: Each group scores each house and summarizes the findings on one picture. (% households that are child, food, water, animal safe)

Signs and Symptoms of Pesticide Poisoning:
This exercise draws a lot of humor and helps better define the meaning of the symptoms and other conditions that could mimic pesticide poisoning.

1. Each group must outline the body of one participant on a double length flip chart.
2. The groups write on cards each sign or symptoms of pesticide poisoning that they have seen, heard about or know about. These are pasted to the body map.
3. They then must correct the body map (adding or taking off cards) referring to the distributed body map survey form.
4. From one correct body map, each participant takes one card.
5. Charade game: With the class sitting in a circle, they must guess what sign or symptom each participant acts out, one by one. Then as a group on a newsprint flip chart, they list what other illness or condition can also present with this same symptom or sign. During this game the teacher demonstrates the special exam used to observe tremors, staggering gait, red eyes, and eye twitching.
6. Each student then draws their own body map picture and writes down all the signs and symptoms.
7. Homework: With this picture the students interview their parents or a neighbor about signs and symptoms 'ever' experienced after spraying.
8. Next day: In groups (5/group) on one picture they summarize their data (e.g. #/total = % by each sign or symptom). They then present their group findings to the class.



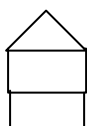
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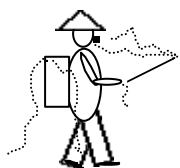
9. Later each sign and symptom is discussed in context of the chemical families, when the class analyzes the pesticides found in their parent's households.

Results: To date 31 primary and secondary teachers have been trained in Thailand. As a result, 11 schools are now helping their students conduct health surveys in their communities. Each has conducted small pilot surveys as a means of training their students to conduct the studies. Now two schools have mapping their entire communities in order to reach every household. One in Chiang Mai has completed their village of 200 farmers. For a WHO case study that is being published, a school in Utai Thani Province did a repeat survey on their pilot population to measure impact. They found:



Safe household pesticide storage and disposal practices improved. Initially, students had identified that pesticides were stored in the same areas where children play (under their houses on stilts, in the garden and hanging from trees).

After four months, houses defined as 'child unsafe' had diminished from 64% to 45%. Pesticide storage and disposal that were potentially contaminating food, water and livestock improved by 31%, 22%, and 20% respectively. Home recycling of pesticide containers diminished from 16% to 5%.



Students felt their parents took greater care to protect themselves during spraying. All wore rubber gloves and boots and none smoked during the spray operation as opposed to the initial survey.



Of the 18 signs and symptoms initially reported by parents, all but two decreased in frequency. For instance during the previous season, 23% reported an episode of vomiting and 28% uncoordinated gait associated with a spray operation. This diminished to 0% and 6% over the second reporting period.

What has been achieved?

Since its inception in 1999, the IPM Health Component is now well developed, tested and documented. The model is easily adaptable in that it has been applied to a variety of countries with different levels of trainers. Teacher and master trainers, farmer trainers, primary, secondary, agriculture college and non-formal education teachers have learned to conduct these studies in 5 countries that include Indonesia, Thailand, Vietnam, Cambodia and Sri Lanka.

The farmer, teacher, and student participants universally appreciate the process. The data that is produced never fails to reveal the same extremely hazardous conditions of pesticide use in the region. As a result, farmers and their communities have become alarmed and seek non-chemical alternatives. For this reason, these studies are only conducted within the IPM context.

Furthermore, it has generated a good deal of interest in the health community who often lack first hand experience on the subtle manifestations of pesticide poisoning. As such, farmers are educating the health care sector. Not only are they more aware of the problem but they also are learning new methodologies with which to develop further studies. It also motivates the health care sector to be more involved in pesticide policy, because farmer's well being as an occupational health issue falls within their domain.

In addition the data is extremely useful to the agriculture sector. They too are being educated because they often lack longitudinal data on spray operation frequency and the types of products in use. Since they often lack the medical expertise to deal with these health issues, these simple study methods has increased their capacities as well.

Finally, community level activities such as this bring the health, education and agriculture sectors together. They are being trained on this innovative health education strategy as well as benefiting from the data.



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Where do we go from here?

Although this process has been well developed and is being used in multiple countries, it has yet to go to scale. We need to reach more farmers and schools. One method is to make other donors supporting IPM projects aware of this component so that it can be integrated into ongoing programs. But ultimately, this health component needs to be institutionalized. From our experience in Cambodia where it has been integrated into Farmer Field Schools we know how it can be done within the agriculture sector. We are now in the process of working out how the health sector can use these strategies for community-based pesticide poisoning surveillance in Thailand. We also have models in Thailand on how the education sector can use these methods through their Non-Formal Education programs and in primary school IPM programs. More countries need to adapt this institutionalization for better sustainability.

Using IPM in the health sector is another means to go to scale and institutionalize this model. For instance, new projects that focus on environmental health can use this model with the addition of IPM as a **primary preventive intervention** to reduce the incidence of pesticide poisoning. WHO has an interest in this direction. They have published our Thai school activity as a case study in their Handbook on Children's Environmental Health. Reducing the availability of pesticides is a well-documented means of reducing suicides from pesticide ingestion. The Sri Lankan Presidential Task Force on Suicide Prevention is considering IPM as an intervention strategy. These are good examples on how IPM can help the health sector which can be replicated in more countries.

Finally these studies need broad dissemination nationally and internationally to benefit more farmer's and better influence pesticide policy. We see the beginnings of these trends. Both the Thai and Cambodian press has covered aspects of our health activities. BBC also produced the documentary 'Toxic Trail' that had worldwide airing. It documents the hazardous pesticide use and adverse health effects Cambodian farmers are finding through their studies. Finally PAN (Pesticide Action Network) Asia is publishing our farmer-to-farmer studies from both

Cambodia and Vietnam. We are encouraging these authors to publish in their own countries as well. Finally, we would like to bring these countries together to share their experiences and publish the proceedings international through PAN Asia.

It seems clear that this health component has many uses and beneficiaries. One, the community's capacity to protect the often forgotten farmer- whose health is critical to the world's food production- is strengthened. Two, multiple sectors are provided with useful educational methods and information. And three, it has the potential to better inform pesticide policy locally as well as national and internationally.

Sources of Further Information:

Publications:

Murphy HH, Sanusi A, Dilts R, Djajadisastra M, Hirschhorn N, Yuliatingsih S. (1999) Health Effects of Pesticide Use Among Indonesian Women Farmers: Part 1: Exposure and Acute Health Effects. Journal of Agromedicine Vol 6, Issue 3. pg 61-85.

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FAO-IPM Training Materials:

The Health Effects of Pesticide Use: Methods to Conduct Community Studies with School Age Children

Guidelines for Farmer-to-Farmer IPM Health Studies

Farmer Based Sentinel Surveillance System For Pesticide Poisoning

Self Assessment Questionnaire Of The Health Risks From Pesticide Use

Videos-Films:

Toxic Trail (activities in Thailand, Cambodia and Indonesia)

In the Shadow of Poison (activities in Indonesia)

Local Heroes (activities in Cambodia)

Some of these documents can be downloaded from the website:

<http://www.communityipm.org>

Copies of all items are available from this address:

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