



Pesticides-Health surveys

Data of 606 farmers in Thailand



Contents

Summary of results	3
Introduction.....	3
Data of 606 farmers	4
Conclusion	9

Summary of results

Data on pesticide use by 606 farmers in 6 provinces of Thailand during August 2003-July 2004 are presented in this report.

Many farmers are found to use chemicals that are very toxic:

- 15% of the farmers used chemicals that are classified in WHO class Ia,
- 39% of the farmers used WHO class Ib pesticides.
- 58% of the farmers used Organophosphates
- 22% of the farmers used Carbamates.
- 31% of the farmers used Paraquat
- 40% of the farmers used pesticides that were on the “watch list”. Most popular of these watch list pesticides are Endosulfan and Parathion-methyl.

Note: In October 2004 (after collecting the data of these 606 farmers) the Thai government has banned the use of Endosulfan and Parathion-methyl.

- 14% of the farmers used pesticides that are banned in Thailand, mainly Methamidophos (which is banned since April 2003). Most of these banned pesticides were used in Suphanburi and Rayong.

Almost all farmers have experienced signs and symptoms of pesticide poisoning:

- 56% of the farmers had experienced moderate signs of pesticide poisoning
- 1% of the farmers experienced severe symptoms of poisoning
- Only 6% of the farmers reported no signs and symptoms of poisoning
- Of the 187 farmers that had a blood test, 11% were found to have dangerous level of cholinesterase inhibition.

There is a big variation in volume of pesticide use and frequency of pesticide use (risk days) between the farmers. It was found that some farmers have extreme high frequency of pesticide use.

- 24% of the farmers have more than 20 risk days per year
- 17 out of 606 farmers (2.8%) sprayed 52 or more days per year, which is on average at least once per week.
- The maximum was a farmer with 120 spray days, which corresponds to spraying on average every 3 days.

Introduction

The IPM DANIDA project has in the past two years organized several training courses for groups of farmers on “the health effects of pesticides”. During these courses the farmers learn to make a so called “cross-sectional survey”, which is a one-time survey of the situation in their own farming community. The training helps the farmers to understand what is going on in their community and understand how and when they are most likely to be contaminated by chemicals. The training model used was developed by Ms. Helen Murphy.

(See website: www.ipmthailand.org/en/pesticides/pesticides_survey.htm)

During the 5-day training the participating farmers learn about various aspects of pesticide use. Major topics include:

- Identifying the types of pesticides used and classifying them according to their acute toxicity (learn to read and understand labels, understand the colored warning signs on containers, etc.)
- Observing how the pesticides are used (protective measures that are taken during mixing and application, observe contamination, etc.)
- Observing how pesticides are stored and the disposal of empty containers (risk for children, food, water, farm animals, etc.)
- Calculating the volume of pesticides used and the frequency of application (number of risk days per year)
- Recognizing signs and symptoms of pesticide poisoning.

After the 5-day program the trained farmers get the task to each interview and observe 3 or more of their neighboring farmers. When they have completed this survey, the farmers meet again to analyze the data and to formulate their own conclusions.

This process of making a survey in their own community helps the farmers to make decisions that reduce the risks. For example they quickly understand that they can reduce risks by avoiding the most toxic substances (WHO class Ia and Ib) in favor of less toxic products (class III or IV).

Between November 2002 and July 2004, 26 groups of farmers (652 farmers) received this type of training and together they interviewed 1930 other farmers. While each farmer group is concerned with their own data, the combination of data from different groups can help to get a broader picture about pesticide use in Thailand. This report presents a sample of the available data.



Farmers analyze the data they collected during their pesticide-health survey

Data of 606 farmers

Data from 606 farmers were selected and entered in a computerized database. All these data are from surveys conducted between August 2003 and July 2004. The following tables give an overview of these data.

Table 1 - Location of 606 farmers

	<i>Frequency</i>	<i>Percent</i>
Chanthaburi	70	11.6
Chiang Mai	213	35.1
Kampangpet	71	11.7
Rayong	67	11.1
Sukhothai	38	6.3
Suphanburi	147	24.3
Total	606	100.0

Table 2 - Gender of 606 farmers

	<i>Frequency</i>	<i>Percent</i>
female	143	23.6
male	463	76.4
Total	606	100.0

Table 3 - Types of crops grown by 606 farmers

	<i>Frequency</i>	<i>Percent</i>
Vegetables	110	18.2
Fruits	272	44.9
Rice	128	21.1
Sugarcane	12	2.0
Corn	60	9.9
Cassava	6	1.0
Watermelon	1	0.2
Garlic - onion	145	23.9
Tobacco	2	0.3
Bean	16	2.6
Flower	1	0.2
Chili	14	2.3
Black galingale	1	0.2

Table 4 - Types of pesticides used (WHO classification) by 606 farmers

	<i>Frequency</i>	<i>Percent</i>
WHO class Ia	94	15.5
WHO class Ib	234	38.6
WHO class II	488	80.5
WHO class III	222	36.6
WHO class IV or U	349	57.6
Not listed	350	57.8

Table 5 - Types of pesticides used (chemical families) by 606 farmers

		<i>Frequency</i>	<i>Percent</i>
Organophosphates	OP	352	58.1
Carbamates	C	133	21.9
Pyrethroids	PY	246	40.6
Organochlorines	OC	129	21.3
Paraquat	P	186	30.7
Other	Other	504	83.2

Table 6 - Watch list pesticides used by 606 farmers

	<i>Frequency</i>	<i>Percent</i>
Parathion-methyl *	87	14.1
Methomyl	49	8.1
Dicrotophos	27	4.5
Endosulfan *	114	18.8
Methidathion	4	0.7
EPN	5	0.8
Carbofuran	8	1.3
Formetanate hydrochloride	1	0.2
Oxamyl	1	0.2
Uses watch list pesticides	244	40.3

* Since October 2004, the use of Parathion-methyl and Endosulfan has been banned in Thailand.

Table 7 - Banned pesticides used by 606 farmers

	<i>Frequency</i>	<i>Percent</i>
Methamidophos	76	12.5
Monocrotophos	9	1.5
Gamma BHC	1	0.2
DDT	1	0.2
Mevinphos	2	0.3
Chlordane	1	0.2
Uses banned pesticides	84	13.9

Table 8 - Farmers using banned pesticides

	<i>Total farmers in location</i>	<i>Frequency with banned pesticides</i>	<i>Percentage with banned pesticides</i>
Chanthaburi	70	3	4.3
Chiang Mai	213	9	4.2
Kampangpet	71	4	5.6
Rayong	67	19	28.4
Sukhothai	38	3	7.9
Suphanburi	147	46	31.3
Total	606	84	13.9

Table 9 - Types of banned pesticides used in 6 different provinces

	<i>Methamidophos</i>	<i>Monocrotophos</i>	<i>Gamma BHC</i>	<i>DDT</i>	<i>Mevinphos</i>	<i>Chlordane</i>
Chanthaburi	3					
Chiang Mai	9	1				
Kampangpet	2	2				1
Rayong	18	1				
Sukhothai	2	2				
Suphanburi	42	3	1	1	2	
Total	76	9	1	1	2	1

Table 10 - Overview of the use of hazardous pesticides by 606 farmers

	<i>Frequency</i>	<i>Percent</i>
WHO class Ia	94	15.5
WHO class Ib	234	38.6
Watch list pesticides	244	40.3
Banned pesticides	84	13.9
Paraquat dichloride	186	30.7

Signs and symptoms of pesticides poisoning have been ranked in 4 classes according to the training manual that is used during the pesticide-health training (manual by Helen Murphy, see website: www.ipmthailand.org/en/download_documents.htm).

Table 11 - Overview of signs and Symptoms of pesticide poisoning in four levels of severity

<i>0</i>	<i>1</i>	<i>2</i>	<i>3</i>
<i>None</i>	<i>Mild</i>	<i>Moderate</i>	<i>Severe</i>
	Sweating	Twitching eyelids	Convulsion
	Burning nose	Blurred vision	Seizure
	Excessive salivation	Nose bleed	Loss of consciousness
	Burning-Stinging-Itchy eyes	Runny nose	
	Red eyes	Excessive tearing	
	Dizziness	Insomnia	
	Exhausted	Tremor	
	Headache	Muscle cramps	
	Dry throat	Malformed-discolored-loss of nails	
	Short of breath	Staggering gait	
	Shaky heart	Diarrhea	
	Muscle weakness	Stomach cramps	
	Skin rashes	Nausea	
	Itchy skin	Chest pain (tightness burning)	
	Numbness	Wheezing	
	Cough	Vomiting	
	Sore throat		

Table 12 - Signs and Symptoms of pesticide poisoning in 606 farmers

	<i>Frequency</i>	<i>Percent</i>
Level 0 - None	34	5.6
Level 1 - Mild	226	37.3
Level 2 - Moderate	341	56.3
Level 3 - Severe	5	0.8
Total	606	100.0

Blood tests are sometimes carried out to detect if Cholinesterase inhibiting chemicals are present in the blood, which is an indication of poisoning by organophosphates or carbamates. The blood test distinguishes 4 levels: 1) normal, 2) safe, 3) risk, and 4) dangerous. Of the 606 farmers covered in this report, 187 had a blood test.

Table 13 - Blood test by 187 farmers

	<i>Frequency</i>	<i>Percent</i>
Normal	30	16.0
Safe	74	39.6
Risk	62	33.2
Dangerous	21	11.2
Total	187	100.0



Blood tests are carried out to detect contamination with cholinesterase inhibiting chemicals

There are huge differences between farmers in the number of days that they handle chemicals (risk days) and in the volume of chemicals used (liters per year). The number of risk days varies from 1 to 120, and volume used varies from 40 liters to 240,000 liters. It is therefore not meaningful to show averages of these data. To give an overview of risk days and pesticide volume these data were categorized in 4 groups based on percentile groups, with each group containing approximately the same number of cases. Group 1 are the cases below the 25th percentile, group 2 are the cases between the 25th and 50th percentile, group 3 are cases between the 50th and 75th percentile, and group 4 are cases above the 75th percentile.

Table 14 - Volume of pesticide use (liters per year) by 606 farmers in 4 categories

	<i>Min</i>	<i>Max</i>	<i>Frequency</i>	<i>Percent</i>
Group 1	40	1920	152	25.1
Group 2	1960	4160	150	24.8
Group 3	4200	9520	152	25.1
Group 4	9600	240000	152	25.1
Total			606	100.0

Table 15 - Number of risk days of 606 farmers in 4 categories

	<i>Min</i>	<i>Max</i>	<i>Frequency</i>	<i>Percent</i>
Group 1	1	6	151	24.9
Group 2	7	11	128	21.1
Group 3	12	20	182	30.0
Group 4	21	120	145	23.9
Total			606	100.0

The last table shows that some farmers have extreme high frequency of pesticide use. In fact we found that 17 out of 606 farmers (2.8%) sprayed 52 or more days per year, which is on average at least once per week. The maximum was a farmer with 120 spray days, which corresponds to spraying on average every 3rd day.

Conclusion

The presented data are from 606 quite different farmers. These farmers grow a variety of crops, have different sizes of crop fields and have different spraying habits. Pesticide use varies from very low to very high volumes, and also there is a big variation in the frequency of pesticide use (number of risk days).

Due to the big variation between the farmers in the surveys, it is difficult to establish relationships between sets of data. For example it would be interesting to compare vegetable growers with fruit growers or to find linkages between pesticide use and the results of blood tests. However, because of the nature of these data and the way they were collected it is not possible to make statistically justified conclusions about this type of relationships.

Nevertheless, the report gives a picture of pesticide use in Thailand, especially by showing that many very toxic chemicals, including watch list chemicals and banned chemicals are frequently used. Use of banned pesticides was particularly high in Suphanburi and Rayong. The report also clearly shows that pesticide poisonings are very common.

It is recommended to conduct further studies to search for direct relationships between cases of pesticide poisoning and the types of pesticides that have caused them.