

SLOW SUICIDE:

*How Korean Farmers are
Poisoning themselves with Pesticides*



by

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PREFACE

This report is based on a survey of pesticide use in South Korea in 2003 that was carried out by the former Citizens Alliance for Consumer Protection of Korea (CACPK), now CK (Consumers Korea), an organisation which is a network partner and steering committee member of the Pesticide Action Network Asia-Pacific (PAN AP). Although the survey is focused on Korea, it is integral to the international campaign against the marketing and use of pesticides that has united a broad coalition of concerned scientists, citizens groups, farmers and others for over more than three decades now.

The survey focuses attention on the hazards that farmers are exposed to as a result of their direct contact with the highly toxic chemicals which hold modern agricultural production in a death grip. As the survey findings show, 98% of Korean farmers are using pesticides in the cultivation of major crops. Unfortunately, the acute and chronic effects on farmers of this widespread use of toxics - including cancer, genetic changes, organ failure and death - does not receive the kind of attention that should result in change. Aside from farmers, the disastrous effects of agro-chemical abuses on consumers and the environment are already well-documented.

Indeed, reform is not an option for humanity, for we are paying the toll for these abuses in our daily lives. Today, we are witnessing the countdown to the next outbreak of superpests, cancers, groundwater pollution, or even an industrial accident involving pesticides. The survey findings merely provide empirical evidence to convince the sceptics and to silence cynics concerning the gravity of the crisis that we are experiencing.

The approach of governments that pesticides are a necessary evil distorts the reality and stalls the return to environmentally-sound agricultural practices. The agro-chemical industry spares no effort in perpetuating the myth that chemical fertilizers and pesticides are indispensable. The reality however is quite different. While the position of agriculture in the Korean economy has been rapidly supplanted by industrial production since the 1970s, agro-chemical use has expanded dramatically. So farmers are exposed to a double jeopardy – as farm incomes fall, they have turned increasingly to pesticides and fertilizers in a vain attempt to boost yields.

The findings of the Korean survey provide a powerful case for adopting an ecologically-responsible system of agriculture now.

CHAPTER 1: INTRODUCTION

1.1 The Problem with Using Pesticides

When dealing with pesticides, one thing matters most: pesticides are highly toxic and harm the user, consumer and the environment. All other problems follow on from there.

In Korea, farmers use pesticides extensively for a wide variety of crops. This poses several crucial questions:

- How much pesticide are Korean farmers using?
- Why are they using these poisons?
- Do they know the dangers of using these chemicals?
- Are they suffering from pesticide poisoning?
- What is their attitude towards pesticide use?
- Who is providing them these pesticides?
- Do they know how to handle pesticides?
- Are they utilising protective equipment and clothing when using pesticides?
- Do they know that there are safe alternatives?
- What are the regulators doing about pesticide use?

And that is just the tip of the proverbial iceberg.

This study seeks the answers to these and other questions in order to:

- measure the extent of pesticide use by Korean farmers,
- record the effects on their health,
- record farmers' attitudes towards pesticide use
- survey the farmers' knowledge more sustainable farming methods,
- examine whether farmers use protective measures when handling pesticides.

Equipped with this information, PAN AP and CACPK aim to pursue the campaign together with like-minded groups and people to stop pesticide use and encourage farmers to turn to natural, environmentally benign cultivation methods and sustainable practices. The information gathered here marks an important milestone towards that goal.

In the next two sections, background information about the Korean agricultural sector is provided to illustrate the socio-economic context of the survey. Data on agricultural acreage, type of crops, farm economy and other topics are briefly presented, and trends in farming outlined. Specific information related to pesticide use in Korean agriculture is elaborated in the third section.

1.2 Overview of the Korean agricultural sector

This survey covers the agricultural sector of South Korea, which occupies about 45% the Korean Peninsula. The peninsula spans 1,000 km north to south and covers 222,154 sq. km. Since 1948, it has been divided into two countries, the Republic of Korea in the south and Democratic People's Republic of Korea in the north. South Korea (hereafter Korea) comprises an area of 99,268.38 sq. km, which is divided into nine provinces.

Since 1972, land use for agriculture has been regulated under the Farm Land Conservation and Utilization Act. Agricultural land has decreased since the early 1970s as economic growth and urban expansion have encroached into arable land. Although land reclamation has added to Korea's size, farmland has shrunk due to the construction of factories and houses. As of the end of 2002, total farmland stood at 1,862,622ha, accounting for 18% of the total land area in Korea.

Total farmland acreage decreased by 17.4% from 1965 to 2002. Rice fields and vegetable/fruit gardens have decreased by 11.5% and 25.4%, respectively. Agricultural land use in Korea is characterized by the extensive cultivation of rice, which is the most important crop. It takes up 61.1% of the entire farmland. Other main agricultural products include rice, wheat, barley, miscellaneous grains, pulses, potatoes, vegetables, fruits and special crops (see Table 1).

Table 1) Land use by crop type

Types of crop	1995 (ha)	2001 (ha)	Growth / decrease (ha)	Growth (%)
1.Rice	1,055,868	1,083,000	+27,132	+2.6
2.Barley &Wheat	89,814	92,000	+2,186	+2.4
3.Miscellaneous grains	28,097	23,000	-5,097	-18.1
4. Pulses	132,535	99,000	-33,535	-25.3
5. Potatoes	39,849			
6. Special crops	122,450	94,000	-28,450	-23.2
7. Vegetables	321,782	280,000	-41,782	-13.0
8. Fruits	172,367	163,000	-9,367	-5.4
9. Others	233,878	218,000	-15,878	-20.4
Total	2,196,640			

Source: Ministry of Agriculture and Forestry, Republic of Korea

Farming in Korea is mostly undertaken by families on very small plots. The average farm size stood at 1.45 ha in 2002, with about 60% of farms being less than 1 hectare in size. FAO statistics show that this is substantially lower than in many developed countries such as Canada (116.8ha), Australia (112.5 ha), US (58.5 ha), and France (20.5 ha).

Table 2) Farmland area in Korea 1990-2002

	unit	'90	'95	'99	'00	'01	'02
Total land area	'000 ha	9,926	9,927	9,943	9,946	9,954	9,959
Farmland area	"	2,109	1,985	1,899	1,889	1,876	1,863
Farmland: total land	%	21.2	20.0	19.1	19.0	18.9	18.7
Average farm size	ha	1.19	1.32	1.37	1.37	1.39	1.45

Source: Major Statistics Related to Agricultural Industry 2004, the Ministry of Agriculture and Forestry

The head of the household in these owner-operated farms is traditionally male. Monocultivation is predominant and production is heavily dependent on agro-chemical inputs. Women workers are generally offered subordinate and also hazardous tasks such as pesticide spraying. With women's issues and concerns by and large ignored in society, they have minimal representation in leadership positions since most of them are members of small farm holdings. In addition, their roles are also restricted by socio-cultural norms.

The number of households involved in agriculture is shrinking as accelerating industrialization and urbanization draw people away from agriculture. Table 3 shows that, while the total number of households in Korea has risen by 33% from 1990 to 2002, the number of farm households has decreased by 27% during the same period, and continues to decline. Consequently, the ratio of farm households to total households has almost halved from 15.6% in 1990 to 8.5% in 2002. In the same period, total population has increased by 12%, while the population of farm households has drastically decreased by 46%.

Table 3) Number and Population of Farm Households

Year	Total households	Farm households		Total population	Population of Farm Households	
		1,000 households	%		1,000 people	%
1990	11,355	1,767	15.6	42,869	6,661	15.5
1995	12,958	1,501	11.6	45,093	4,851	10.8
2000	14,312	1,383	9.7	47,008	4,031	8.6
2001	14,834	1,354	9.1	47,343	3,933	8.3
2002	15,064	1,280	8.5	47,640	3,591	7.5

Source: Korea National Statistical Office

Therefore, the ratio of the population of farm households to the total population has shown a sharp decrease from 15.6% in 1990 to 8.5% in 2002 (see table 4). The ratio of economically active population in agriculture to the total number of economically active population was 9.5% in 2001, which is however still much higher than in other developed countries. According to the FAO statistics, the ratios in developed countries in 2000 are as follows: UK (1.8%), US (2.1%), Canada (2.4%), Germany (2.5%), France (3.3%), and Japan (4.1%).

One of the serious problems in Korean agriculture is that the average age of the population of farm households is rapidly increasing as young people move out of the rural area. The ratio of farm household members above 60 years to the total farming population increased from 17.8% in 1990 to 38.2% in 2002, reflecting this worrying trend. Meanwhile, the percentage of those from 15 to 49 years has decreased from 44.9% to 34.6% in the same period. Moreover, the percentage of people below 15, the future farmers, has drastically decreased from 20.6% to 10.7% during the same period. This trend is only expected to worsen (see table 4).

Table 4) Population of farm households by age

Unit: 1,000 people

Year	Population of farm households		Below 15 years		15 to 49 years		50 to 59 years		Above 60 years	
		%		%		%		%		%
1990	6,661	100.0	1,370	20.6	2,993	44.9	1,111	16.7	1,187	17.8
1995	4,851	100.0	680	14.0	2,049	42.2	867	17.9	1,255	25.9
2000	4,031	100.0	459	11.4	1,563	38.7	676	16.8	1,333	33.1
2001	3,933	100.0	444	11.3	1,430	36.4	636	16.2	1,423	36.2
2002	3,591	100.0	384	10.7	1,245	34.6	590	16.4	1,372	38.2

Source: Korea National Statistical Office

Korean agriculture is encountering other challenges as well, both internal and external. Foreign agricultural products have been given greater access to the Korean market following the Uruguay Round Agreement on Agriculture (URAA). Since the URAA came into effect in 1995, Korea has converted import restrictions on all agricultural products to tariffs except on rice. Price supports for domestic agricultural products have also been reduced. As a result, there has been an influx of imported agricultural products since 1995 (see table 5). Korean farmers have been suffering from the increased competition with these imported agricultural products, as they cannot compete with the lower-priced imports.

Table 5) Exports and imports of agricultural products

Unit: million \$

Year	Export		Import		Balance
	Total	Agricultural products	Total	Agricultural products	(exports - imports)
1990	65,016	2,920	69,844	5,789	-2,869
1991	71,870	2,986	81,525	6,923	-3,937
1992	76,632	2,888	81,775	7,147	-4,259
1993	82,236	2,760	83,800	7,811	-5,051
1994	96,013	3,049	102,348	8,716	-5,667
1995	125,058	3,469	135,119	10,520	-7,051
1996	129,715	3,464	135,119	12,021	-8,557
1997	136,164	3,252	144,616	11,179	-7,927
1998	132,313	3,004	93,282	6,991	-3,987
1999	143,685	3,200	119,752	8,600	-5,400
2000	172,268	3,036	160,481	9,861	-6,825
2001	150,439	2,854	141,098	10,111	-7,257
2002	162,471	2,800	152,126	11,469	-8,669

Source: International Agriculture Bureau

In addition, there are not enough opportunities for farmers to engage in non-farm business activities in the rural areas, which means that farmers are very dependent upon their farm business for their income. Besides that, the cost-price squeeze on agricultural produce has also hurt farmers. During the Asian economic crisis in 1997, the price of farm supplies rose drastically, causing the prices of agricultural inputs to increase at a higher rate compared to those of farm produce. This means that the terms of trade for farm households have been steadily getting worse.

1.3 Socio-economic dimensions of Korean agriculture

Until the 1960s Korea was a typical agrarian country. Agriculture generated almost half of its Gross National Product (GNP) and employed half of the labour force. However, the importance of agriculture to the Korean economy is declining. Since the late 1960s, agriculture's share of Gross Domestic Product (GDP) fell from 46.2% in 1965 to almost 3.4% in 2002. Labour employed in the agricultural sector also declined from 58.5% to 9.3% over the same period (see table 6).

Table 6) Population employed in agriculture/ forestry/ fisheries

	unit	'65	'90	'95	'99	'00	'01
Total employed population	'000 persons	18,085	20,432	20,281	21,061	21,572	22,169
Agriculture/ forestry/ fisheries	"	3,237	2,534	2,349	2,288	2,148	2,069
(ratio)	(%)	(17.9)	(12.4)	(11.6)	(10.9)	(10.0)	(9.3)

Source: the Ministry of Agriculture and Forestry

Since the 1960s, Korea has pressed rapidly toward industrialization. The economic structure was radically transformed and an export-oriented industrialization strategy was adopted. The First Five-Year Economic Development Plan (1962-66) focusing on laying a foundation for industrialization accelerated the structural readjustment of the economy from subsistence agriculture to modern manufacturing and export trade. Gross National Income (GNI) in agriculture, forestry, and fisheries increased at an annual growth rate of 9.0% on average from 1990 until 1995. However, it has almost been stagnant since 1995 when the URAA came into effect. From 1995 till 2002, it has increased at an annual rate of only 0.1% on average. In addition, due to the Asian economic crisis, it decreased by 9.4% from 1997 to 1998. In contrast, total GNI has sharply increased at an annual growth rate of 10.6, on average, from 1990 till 2002 aside from a 3.2% dip during the 1997-1998 economic crisis (see table 7).

Table 7) Gross National Income (GNI) by industry

Unit: KRW billion

Year	GNI	Agriculture, forestry, fisheries		Manufacturing, mining	Construction, electricity, gas, water	Services
			%			
1990	178,628.3	15,212.2	8.5	52,929.8	24,142.0	69,794.1
1995	376,316.4	23,353.5	6.2	112,603.2	50,420.6	154,892.7
2000	519,227.4	24,517.6	4.7	165,085.4	56,162.4	224,854.7
2001	550,014.4	23,935.2	4.4	170,053.9	61,509.6	239,171.5
2002	596,881.2	23,593.5	4.0	176,316.8	67,864.5	266,180.9

Source: The Bank of Korea

As a result, Korea has become heavily dependent on agricultural imports. Grains such as corn, wheat and soybean constitute more than 30% of agricultural imports. In 2002, 8.5 million tons of corn worth US\$ 916 million and 3.8 million tons of wheat worth US\$ 540 million were imported. A large portion of these two crops were from China, but as China

reduced its export of corn, Korea has turned to South Africa and Argentina. Wheat is sourced from Canada and Australia (see table 8).

Table 8) Food Grain Imports

Unit: Quantity in thousand tons, Value in million \$

	Total		Polished rice		Wheat		Corn		Soybean	
	quantity	value	quantity	value	quantity	value	quantity	value	quantity	value
95	14,492	2,259	-	-	2,860	507	8,879	1,169	1,435	382
96	13,136	2,748	115	50	3,107	700	8,169	1,438	1,325	419
97	14,904	2,788	-	-	3,400	633	8,634	1,368	1,628	538
98	13,400	2,075	77	36	4,295	624	6,990	907	1,261	355
99	14,743	1,929	97	38	4,413	559	1,995	859	1,475	324
00	14,867	1,946	103	29	3,337	466	8,830	941	1,567	342
01	14,381	1,880	172	46	3,330	442	8,688	940	1,354	290
02	14,733	1,977	154	50	3,843	540	8,552	916	1,445	305

Exports of agricultural products amount to a mere 1.15% of Korea's total exports. These consist of processed products and livestock, and some fresh produce such as fruits and vegetables. Among processed products' exports, ramen noodles are a major item, amounting to US\$ 6.94 million in 1995. Kim-chi (processed cabbage) has been traditionally exported while cucumbers, tomatoes, onions, carrots, strawberries, etc. are exported to Japan in small quantities. Livestock and meat constitute a big portion of agricultural exports and the major item is pork which chalked up US\$ 90 million in exports in 1995.

For farmers, the economic restructuring and import policies have caused major impacts on their welfare. From 1985 till 1995, the annual growth rate of farm household incomes was 14.3% on average, but from 1995 to 2002 it had slumped to just 1.7%. Similarly, income from farming showed an annual growth rate of 11.0% from 1985 till 1995, but from 1995 to 2002 it had shrunk to 1.1%. The slowdown in growth rate is rooted in the depressed prices of domestic agricultural products as a consequence of the open market policy for imports and reduction in price support for domestic agricultural products under URAA. The foreign exchange crisis that hit the country around the end of 1997 also landed on the farmers with devastating force. Korean farmers are still very dependent upon farming for their income because there are not enough opportunities for farmers to find employment in non-farming activities in the rural areas. In 2002, farming contributed 46.1% on average to farm household income. This level is relatively high compared with those of developed countries. For example, in the year 2000, the ratio was only 13.1% in Japan (see table 9).

Table 9) Farm household income

Unit: KRW 1,000

Year	1985		1995		2000		2001		2002		Annual average growth rate (%)	
		%		%		%		%		%	85-95	95-02
Farm household income	5,736	100.0	21,803	100.0	23,072	100.0	23,907	100.0	24,475	100.0	14.3	1.7
Income from farming	3,699	64.5	10,469	48.0	10,897	47.2	11,267	47.1	11,274	46.1	11.0	1.1
Income from non-farming activities	1,060	18.5	6,931	31.8	7,432	32.2	7,829	32.8	8,140	33.2	20.7	2.3
Transfer income	977	17.0	4,403	20.2	4,743	20.6	4,811	20.1	5,060	20.7	16.2	2.0

Note: 1. Farm household income is the total of income from farming, income from non-farming activities and transfer income.

2. Income from farming is the balance after deducting farm production expenses from gross farm receipts.

3. Income from non-farming activities is earnings from businesses other than farming.

4. Transfer income is earnings from non-economic activities such as rewards, public and private subsidies, congratulatory and condolatory donations, and retirement allowances.

Source: Korea National Statistical Office

Along with the changing economic scenario, the urban-rural income gap has been widening. While urban household incomes have increased steadily each year, farm household incomes have been almost stagnant. Urban household incomes have increased by 46.2% from 1995 to 2002, whereas farm household incomes increased by just 12.3% during the same period. As a result, the ratio between farm and urban household incomes, which was 95.1% in 1995, has fallen to 73% in 2002.

The terms of trade of farm households are getting bleaker as the prices of farming inputs have increased much faster than the prices of farm produce. Farmers were paying 48.9% more for fertilizers, seeds and pesticides, among others in 2002, than they did in 1995, while the prices for their produce have risen by just 22.3% during the same period. In particular, after the foreign exchange crisis in 1997, farmers faced much hardship as the price of farm supplies rose rapidly. Consequently, the farm household terms of trade, which represent the trend of the farm economy in terms of price, has continued to decrease. Since 1995, it has dropped by 27.9% to 2002.

The task of nurturing the agricultural sector is shared by various government departments and agencies. The Department of Agriculture and Forestry implements the National Agricultural Policy based on the Agriculture Act 1965. A New Agricultural Plan (NAP) was announced on June 24, 1993 and was succeeded by the Agriculture and Fisheries Development Plan in 1994. The government aims to create a more efficient and competitive agricultural sector through the operation of the New Agricultural Plan. The primary goals of the NAP are to make the agricultural sector more competitive, help farmers acquire expertise to adjust to liberalization and to improve rural living conditions. In pursuit of these goals, the following programmes have been prioritised: farm mechanization, promotion of high-value crops, maintaining the farm population, and promoting exports of processed agricultural products. The issue of land use is being given close attention under the plan. To this end, a special tax has been introduced with a revenue target of 15 trillion won, in addition to the 42 trillion won investment planned for agriculture.

1.4 The pesticide industry's presence in Korea's agriculture

Pesticide production

Although farm acreage has been declining rapidly in the last few decades with the change in economic policy towards industrialization, pesticide production and import has not mirrored that trend. In 2002, 26,585 metric tons of pesticides were produced and 25,844 million tons of active ingredients were used. According to statistics compiled by the Korean Crop Protection Association, the production of pesticides declined from 1995 to 1998, but increased in 1999 and 2000. However, the production of pesticides declined again in 2001 (see table 10).

Table 10) Production of pesticides by usage

Unit: Amount of active ingredient in metric tons

	Total	Fungicides	Insecticides	Herbicides	Plant Growth Regulators	others
1990	26,610	8,248	9,488	6,274	755	1,845
1995	26,676	9,527	9,527	5,756	1,735	1,573
2000	29,459	9,482	10,563	5,978	1,798	1,638
2001	27,790	9,728	9,647	6,468	732	1,215
2002	26,585	9,129	9,017	5,729	1,648	1,054

Source: Korea Crop Protection Association

Table 11) Total production and shipment (export) of pesticides

Unit: ton

	1995	1998	2000	2001	2002
Total production	26,676	22,073	29,459	27,790	26,585
Crops	4,692	7,009	6,688	6,558	6,129
Garden plants	21,714	15,064	22,771	21,232	21,456
Total shipment	25,834	22,103	26,087	28,218	25,844
Crops	4,867	6,749	6,292	6,492	5,763
Garden plants	20,967	15,354	19,795	21,726	20,081

Source: the Ministry of Agriculture and Forestry, Statistical Yearbook 2003

In 1995, a total 34,211 metric tons of raw materials for pesticides were imported, comprising 1,644 metric tons of agro-chemicals and 20,435M/T of intermediate ingredients for local production. In comparison, pesticide exports are much smaller. In 1995, for instance, a meagre 5,482 metric tons of raw materials for pesticides and agro-chemicals were exported.

Table 12) Import and export of pesticides

Unit: metric ton

2000 (C)		2001 (B)		2002 (A)		(A/B)%		(A/C)%	
Import	Export	Import	Export	Import	Export	Import	Export	Import	Export
37,964	3,581	38,125	2,593	36,729	3,272	-3.7	26.2	-3.3	-8.6

Source: Korea Crop Protection Association

Registration of pesticides

As of January 2003, 1,027 pesticides products that use 339 active ingredients were registered in Korea. Another 643 products were listed for garden plants, and 45 for other uses (see Table 13).

Table 13) Pesticides registered in Korea

		Products	Total no. registered	No. of brands	Safety use standard
Total		1,027	2,235	1,422	640
Crops	Fungicides	74	219	115	63
	Insecticides	74	190	100	13
	Fungicides & insecticides	19	22	18	13
	Herbicides	172	246	197	-
Sub total		339	677	429	147

Garden plants	Sterilization	246	536	311	217
	Insecticides	288	660	469	258
	Sterilization & insecticides	7	7	5	7
	Herbicides	102	235	123	-
Sub total		643	1,438	908	482
Others		45	120	85	11

Source: Ministry of Agriculture and Forestry, Statistical Yearbook 2003

Fertilizer production

The production of fertilizers in 1995 was about three times higher than in 1970. However, production has decreased since 2000. Total consumption of chemical fertilizers was 1,104,000 tons in 1990, but declined to 689,000 tons in 2002 (see Table 14). The government plans to reduce fertilizer usage by 40% in 2004 based on the usage in 1993.

Table14) Fertilizer production & consumption

	Production	Consumption Ingredient / 1000 ton	Consumption kg/ha	Self- sufficiency (Production-consumption ratio (%))
1970	590	563	162	105
1985	1,398	807	311	173
1990	1,648	1,104	458	149
1995	1,778	954	434	186
2000	1,546	801	382	211
2002	1,262	689	342	183

Table 15) Sales volume of fertilizers

	Volume of fertilizer sales (ingredient 1000 ton / year)			
	total	nitrogenous	phosphatic	ca
1999	701	273	197	231
2000	954	472	223	259
2001	717	375	153	188
2002	689	363	146	180

Source: the Ministry of Agriculture and Forestry

Integrated Pest Management

Integrated Pest Management (IPM) research has been undertaken since the 1970s to understand the basic ecological relationships of weeds, insect pests and diseases in major crops. In 1993, rice validation trials carried out at eight provincial Rural Development Administrations (RDAs) indicated that a reduction in insecticide use of up to 80% and fungicides of up to 50% are possible with no significant yield losses.

In 1994, initial collaborative studies involving farmers, technicians, extension staff, researchers, and academicians began to show the ecological and economic dynamics of apple pest management in the area of the Apple Research Institute in Gunwi, North Kyungsang Province. Besides rice and apples, initial studies have begun on the introduction of non-toxic pesticide methods for other crops. Among them, the commercially available *Encarsia formosa* greenhouse white fly parasite is being tested at the RDA.

The Korean IPM Development and Training Program was established in 1993 to develop IPM field training for farmers and new IPM methods for rice, apple, and vegetable farming. This initiative was supported by the RDA, UNDP, Ministry of Science and Technology, and FAO.

The majority of farmers belong to the older generation, with 40.3% of the total rural population being over 50, while only 31.4% are aged between 20-49. Thus, it is unlikely that all elderly persons would be able to engage in the labour-intensive organic planting and livestock production methods. For this reason, the RDA is pursuing IPM practices which the majority of Korean farmers can implement. The RDA is tasked with reducing agricultural pollutants by the quickest and most comprehensive means possible. Using IPM, a large number of farmers will be able to quickly reduce pesticide usage, whereas the introduction of organic agriculture practices is limited by access to technology, marketing needs, personal motivation, and human resources. From 1992 to 1994, the RDA has carried out field validation of IPM methods for rice, emphasising on:

1. Improving cultivation methods to ensure healthy crop production, especially by controlling fertilizer use and encouraging mixed cropping.
2. Conserving naturally occurring levels of natural enemies by reducing preventive sprays and using pesticides with lower toxicity.
3. Observing fields for actual pest and disease problems so that pesticides are never applied needlessly. Field observations take into account plant condition, plant compensation, natural enemies, and weather conditions for complete agro-ecological management.

Extension IPM Training of Trainers (TOT) has been undertaken since 1993 with some 85 agricultural graduates who remain active in the field. The programme began with the holding of Farmer Field Meetings to inform farmers of the benefits of IPM and to get them involved in its practice. Gradual but notable progress has been accomplished. TOT graduates have trained a total of 584 IPM trainers from 1993 to 1999, and a total of 750 farmers received season-long field-based IPM training. The training focuses on two major groups which are

farmers and their extension staff. In 1995 and 1996, two TOTs were undertaken simultaneously for 96 IPM trainers each year. Additionally, in 1995, 46 Farmer Field Meetings involving approximately 1,300 farmers were organized to provide IPM training.

1.5 Overview of pesticide problems

Increase in pesticide production

The use of agricultural pesticides has increased markedly in Korea since 1980. By 1990, pesticide use had risen by some 52% to 26,610 tons over their usage in 1980 (see Table 16). This trend was reversed from 1990 to 1996 after environmentally-friendly government policies were introduced. However, pesticide production and consumption have increased again from 1997 to 1999, which reflects that the use of pesticides is still a serious problem in Korea.

The use of agricultural chemicals has decreased for rice farming, but increased for horticultural crops such as vegetables, fruits, and flowers, due to the expansion of the cultivated area for these produce and year-round production of greenhouse crops.

Table 16) Production and Shipment of pesticides (metric tons)

Year	Production			Shipment		
	Total	Rice farming	Vegetable/fruit gardens	Total	Rice Farming	Vegetable/fruit gardens
1980	17,431	6,942	10,489	16,132	6,430	9,702
1990	26,610	8,316	18,294	25,082	8,429	16,653
1995	26,406	4,692	21,714	25,834	4867	20,967
1996	25,085	4,858	20,227	24,641	5,073	19,568
1997	25,300	6,538	18,762	24,814	6,526	18,288
1998	22,073	7,009	15,064	22,103	6,749	15,354
1999	26,264	7,546	18,718	25,837	7,255	18,582
2000	29,459	6,688	22,771	26,087	6,292	19,795
2001	27,790	6,558	21,232	28,218	6,492	21,726
2002	26,585	6,129	20,456	25,844	5,763	20,081

Source: Korean Crop Protection Association

Increased use of hazardous pesticides

The use of pesticides has grown because it has been supported by the Korean government. Most farmers too believe that pesticides are good for their crops. Both quarters are not overly concerned about the hazards posed by pesticides, despite the serious problems including environmental and health hazards that result from their use.

Due to these attitudes, the use of hazardous pesticides is a serious problem in Korea. As an example, Paraquat is widely used in rice cultivation in Korea. Moreover, most hazardous pesticides used in Korea are categorized as highly toxic. Since 1986, CACPK has asked the government to ban hazardous pesticides that are included in the UN Consolidated List. The government banned the use of Maneb, Cyhexatim, Chlorbenzilate, Amitrole and Digulsoton in 1989, Propaphos, Zineb, Picloram and Carbophenothion in 1990, eight items containing Butachlor, five items with chottusol, and seven items using captapol in 1993. In 2002, the government cancelled the registration of four more products containing captapol (see Table 17).

The 11 formulations containing Captapol which are banned are Captafol Soluble Powder, Pancodi Soluble Powder, Policap Soluble Powder, Manine Soluble Powder, Manita Soluble Powder, Dajoa Soluble Powder, Dajaba Soluble Powder, Neojinbubje, Janjaba, Morisempije, Morisipje.

Table 17) Pesticides banned by the Korean Government

Active Ingredient	Year	Reasons
Cyhexatim	1989	Congenital defects
Maneb	1989	Carcinogenic
Chlorbenzilate	1989	Carcinogenic
Amitrole	1989	Carcinogenic
Digulsoton	1989	Acutely Toxic
Propaphos	1990	Acutely Toxic
Zineb	1990	Carcinogenic
Picloram	1990	Persistent residues
Carbophenothion	1990	Persistent residues
Butachlor (8 items)	1993	Fish Toxicity
Chpttusol (5 items)	1993	Carcinogenic
Captapol (11 items)	1993, 2002	Carcinogenic

Source: Ministry of Agriculture and Forestry, Republic of Korea

Outcome of overall evaluation on pesticide safety

The government has implemented overall evaluation programmes on pesticide safety and is working on several kinds of environment-friendly farming programmes specifically to raise awareness of pesticide problems and reduce the use of pesticides.

Table 18) Actions taken based on pesticide safety evaluation

	Active ingredient	Action taken
1994	Alachlor, Captan, Folpet	Reduction of shipment
1995	Azinphos – methyl Azocyclotin, Demeton-s-methyl	Stricter standards for package labelling; Reduction of shipment
1996	Carhofwran Neoasozin, Omethoate	Stricter standards for package labelling; Reduction of shipment

1997	Chlorthalomil, Mancozeh	Reduction of shipment
1998	Procymklone	More stringent registration requirements
1999	Paraquat	Freezing of shipment; Setting of management limit
2002	Molinate Ethoprophos	Added test; Guidelines for safe use

Source: Ministry of Agriculture and Forestry, Republic of Korea

Contamination and Poisoning

The mass media frequently carries reports about the high levels of pesticide residues in food crops. Almost every year, CACPK has also reported the result of pesticide residue tests to the public. However it is quite difficult to establish the actual number of pesticide poisoning cases. Most farmers only take medicines when they are sick after spraying pesticides. Hospital admission records are incomplete. It is often not clear whether minor symptoms are related to pesticide exposure or other causes. Between 1987 to 1997 official statistics show that on average 603 farmers died each year of agricultural chemical poisoning and suicide involving pesticides.

Table 19) Reported deaths by pesticide poisoning

Unit: number of person

Year	Total	Poisoned by spraying	Didn't know it is pesticide	Suicide	Others
87	805	4	1	795	5
88	899	4	9	883	3
89	797	4	7	786	-
90	668	9	11	641	7
91	515	6	2	507	-
92	557	1	9	544	3
93	542	2	4	535	1
94	435	2	7	425	1
95	414	-	3	411	-
96	527	3	14	502	8
97	473	4	7	455	7
Average per year	603	3.6	6.7	589.5	3.2

Source: Statistical yearbook of agriculture, forestry and fisheries 2002

1.6 Current issues concerning pesticide use in Korea

The Ministry of Agriculture, Forestry and Fisheries has set up a pesticide safety committee to address current issues concerning pesticides. CACPK plays an active role in the committee, having a CACPK staffer as a member.

Sixteen pesticides, including Molinate, have been subjected to overall safety evaluation by the committee. These have been suspected by the US EPA and Japanese authorities to affect the endocrine system. CACPK presented the problems concerning Molinate to the committee on July 6, 1999 and completed the overall safety evaluation of the pesticide by the end of 2002. Subsequently, the committee announced independent safety measures for the pesticide industry including freezing of production at 695 tons per annum.

On July 12, 2002 the committee reviewed additional results of safety evaluation testing and usage data compiled by the pesticide industry. The committee also asked for monitoring of pesticide residues at a waterway and testing for chronic toxicity of fish. As a result, the pesticide industry agreed to voluntarily withdraw the pesticide by 2008 based on the results of Environmental Declaration of Products (EDP) in US. The government will take additional action following the final review of results of domestic safety evaluation as well as EDP in the US. CACPK has pressed for a ban on pesticide production, 50% by 2006 and 75% by 2007 and 2008, and enforcement of the schedule.

A total of 1,027 pesticides (active ingredients) and 2,071 brands are registered in Korea. The number of registered pesticides manufactured under licence has decreased since the Agrochemicals Regulation Act was established in compliance with chemical data standardization rules required by the OECD.

The characteristics of registered active ingredients are:

All 1,027 are classified as toxic to mammals

- i. There are no registered pesticides classified in the hazardous category;
- ii. 17 or 1.7% are classified as highly toxic;
- iii. 187 or 18.2% are classified as moderately toxic.
- iv. 823 or 80.2% are classified as having low toxicity.

1.7 Pesticide regulations in Korea

Pesticide products manufactured in Korea are required to be registered under the Agrochemicals Regulation Act. Currently, 1,075 pesticides are registered under this law. Other major laws concerning pesticides are the Enforcement Ordinance, Pesticide Enforcement Regulations and Pesticide Residues Act.

Agrochemicals Regulation Act

This law regulates which pesticides are permitted for use, the length of time between the spraying of pesticides and harvesting, and other restrictions on pesticide use. It also establishes pesticide levels for crops so that they do not exceed pesticide residue limits while being used to prevent damage by blight and harmful insects. Pesticide residue limits have been established for 104 pesticides used on 56 crops in Korea.

Enforcement Ordinance

This law concerns enforcement matters under the Agrochemicals Regulation Act and related legislation.

Other regulations are the **Enforcement Regulations**, aimed at controlling pesticide production and consumption and **Tolerance Limits for Pesticide Residues** for establishing and maintaining tolerance limits for pesticide residues for crops. Standards bodies and organisations in charge of agricultural product safety and pesticide monitoring in Korea are listed in Table 19 below.

National Codex Committee

There are 175 types of pesticides used in Korea for which tolerance limits for pesticide residues have not been established. The Korean government has set up a National Codex Committee to support residue testing and research, and to train specialists in these areas.

POPs regulation

In Korea, 12 pesticides categorized as persistent organic pollutants (POPs) have already been prohibited. But some hundred tons of PCBs are being stored without any restrictions on their use yet.

EDC regulation

Since 1999, the Ministry of Environment, Korea Food and Drug Administration, and the Ministry of Agriculture and Forestry have set up a long term programme to regulate endocrine disrupting chemicals (EDCs). CACPK has been actively involved in this project.

Pesticide Use Indicator

Since 1999, research on the Pesticide Use Index has been performed as a routine function of agricultural planning.

Table 19: Implementation of international standards and domestic organisations in charge of agricultural product safety and pesticide monitoring in Korea

Fields	International Organizations in charge	Domestic Organizations in charge	
Codex	FAO/WHO	Ministry of Agriculture & Forestry (MOAF)	Korea Food and Drug Administration (KFDA)
Prior Informed Consent	UNEP/FAO	Ministry of Foreign Affairs & Trade (MFAT)	Ministry of Environment Rural Development Administration (RDA)
POPs	UNEP	MFAT	Ministry of Environment RDA
EDCs	OECD	Ministry of Environment (ME)	KFDA RDA
Pesticide Use Indicator	OECD	MOAF	RDA
Biocides	OECD	None	None
GLP	OECD	ME	KFDA RDA

1.8 On the farm: Trends and effects of pesticide use

Although pesticides are used widely in Korea, there are not many surveys on the damage caused by pesticide use. This research project shows the present state of pesticide use and the harmful effects on farmers caused by the use of pesticides in Korea. More importantly, this survey reveals substantial reasons why farmers suffer adverse effects and how seriously they are poisoned by using pesticides. The survey has tried to reflect the farmers' perspective as pesticide users, through interviews with the farmers themselves.

This is a nationwide survey consisting of two parts, an interview segment with a close-ended questionnaire and case study segment based on in-depth interviews. The interview survey also consists of two parts, a nationwide and regional survey. In this survey, 550 farmers from all six provinces in Korea were interviewed to find out the general trend in pesticide use and symptoms of poisoning reported by farmers. The case studies are based on in-depth interviews conducted in order to investigate why and how seriously farmers are harmed by using pesticides. Surveys were conducted to compare the experiences of local farmers in Hoengseong-gun with those of farmers in all six provinces.

CACPK conducted this research particularly to find out the seriousness of health problems created by the use of pesticides, to prove the necessity of banning them for consumer and farmer safety, and to take action to prevent the damage caused by using pesticides.

As expected, the survey established several serious problems relating to the use of pesticides. First, many farmers rarely use protective equipment while spraying pesticides. Second, although they had symptoms like dizziness, nausea, or twitching eyebrows, farmers generally treated these symptoms through self-medication – buying pills from the drug store and resting at home. Significantly, the survey also found that Gramoxone (paraquat), one of the Dirty Dozen pesticides that are banned in many countries because of its high toxicity, is still being used by farmers, posing as a threat to the safety of both farmers and consumers in Korea.

While farmers are getting older and the size of the average farm household has declined, the import of pesticides has been increasing. Elderly farmers are not keen on introducing alternative farming technologies that minimize or eliminate pesticide use or on understanding the need for safe pesticide use.

Therefore, CACPK recommends, based on the research results, first, to improve farmers' and public awareness on the safe use of pesticides and, second, that governments and the pesticide industry to take action to prevent damage to health and the environment because of pesticide use. Based on the fact that 98% of farmers are using pesticides, CACPK has launched a "Cut pesticide use by 50% campaign". In addition, CACPK has suggested that local governments provide safety education programs not only to farmers but also sales personnel. The survey results have been used for designing educational programs for farmers and the authorities as well.

CHAPTER 2: THE SURVEY: CURRENT PESTICIDE USE IN KOREAN AGRICULTURE

2.1 Korea's shrinking farming sector and growing pesticide usage

The diminishing role of agriculture in Korea's economy can be seen in the shrinking amount of land used for farming. The proportion of farmland in relation to the national land area has declined from 21.2 percent in 1990 to 18.7 percent in 2002. However, the average farm size has increased slightly from 1.19 hectare in 1990 to 1.45 hectare in 2002.

Likewise, both the total farming population and the average size of the farm household has decreased over the last three decades. The farming population has declined from about 6.7 million in 1990 to about 3.6 million in 2002. In terms of ratio, the farming population has declined from 15.5 percent of the total population in 1990 to 7.5 percent in 2002.

As younger people leave the farms to seek work in the urban areas, the average age of farmers has increased. Farmers aged over 50, who made up 34.5 percent of the farming population in 1990, grew to constitute 54.6 percent in 2002. This has been an obstacle to the reduction of pesticide use in farming as ageing farmers are mostly reluctant to learn how to reduce pesticides. Also, they are resistant to adopting new farming technologies that depend less on pesticides.

Despite the decline in agriculture, pesticide use has increased significantly. For example, the Korean Crop Protection Association reports that in 1980 pesticide imports totalled 16,132 tons. But in 2002, total imports stood at 25,844 tons – a 60% increase. Whether the increase is due to more aggressive promotion by pesticide manufacturers, increasing problems with pests, a reaction to declining yields or because farmers are increasingly looking towards chemicals to solve their agricultural problems, or a combination of these factors, the situation is cause for grave concern.

The amount of pesticides used per hectare of farmland in Korea is less than in Japan, but it is more 10 times higher than in Germany and the U.S. In 2001, for instance, the amount of pesticides used per hectare was 12.8kg in Korea, while it was only 1.3kg in the U.S. This high level of usage has serious implications on the health of the farmers and consumers, as well as for the environment.

2.2 Scope and aims of the survey

Farmers in Korea are not sufficiently aware about the hazards pesticides present. They must learn how to protect their health and the environment from pesticides. This survey was conducted to find out more about whether farmers are aware of pesticide pertaining problems and other implications during use and to investigate health problems caused by pesticide use.

2.3 Methodology

The survey was conducted in three stages. In the first stage, farmers from all six provinces in Korea were interviewed using a close-ended (quantitative) questionnaire. In the second stage, farmers in Hoengseong-gun Gangwon Province were interviewed with the same questionnaire in order to compare their responses with the overall sample of farmers. Hoengseong-gun Gangwon Province was chosen because it is a remote mountain village and an area of conventional farming in Korea. This area also falls behind in terms of farmers' awareness on pesticide use compared to other farming areas. Finally, in-depth interviews were conducted with farmers from Hoengseong-gun Gangwon Province to serve as case studies. The multi-stage cluster stratified random sampling method was employed in selecting samples. Data from the interviews were analyzed by SPSS.

The 1st survey

- The survey was conducted from July to September, 2002.
- A total of 550 farmers (Gyeonggi - 150, Gangwondo - 100, Chungchong - 100, Kyungsang - 100, Junra-50, and Jeju-50) were randomly selected as subjects.
- Data collection was done by interviewing the subjects using a close-ended (quantitative) questionnaire.
- The scope of the interview covered the methods of using pesticides, how pesticides are purchased, the use of protective clothing during pesticide application, measures taken after spraying, and awareness about the damages caused by pesticides.

The 2nd survey

- The survey was conducted from August to September, 2002.
- The sample consisted of 53 farmers in Hoengseong-gun Gangwon Province.
- Data was collected by interviewing the subjects with a close-ended (quantitative) questionnaire. (See appendix 1)
- The interview covered all aspects as the first survey.

In-depth interviews/ Case studies

- The interviews were conducted from August to November, 2002.
- The subjects consisted of 53 farmers in Hoengseong-gun Gangwon Province (the same subjects who were interviewed for the 2nd stage).
- Data collection was done using a semi-structured interview.
- The interview covered the health problems (symptoms) experienced after using pesticides.

Apart from reflecting the prevailing practices and attitudes concerning pesticides among Korean farmers, this survey captures information on the ground about pesticides used by the farmers, the farmers' sources of information on pesticides and their perceptions about the damage caused by pesticides. While correlations and inferences about the various factors concerning pesticide use could be drawn, these must be left to further surveys that may be designed to measure specific variables.

CHAPTER 3: POISONED FARMERS – FINDINGS OF THE SURVEY ON KOREAN AGRICULTURE

3.1 Survey on pesticide use by Korean farmers

This survey was conducted in Korea from July to September 2002 among 550 farmers who use pesticides. The farmers were from six provinces, namely Gyunggi (150), Gangwon (100), Chungchong (100), Kyungsang (100), Junra (50), and Jeju (50). The survey involved an interview using a close-ended questionnaire that examined the farmers' experiences in the following areas:

- 1) the methods they used for applying pesticides,
- 2) how they purchase pesticides,
- 3) the use of safety clothes when applying pesticides,
- 4) safety measures taken after spraying, and
- 5) awareness about the damage caused by pesticides.

3.1.1 General characteristics of the respondents

Of the 550 farmers interviewed, 26% were women and 74% were men. The respondents were selected from all six provinces in Korea: 27% were from Gyunggi-do, 28% from Gngwon-do, 17% from Choongchung-do, 9% from Gyungsang-do, 9% from Genra-do, and 9% from Gheju island.

In terms of age distribution, 1% of the respondents were in their 20s, 7% in their 30s, 26% in their 40s, 24% in their 50s, 25% in their 60s, 16% in their 70s, and 1% in their 80s. This well reflects the excessive aging of Korea's rural population as two third of the respondents were over 50, and a full 92% were over 40 years old.

A majority of the respondents had a family, with 43% consisting of only husband and wife, 36% having two generations living in one household, and 9% comprising three generations. The survey showed that 76% of farms were worked by husband and wife, 4% by husband and wife and grandparents, 6% by husband and wife and son, 1% by the grandfather, 2% by the grandmother and 11% by others.

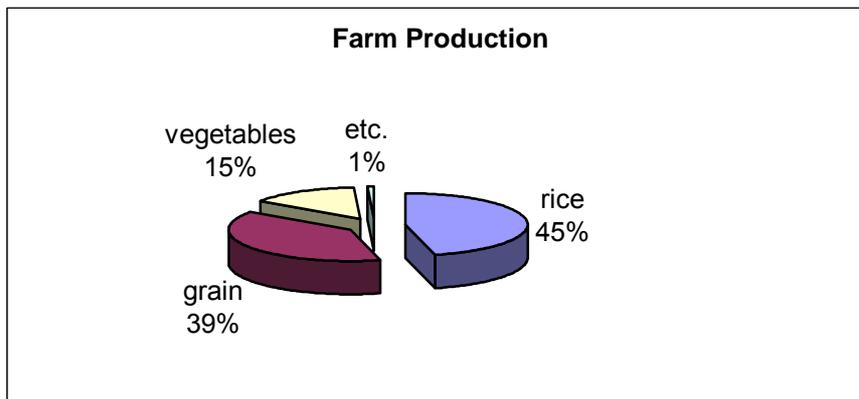
76 percent of the respondents stated that the farming is done by husband and wife, while in 6 percent of the cases the parents and children are farming. In 4 percent husband, wife and grand parents are involved in farming, while in 3 percent only grandmother or grandfather are farming.

Consistent with the ageing demography of the farming population, 43% of the respondents said that they have been working on the farm for 30 or more years, 21% said they had less than 30 years experience, 20% had less than 20 years, 7% less than 10 years, and 9% had less than 5 years. In aggregate, 64% of the respondents have more than 21 years experience in farming.

As for schooling, 35% of respondents said they had primary school education or less, 26% went to middle school, 32% were high school graduates, and 7% were university graduates.

Rice is cultivated by 45% of the respondents, other grains by 39%, vegetables by 15%, and 1% grow miscellaneous crops (see Figure 1).

Figure 1) Types of crops grown



Farm size

Of the 550 respondents, 49% had farms smaller than 3,000 pyong (1 ha), 34% had between 1 and 3 hectare, and only 17% had farms bigger than 3 hectare.

3.1.2 Purchase and use of pesticides

Use of Pesticides

An overwhelming 98% of the respondents use pesticides. Thus it can be assumed that almost all Korean farmers are using pesticides continuously. Pesticides are used by 99% of rice farmers, 95% on field crops and 100% in orchards. Furthermore, 90% of the respondents believed that farming without pesticides is not possible because of pest attacks (see Figures 2 and 3).

Figure 2) Use of pesticides by type of crop

N=550

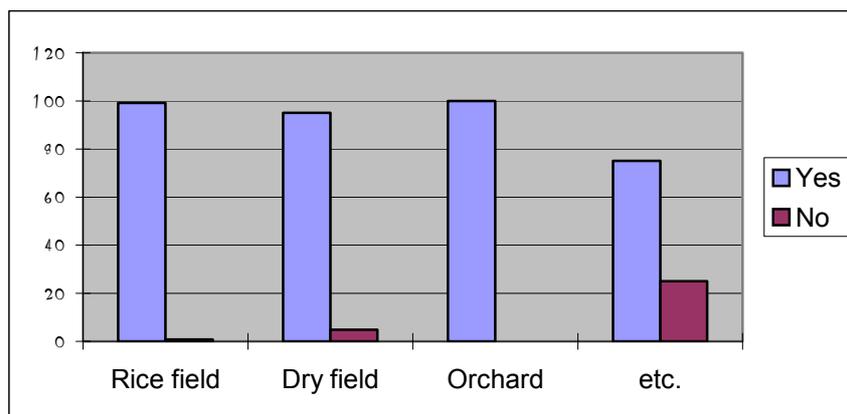
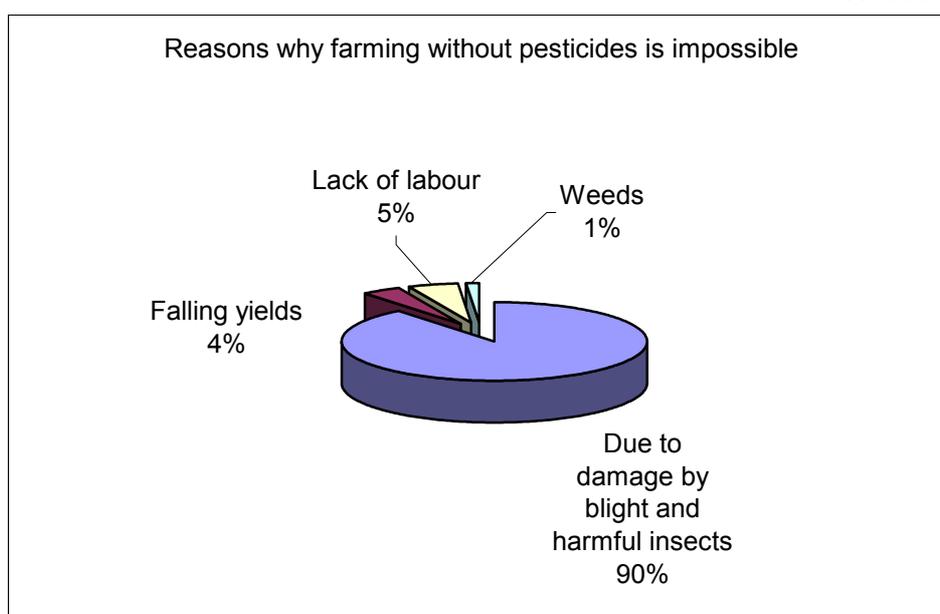


Figure 3) Reasons given why farming without pesticides is impossible

N=550



Use of Pesticides by crop

For rice, the fungicides Kitazin (a.i. Iprobenfos) and Beam (Tricyclazole) are the most popular pesticides, used by 15.7% and 14% of respondents, respectively. This is followed by the systemic herbicide Machete (Butachlor), which is used by 13.1% of the rice farmers. The fungicides Daisen (Mancozeb) and Antracol (Propineb) are used on vegetables by 35 and 20 percent of the respondents (for further details and other pesticides, see appendix 2).

Pesticide Sprayers

80% of pesticide spraying is done by the husband and 20% by the wife. Some 9% said their son does the spraying, 1% get their daughters to help, and 8% outsiders and others.

Where the pesticides are bought

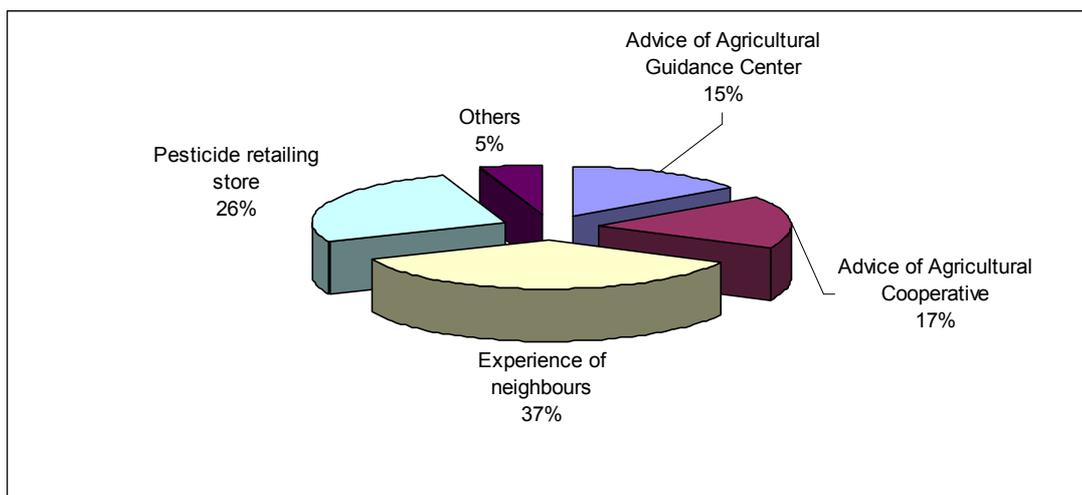
54.6% of the respondents buy the pesticides from a pesticides wholesale store, 44.9% from an agricultural cooperative, and 0.4% from salesmen of pesticide manufacturing companies.

Factors influencing choice of pesticide

37% of the respondents choose a pesticide based on the experiences of other users, 26% follow the advice of pesticide retail stores, 17% follow the instructions of their agricultural cooperative and 15% seek the help of an agricultural guidance center. The finding shows that respondents trust their neighbours' advice more than that of related government institutions in deciding the kind of pesticides they use. The opinion of the pesticide retail store is given more weight than the agricultural cooperative (see Figure 4).

Figure 4) Factors influencing respondents' choice of a pesticide

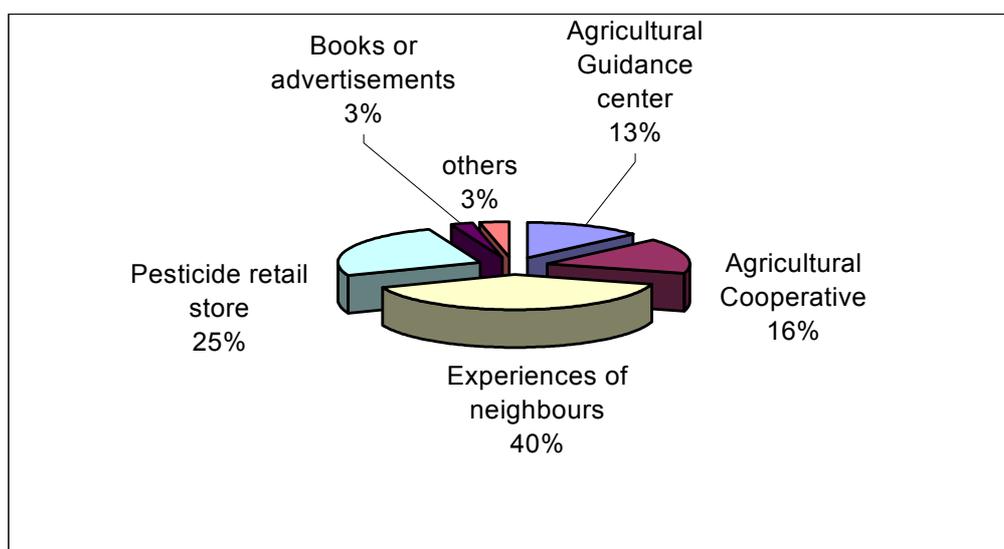
N=550



Sources of information about pesticides

40% of the respondents learnt about the pesticides they are using through the experience of others. Other favoured sources of information were the pesticide retail store (25%), agricultural cooperative employees (16%), agricultural guidance centre (13%), and advertisements (3%). This shows that neighbours' advice and experiences are the biggest influence on farmers' decisions about which pesticides to use.

Figure 5) Sources of information about pesticides **N=550**



3.1.3 Pesticide use practices

Reading of directions before using pesticide

66% of the respondents replied that they always read the directions, 22% read them once in a while, and 10% never read the directions. This indicates that almost one-third of farmers have a significant problem following instructions for use. However, 90% of the respondents said that they follow the directions on the label.

Decision on the pesticide amount to use

54% of the respondents said that they follow the product's instructions in deciding the amount of pesticides to use or the ratio for preparing the spraying solution. Others decide based on their own experience (17%), advice from the agricultural guidance centre (10%), the agricultural cooperative (8%), and neighbours (4%). 6 percent responded that they just do a rough measurement.

Observance of the indicated amount of pesticide

65% of the respondents stated that they use the indicated amount and 24% exceed that amount, while 2% replied that they use less than the amount directed. Even though the farmers try to stick to the directions, there is still a strong perception that more is better.

Sufficiency of the indicated amount of pesticide

57% of the respondents replied that the amount directed is about right, 21% replied that it is too little, 6% replied that it is too much. Most of the respondents who have over 31 years farming experience replied that the amount directed is about right.

Whether the directions on pre-harvest spraying schedules are observed

95% of the respondents said that they follow the directions on when to stop spraying before harvesting and 5% do not. Farmers do not follow the directions if the crop appears to 'require spraying' (43%), 24% if it is for own consumption, and 19% if the crop is in danger of being damaged by blight and insect pests.

Time spent per pesticide application

26% of the respondents spend less than an hour per pesticide application, 58% spend 1-3 hours, and 16% spend 3-5 hours. According to the farmers' feedback, the majority of them are reducing the time spent on one application.

3.1.4 Safety equipment

Use of Safety Equipment

Only 58 percent of the respondents stated that they wear protective gear when applying pesticides.

Respondents own the following kinds of equipment: Gloves (91%), Safety Boots (89%), Safety Masks (88%), Safety outfits (clothes) (62%), and Apron (39%). But not all who own safety equipment use it. The usage rates of safety equipment are: Gloves (85%), Safety Boots (84.6%), Safety Masks (76%), Safety outfits (49%), Apron (23%).

Condition of the safety equipment

74% of the respondents replied that their equipment is old; 25% said that their equipment is not damaged and 75% replied that theirs is damaged and has holes.

Storage of safety equipment

85% of the respondents said that they store their safety equipment in the storage area, 11% dry them before storage, 3% store them in a box, and 1% 'anywhere'.

Cleaning of safety outfits

79% of the respondents store their safety outfits after cleaning and 21% do not. 74% of the respondents clean their safety outfits every time they use them. 69% clean their safety outfits separately from their other laundry.

Reasons for not wearing safety outfits

Asked for the reasons for not wearing the safety outfits, 66% replied that they are uncomfortable, 23% that they are unnecessary. 2% said they are too expensive, and 1.4% said there is a lack of shops to purchase them.

3.2 Survey on pesticide use in Hoengseong-gun

3.2.1 General characteristics of Hoengseong-gun

Hoengseong-gun is located in the southwest region of the Gangwon Province. Its major cities Wonju and Youngwol-gun are in the southern area. Hoengseong-gun is partly a mountainous zone with forests and fields covering 73.3% of its entire area. It extends to the southwest of Hyoinsung where it descends into wide fields. Highland plains ranging from 110 metres to 700 metres above sea level are characteristic for the region.

The alpine climate at 500 metres above sea level and the beautiful natural environment have put Hoengseong-gun in the spotlight as a winter sports and resort location. Improved transportation, including air and land routes, has made the capital more accessible, and rural residential areas are booming as well. The growing local industrial complexes and higher education facilities are contributing to development that capitalizes on its natural assets. Hoengseong is a future city with the following statistics:

- Size: 1,007 square kilometres (of which, 15% is cultivated land)
- Number of households: 14,554 (3.25 persons per household)
- Population: 47,309 (males: 24,115 females: 23,194)
- Administrative districts: 1 Eubs (town), 8 Myons (sub-counties), 2 Chuljangsoes (local districts), 172 Lees (villages)

3.2.2 General characteristics of respondents

This survey was done with 53 farmers living in Hade-ri, Woochan-myon, (Hoengseong county, Gangwon-do), 36% of them were women and 64% were men. The age distribution was: 2% in their 20s, 4% were between 30 and 39 years old, 17% in their 40s, 9% in their 50s, 34% in their 60s, and another 34% older than 70.

In terms of the composition of family members among the respondents, the majority of them had a family with husband and wife (42%), two generations were living in 26% of the households, 3 generations were living in 15% of the households, while 17% were single households.

62 percent of the respondents stated that he farming is done by husband and wife, 30 percent farm alone, and in only 8 percent of the cases the children are involved in farming as well.

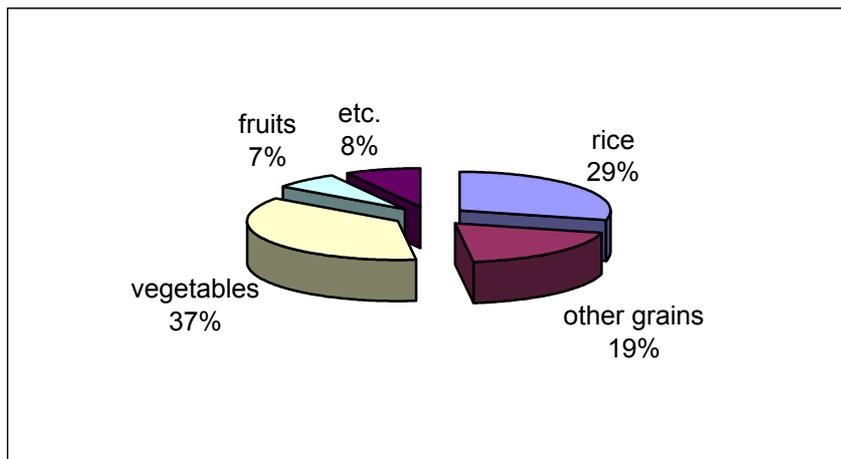
Over half of the respondents (56%) had more than 31 years farming experience, those with less than 30 years were 8%, under 20 years constituted 17%, those with under 10 years were 4%, and under 5 years made up 15%. This means that 64% of the respondents had experience in farming of more than 21years.

Respondents with primary school education or less made up 70%, high school graduates 15%, middle school graduates 9%, and university graduates 6%.

Respondents who grew rice constituted 29%, other grains 19%, vegetables 37%, fruits 7%, and miscellaneous crops 8% (see Figure 6).

Figure 6) Crops grown

N=53



Farm size

Of the respondents in Hoengseong-gun, 40% own farms smaller than 3,000 pyong (1 ha), and 49% own between 1 and 2 hectare. Thus, only 11% own farms bigger than 2 hectare.

3.2.3 Purchase and use of pesticides

Use of Pesticides

94% of the respondents use pesticides and only 6% do not, indicating that the practice is almost universal. 90% of respondents use pesticides in paddy rice cultivation, 91% apply them in the field, and 100% use pesticides in orchards. A full 80% of respondents believed that farming without pesticides is impossible due to insect pests (See Figures 7 and 8).

Figure 7) Use of pesticides by type of crop

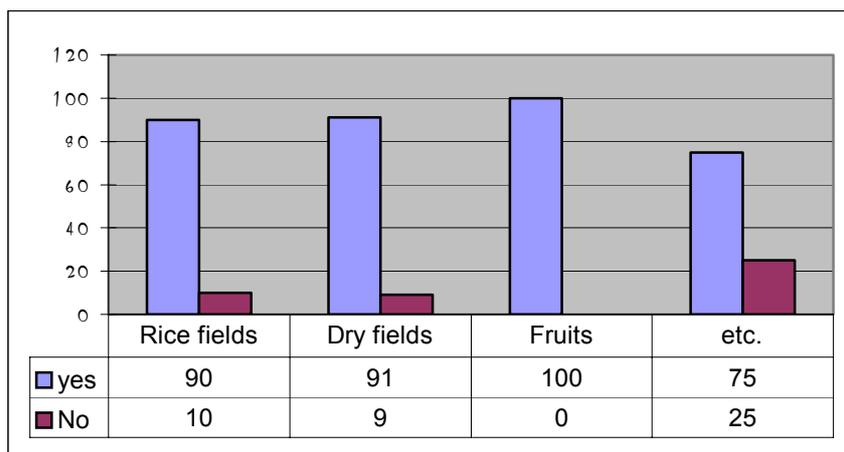
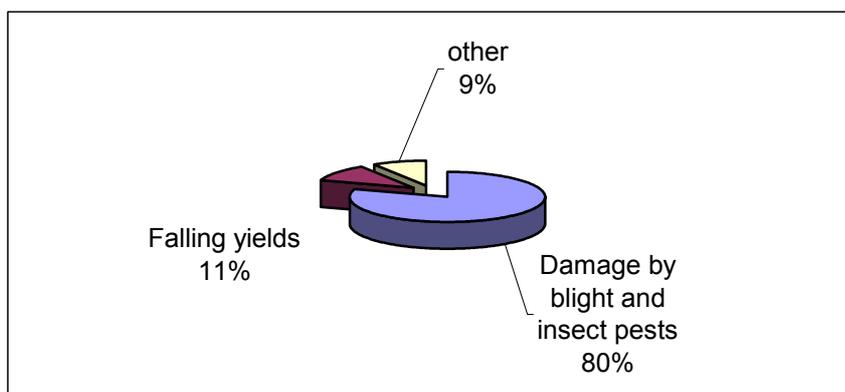


Figure 8) Reasons given 'why farming without pesticides is impossible' (N=53)



Choice of Pesticides by type of crop and farm worker

The most popular pesticides for rice growers are IBP (22%) and Tricyclazole (16%). For grains, Gramoxone (paraquat) is the most used, with 63.6% applying it to their fields.

60% of those who apply pesticides are husbands and 22% are wives. Among others who do spraying, 8% are sons, 4% are husbands and sons, and 4% are daughters.

Where the pesticides are purchased

53% of the respondents purchase the pesticides from an agricultural cooperative and 47% from a pesticides wholesale store.

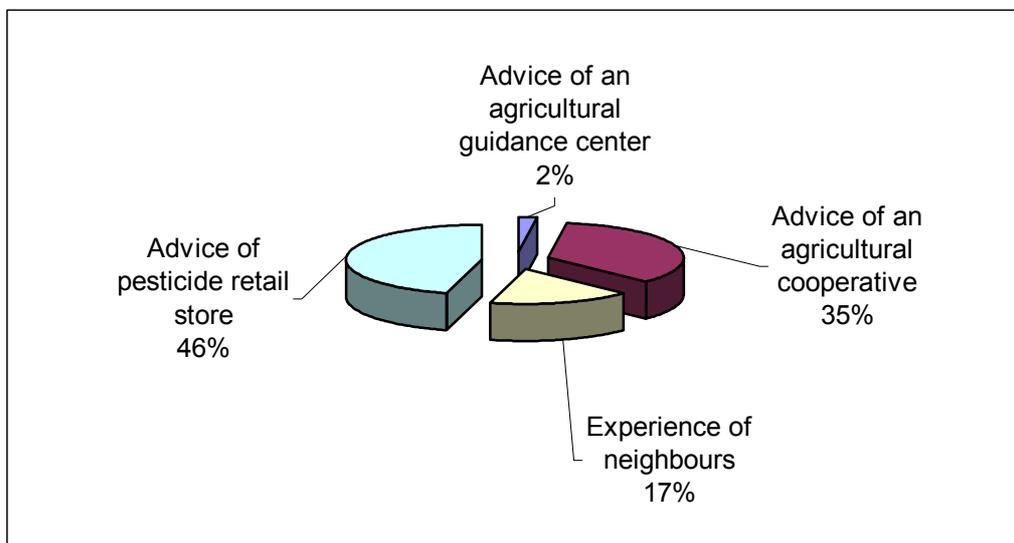
Factors that influence the choice of pesticides

67% of the respondents follow the advice of pesticide retail stores, 25% decide on the pesticide through the experiences of others, 5% base decisions on the instructions of the agricultural cooperative and 3% follow the instructions of an agricultural guidance centre.

This shows that the recommendations of the pesticide retail store carry weight with farmers (see Figure 9).

Figure 9) Factors influencing farmers' choice of pesticides

N=53

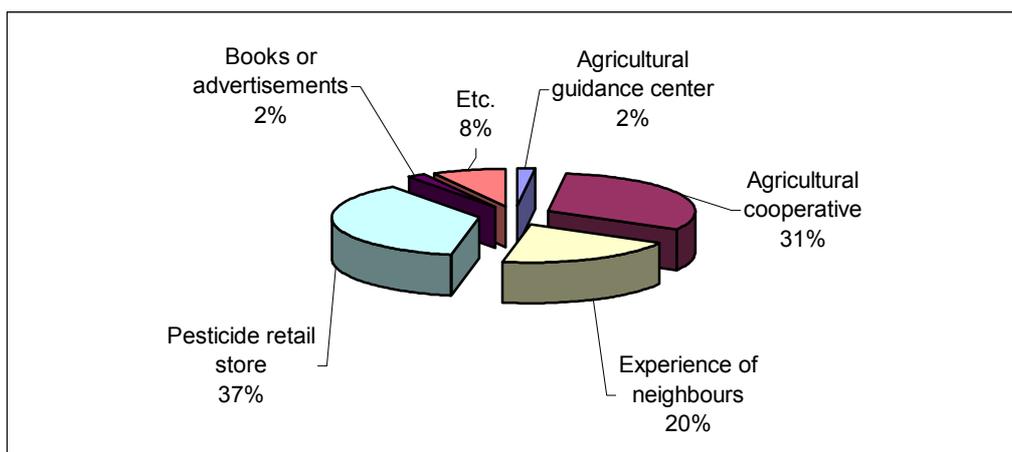


Sources of information on pesticides

37% of the respondents learn about the pesticides they are using through the pesticide retail store. Other sources of information are: agricultural cooperative staff (31%), the experiences of others (20%), agricultural guidance centre (2%), and advertisements (2%). This proves that the pesticide retail store has the biggest influence on what pesticides farmers use (see Figure 10)

Figure 10) Sources of information on pesticides

N=53



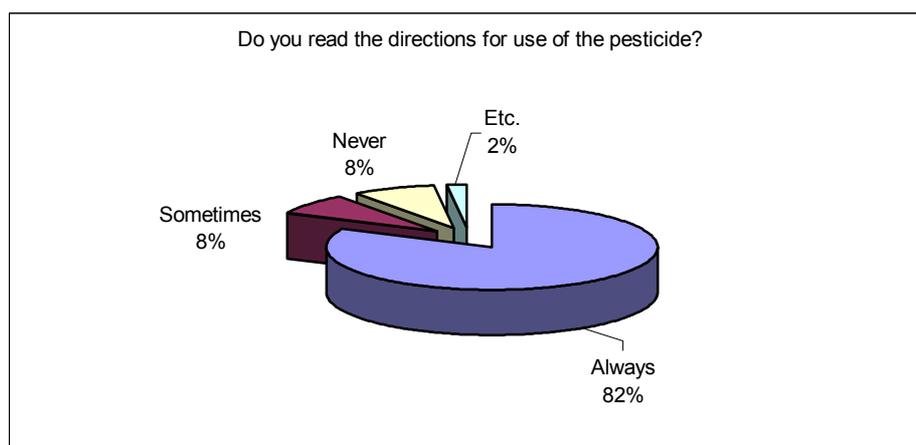
3.2.4 Methods of pesticide use practices

Whether directions on the use of pesticides are read

82% of respondents replied that they always read the directions, 8% read them once in a while, and 8% never read the directions (see Figure 11).

Figure 11) Whether directions on the use of pesticides are read

N=53



Whether the directions for use of pesticides are followed

96% of the respondents follow the directions in using pesticides and 4% do not.

How farmers decide on the amount of pesticide to use

58% of the respondents follow the directions on the label for the amount of pesticide to use or the ratio for preparing the spraying solution. Other factors are: from their own experience (22%), agricultural guidance centre (8%), neighbours (4%) and agricultural cooperative (10%).

Whether the amount of pesticide as directed is used

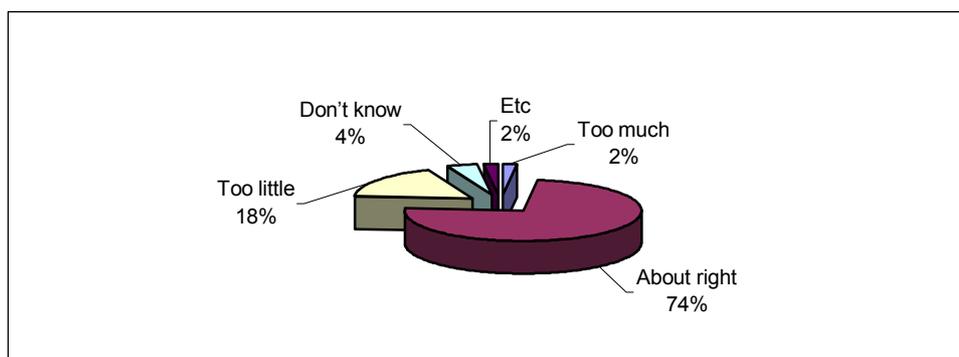
82% of the respondents use the amount as directed and 18% use more than the amount directed. Even though the farmers try to follow directions, there is still a strong perception that more is better.

Opinions about the amount of pesticide given in the directions

74% of the respondents said that the amount directed is about right, 18% replied it is too little, while 2% replied that it is too much (see Figure 12).

Figure 12) Opinions about the amount of pesticide given in the directions

N=53



Whether the directions on the interval between spraying and harvesting are followed

100% of the respondents said that they follow the directions to stop spraying for the required number of days before harvest.

Amount of time spent in one application of pesticides

67% of the respondents spend less than an hour, 22% of the respondents spend 1-3 hours and 9% spend 3-5 hours in one application of pesticides. Based on farmers' feedback, they appear to be cutting down on the amount of time spent in applying pesticides (see Figures 13 and 14).

Figure 13) Amount of time spent in one application of pesticides

N=53

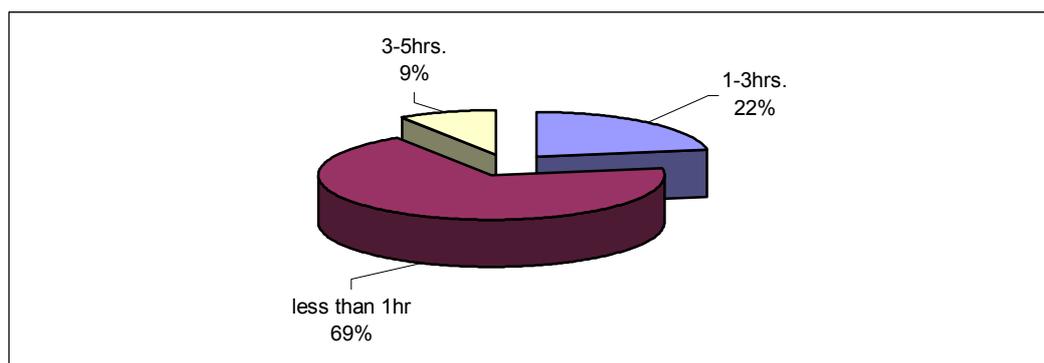
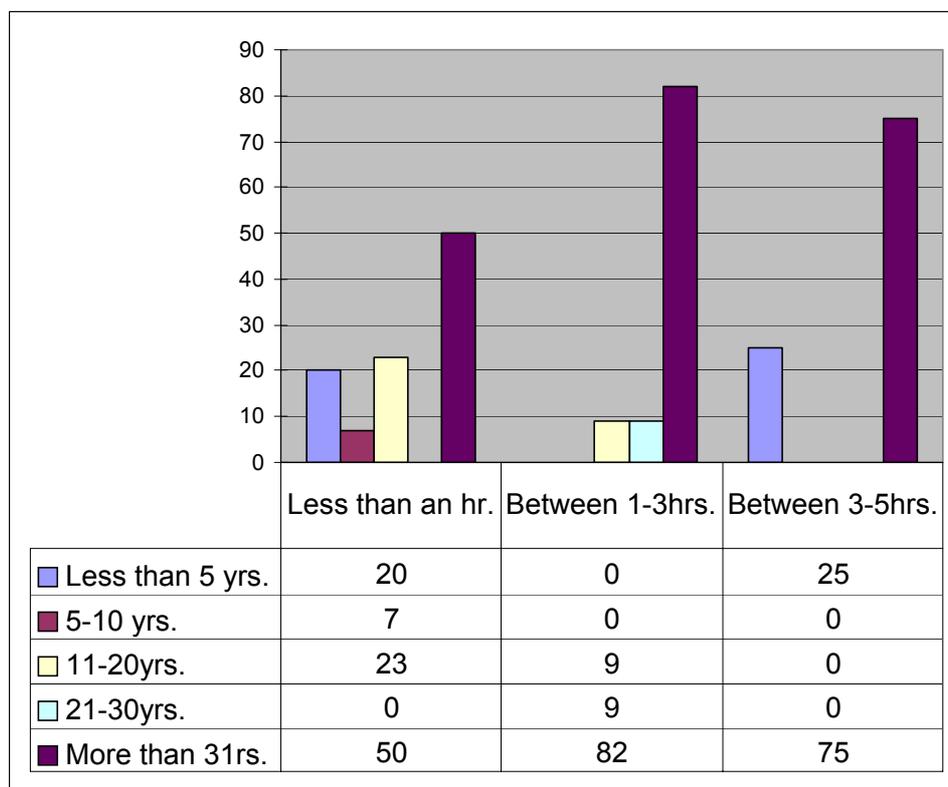


Figure 14) Amount of time spent in one application of pesticides by farm Experience
N=53



3.2.5 Safety equipment

Use of Safety Equipment

58% of the respondents said that they wear safety outfits and 42% do not. Respondents said that they own the following kinds of safety equipment: Safety Boots (88%), Gloves (84%), Safety Masks (73%), Safety outfits (49%), Apron (48%). But the rate of using safety equipment is much lower than ownership of the items. The rate of use of safety equipment is as follows: Gloves (85%), Safety Boots (84.6%), Safety Masks (65%), Safety outfits (49%), and Aprons (44%).

Condition of safety equipment

74% of the respondents said that their equipment was old and 25% said that theirs was damaged and had holes.

Storage of safety equipment

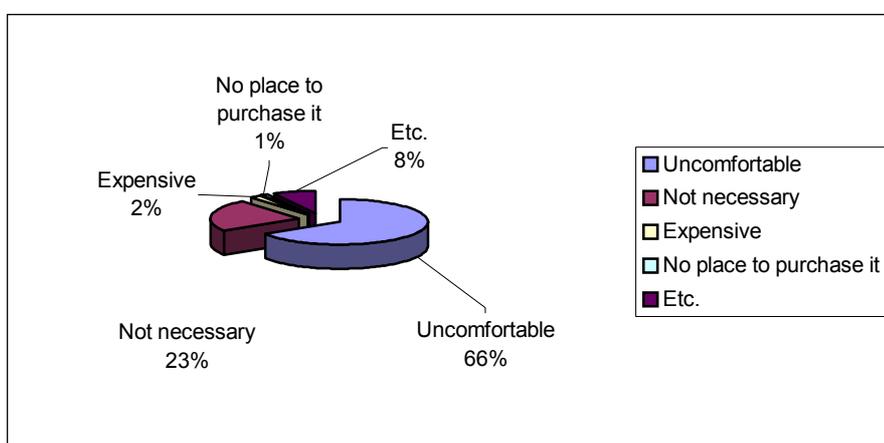
58% of the respondents said that they store the safety equipment in a storage area, 11% dry them before storage, 3% store them in a box, 1% stores them anywhere. 79% store their safety outfits after cleaning them and 21% do not. 74% said that they clean their safety outfits after each use. 69% said that they clean their safety outfits separately from their other laundries.

Reasons for not wearing safety outfits

66% of the respondents said that they do not wear safety outfits because they are uncomfortable, 23% said that they are unnecessary, 2% said they are too expensive, and 1% replied that there's no place to purchase them (see Figure 15).

Figure 15) Reasons for not wearing safety outfits

N=53



3.3 Incidence of pesticide poisoning and pesticide problems (in-depth interviews)

The following interviews were conducted from August to November, 2002 with 53 farmers living in Hoengseong-gun, Gangwon Province. Data collection was done through in-depth interviews using a semi-structured questionnaire. Interviewees were asked about symptoms they experienced after using pesticides.

Number of visits per farming household

Each of the 53 farming households was visited three times, but only 25 % of the households were interviewed three times because many farmers were not home. 23 % were researched two times and 52 % were researched one time.

Whether farmers are using pesticides or not

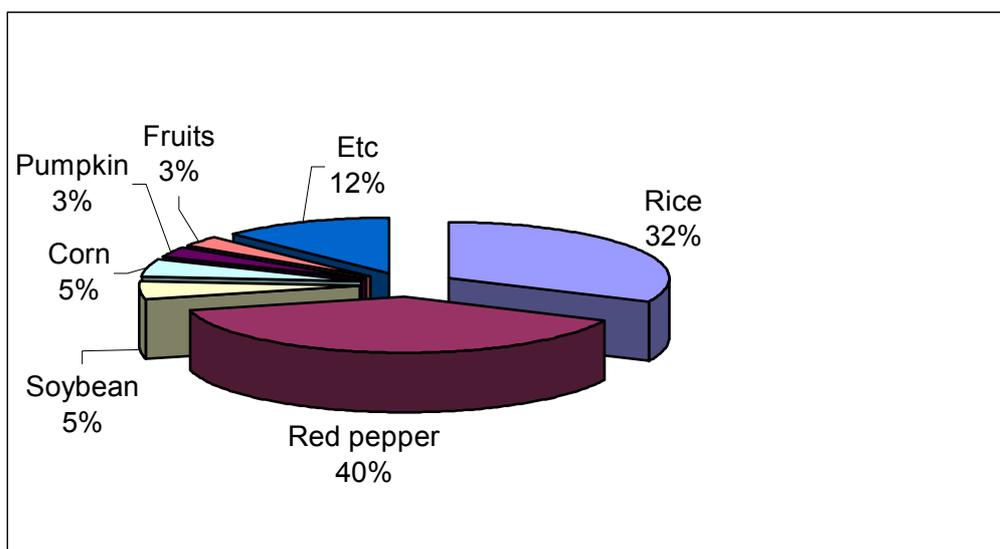
95% of farmers answered that they are using pesticides and only 5% said they do not use pesticides.

Crops cultivated

40 % of the respondents cultivate red peppers, 32 % grow rice, 12 % other crops, 5% each grow soy bean and corn and 3 % each cultivate pumpkin and fruits (see Figure 16).

Figure 16) Crops cultivated

N=53



Pesticide use according to crop

In rice cultivation, 22 % of farmers use the fungicid Kitazin (Iprobenfos), 16 % of farmers use Beam (Tricyclazole), 13 % use the insecticide Furadan (Carbofuran), and 13 % use the herbicide Nonanmae (Pyrazosulfuron-ethyl + Molinate). For red pepper cultivation, farmers choose from 23 kinds of pesticides. 10% of farmers use Gramoxone (paraquat), 10 % use Tie Break, 7 % use Beam, and 7 % use Fastac. 64 % of farmers use Gramoxone and 9 % use Furadan on other crops (for more details see table 20).

Table 20) Choice of pesticide according to crops (%)

N=53

Brand Name	Active Ingredient	Chemical class/ Use	Company (org.)	Rice	Red pepper	others
Beam	Tricyclazole	Azole/ F	Dow	16	7	
Furadan	Carbofuran	carbamate/ I	Bayer	13		9
Nonanmae	Pyrazosulfuron-ethyl + Molinate	Sulfonylurea + Thiocarbamate / H	Bayer	13		
Kitazin	Iprobenfos	Organophosphorus / F	Dong-oh Chem.	22		
Elsan	Phenthoate	Organophosphorus / I	Nissan Chem. Ind.	6		
Machete	Butachlor	Chloro-acetanilide/ H	Monsanto	3		
Eungbunon	Pyrazosulfuron-ethyl + molinate	Sulfonylurea + Thiocarbamate/H		6		
Hangumool	Fenobucarb (BPMC)	Carbamate/ I		3		
Marshal	Carbosulfan	Carbamate/ I		3		
Sevin	Carbaryl	Carbamate / I	Bayer	3		5
Gramoxone	Paraquat dichloride	/ H	Syngenta	3	10	64
Tie Break	Fenhexamid, tebuconazole	Anilide, Azole/ F	Bayer		10	
Monceren	Pencycuron	Phenylurea/ F	Bayer		2	
Daconil	Chlorothalonil	Substituted Benzene / F	Syngenta		2	
Euparen	Tolyfluanid	/ F	Bayer		4	
Sumithion	Fenitrothion	Organophosphorus/ I	Sumitomo Chem.		2	
Pyreth	Cypermethrin	Pyrethroid/ I			4	
Fastac	Alpha-cypermethrin	Pyrethroid/ I	BASF		7	
Forum D	Dimethomorph + dithianon	/ F	BASF		4	
Forumman	Dimethomorph+mancozeb	Morpholine + Dithiocarbamate/ F	Kyung Nong Corp.		4	
Deltanet	furathiocarb	Thiocarb-amate / I	Syngenta		2	
Dimecron	Phosphamidon	Organophosphorus/ I	Syngenta		2	
Decis	Deltamethrin	Pyrethroid/ I	Bayer (?)		4	
Grisin	Chlorbufam	Other Carbamate/ H			2	5
Alphathrin	Alpha-cypermethrin	Pyrethroid/ I			4	
Spical					4	
Manjangilchi	Acetamiprid + etofenprox	/ I	Kyung Nong Corp.		2	
Seda					4	
Diodix					2	
Jindibul					2	5
Tanger					7	
Spreader					2	2
Roundup	Glyphosate	Phospho-noglycine / H	Monsanto			5
Diatone						5
Do not know				9	7	
Total				100	100	100

Acute symptoms that occur after spraying pesticides

Some of the common acute symptoms experienced by the farmers are headache, dizziness and excessive sweating. Other symptoms after using pesticides included (see Table 21):

Table 21) Symptoms that occur after spraying pesticides (%) **N=53**

Symptoms	Yes	No
Excessive Sweating	24	76
Headaches	22	78
Dizziness	12	88
Itching	7	93
Thirst	5	95
Cough	5	95
Blurred vision	3	97
Eye congestion	3	97
Running nose	3	97
Nausea	3	97
Smarting nose	2	98
Fatigue	2	98
Chills	2	98
Breathing difficulties	1	99
Skin eruptions	1	99
Staggering gait	1	99

Protective equipment used when working with pesticides

The respondents reported that they wore the following protective equipment when working with pesticides (see table 22):

Table 22) Protective equipment used when working with pesticides

Protective equipment	Whether worn by farmers (%)
Hat	78
Goggles	27
Mask	64
Long sleeved shirt	80
Long pants	80
Rubber boots	77
Short sleeves	17
Gloves	60
Short pants	13
Short jodhpurs	2

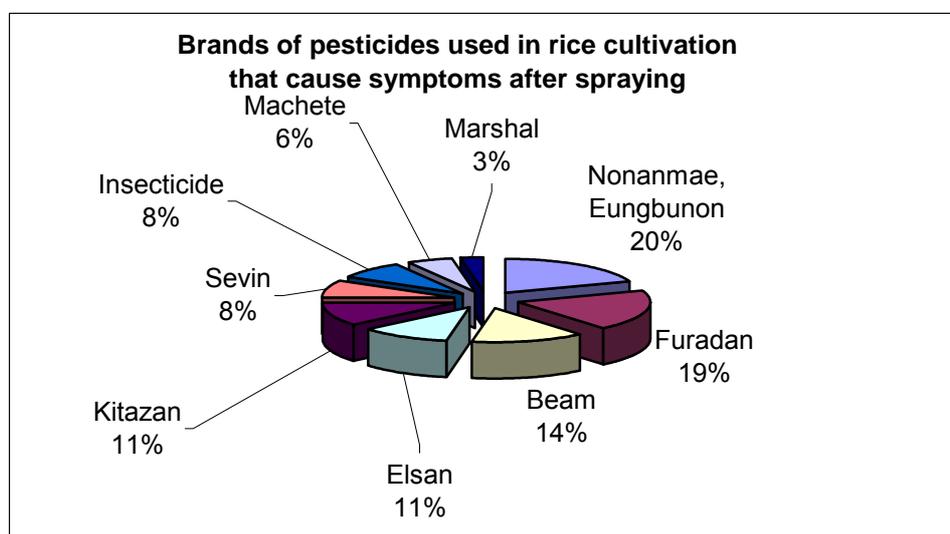
Whether protective equipment become wet after working with pesticides

56% of farmers reported that their jacket gets wet, 55% of farmers said their pants become wet and 30% of farmers answered that their hat gets wet after using pesticides. As absorption of pesticides is mainly through the skin, soaked clothes can be a major factor in pesticide poisoning.

Pesticides which cause symptoms after use

20 % of farmers suffered adverse symptoms after using molinate-containing herbicides Nonanmae and Eungbunon for rice cultivation, while 14% experienced adverse effects with Furadan, Beam (14%), and the organophosphorus pesticides Elsan and Kitazin (11%) (see Figure 17).

Figure 17) Brands of pesticides that cause symptoms after spraying for rice N=53



27% of farmers say they experienced sweating after using pesticides for miscellaneous crops, 17% suffered itching, 11% dizziness and 11% had headaches (see Table 23).

58 % of farmers who have symptoms after working with pesticides on miscellaneous crops say they got symptoms after using Gramoxone (paraquat), while those who used Diatone and Spreader accounted for 12% each.

Table 23) Symptoms experienced by respondents after spraying miscellaneous crops (%)

Symptoms	%
Sweating	27
Itching of skin	17
Coughing	16
Dizziness	11
Headache	11
Blurred vision	6
Burning sensation when inhaling	6
Runny nose	6

3.4 Case Studies of symptoms that occurred after using pesticides

Case 1

- Name : Ko, Byung Sook
- Age : 63
- Sex : Female
- Date of interview : Aug. 19, 2002
- Area : Hoengseong-gun Gangwondo

General information about the farmer

Ko, Byung Sook has been farming in Hoengseong-gun Gangwon Province for more than 20 years. Her husband and her grow red peppers, rice and soy beans and have used pesticides almost all the time. The size of their farm is about 3,000 pyung (app. 1 hectare). Their son and daughter are working in the town.)

Purchasing habits and method of using pesticides

Ko sprays Tie Breaker and Beam soluble powder for red peppers and Gramoxone for soy beans, storing a supply of pesticides on her farm. She buys pesticides which the salesman recommends after she discussing with him the condition of her crops.

Before using pesticides, Ko always reads the directions on the bottle and asks employees from the agricultural cooperative what ratio to use when mixing the product and how much of the pesticide to use. However, she often uses more than the indicated amount because she believes that overdosing is more effective.

Ko tries not to spend more than one hour spraying pesticides because she gets tired and cannot endure the strong suffocating smell of the chemicals. She wears safety clothes when spraying, taking care to wear a cap, mask and gloves, but she rarely wears goggles because they are not comfortable. When tending to her rice plot, Ko wears boots.

Symptoms that occur after spraying pesticides

Ko concentrates on cultivating red peppers. For this crop she applies pesticides 10 times and for rice cultivation she uses pesticides once in the summer because of the rice blast disease.

Ko uses Tie Breaker and Bim soluble powder for the red pepper and Sevin (Carbaryl) for rice crop. When she uses Tie Breaker, her nose becomes flushed, legs itch and she has bouts of dizziness. After using Sevin, Ko notices symptoms like sweating, dizziness and headache. Even though she has felt these symptoms, she did not think they were dangerous, so she has never gone to the hospital. Although the hospital and public health centre are not far from her home, Ko is reluctant to go there. She usually feels better after taking a rest at home.

Recognition of the hazards posed by pesticides

Ko knows that pesticides are dangerous, that they threaten human health and the environment and pollute farmland and potable water. She also knows that pesticide residues can remain in red pepper, rice and vegetables, but she does not think it is a serious problem. However, five to six years ago she used to catch grasshoppers and frogs from her farmland, but she cannot find them now. She has never thought that she could cultivate crops without pesticides.

Case 2

- Name : Kwan, Ou Jun
- Age : 67
- Sex : Female
- Date of interview : August 21, 2002
- Area : Hoengseong-gun Gangwon Province

General information about the farmer

Kwan Ou Jun lives in Hoengseong-gun Gangwon Province and mainly grows corn on her 50 pyung farm. She has been farming since she got married over 30 years ago. She is cultivating alone without any family members after her husband died several years ago. The size of farm land for corns is 50pyung.

Purchasing habits and method of using pesticides

Although the farm is small, there is much weeding to do. She has to use pesticides because she is too old to pull out the weeds. Kwan uses Gramoxone on her corn crop and Furadan for her rice plot to get rid of insect pests. She buys the pesticides which the salesman recommends after talking to him about the condition of her crops. Kwan sprays the pesticides herself. She reads the directions on the bottle and uses the indicated amount, spraying the pesticides for one hour.

Kwan wears safety clothes, a cap, gloves and boots during spraying. She also takes a shower afterwards, but washes clothes she had worn when spraying pesticides with her other laundry. She has never been educated on pesticide safety at the agricultural cooperative or the agricultural training centre. Kwan wraps empty pesticide bottles in vinyl (or plastic bags) and hangs them on the wall or leaves them in a corner of the home. She sometimes burns or buries them too.

Symptoms that occur after using pesticides

When using Furadan (Carbofuran), Kwan wears long-sleeved clothes, long pants and rubber gloves. Although she does not think that pesticides remain on the skin or that they are inhaled, she experiences congestion of the eyes, thirst, coughing and shivers after spraying

Furadan. She has never thought that these are symptoms of pesticide poisoning and she does not even know what pesticide poisoning is. Although she has felt these symptoms, she has never gone to the hospital to be treated. Nor has she taken any medicine for these symptoms. She just takes a rest at home, and then goes back to work when she feels better.

Recognition of the hazards posed by pesticides

Kwan knows that pesticides are dangerous. She has learned from neighbours and the television that pesticides remain on the crops and seriously pollute the environment, farmland and potable water. She too thinks that it is not possible to cultivate crops without using pesticides because of insect pests.

Case 3

- Name : Kim, Young Gi
- Age : 67
- Sex : Male
- Date of interview : Aug. 21, 2002
- Area : Hoengseong-gun Gangwon Province

General information about the farmer

Kim Young Gi and his wife have been cultivating crops for over 30 years. He mainly cultivates rice and started growing pumpkins several years ago. The size of his farm is 5,000 pyung.

Purchasing habits and method of using pesticides

Kim uses Beam soluble powder to control the rice blast disease and Elsan as an insecticide for rice cultivation. He does not use any pesticides for growing pumpkins. He sprays pesticides by himself and buys the products that the salesman at the pesticides store recommends. Kim reads the directions on the bottle and uses the indicated amount, spraying the pesticides for one hour. He wears long-sleeved clothes, long pants and a raincoat instead of the safety clothes when using pesticides. He thinks that he does not need the safety clothes because spraying takes only one hour. After spraying pesticides, he washes the clothes he had worn, separating them from other laundry.

Empty pesticide bottles are wrapped in vinyl and hung on the wall or just put in the barn or in a box. Although he has cultivated crops for over 30 years, he has never been educated about safety measures when using pesticides.

Symptoms that occur after using pesticides

Kim wears long-sleeved clothes, long pants and gloves when spraying Elsan which he applies to prevent insect attacks on his rice crop. This pesticide causes itchiness and dizziness because it is absorbed through the skin and by inhalation. He had never thought

that these symptoms could be dangerous, so he has never gone to the hospital. He just takes a rest at home and then goes back to work when the symptoms recede.

Recognition of the hazards posed by pesticides

Kim neither knows that pesticides are dangerous nor that pesticide residues in the crop are a health hazard. He does not think that pesticides are harmful for health and to the environment. He thinks that pesticides do not remain in the crops, on the farmland, and that they do not pollute potable water. He has not even thought that he could cultivate crops without using pesticides.

Case 4

- Name : Kim, Tae Won
- Age : 45
- Sex : Male
- Date of interview : July 24, 2002
- Area : Hoengseong-gun Gangwon Province

General information about the farmer

Kim Tae Won and his wife cultivate crops in Hadaeri, Wochun-myun, Hoengseong-gun, Gangwon Province. Their two sons are studying in the town. Kim mainly grows rice, red pepper and sesame, and has cultivated crops for 20 years on his 20,000 pyung farm. He is the head of the village.

Purchasing habits and method of using pesticides

For rice cultivation Kim uses IBP, Kunsami, Basta, Nonanmae, Heungbunon and Beam, which are soluble pesticides. For red pepper cultivation he uses Tie Break, Gramoxone and Fenhexamid Tebuconazole. He purchases pesticides that the salesman in the Hoengseong agricultural cooperative recommends. Kim reads the directions on the bottle before using pesticides and uses the indicated amount, spraying pesticides within one hour. He wears not only protector safety overall, but also long-sleeved clothes, long pants, cap, mask and rubber boots when spraying pesticides. After he finishes spraying, Kim takes a shower and washes the clothes he had worn, separating them from other laundry. Empty pesticide bottles are put in a box and stored or sent to the Korea Resource Recycling Corporation. The labels of pesticide bottles are often worn off after he uses them, so he identifies the pesticides leftover in the bottle and handles them with precaution when reusing next time. He has never been educated about pesticide usage and measures to handle pesticides at the agricultural cooperative.

Symptoms that occur after using pesticides

Although Kim tries to avoid skin contact with pesticides, when using Heungbunon and Nonanmae he has noticed various symptoms including sweating, dizziness, nausea, skin eruptions and headaches. He knows that these are symptoms of pesticide poisoning, but he

has never gone to hospital or taken any medicine for them. Kim says that if he ever gets severely poisoned by pesticides, he would seek treatment from the hospital nearby his home.

Recognition of the hazards posed by pesticides

Kim knows that pesticides are very dangerous. He thinks that pesticides remain on the crops and pollute the environment, farmland and potable water seriously. However, he has never imagined that he could cultivate crops without using pesticides because of resurgence and problems caused by insect pests.

Case 5

- Name : Byun, Kan Nan
- Age : 66
- Sex : Female
- Date of interview : August 21, 2002
- Area : Hoengseong-gun Gangwon Province

General information about the farmer

Byun and her husband have been cultivating crops, mainly rice and red pepper, for over 30 years on their 5,000 pyung farm. She left school after the elementary level and her children are working in the town.

Purchasing habits and method of using pesticides

Most of the time, it is her husband who sprays pesticides. For rice cultivation he uses Beam soluble powder to control the rice blast disease. He purchases pesticides that the salesman at the agricultural cooperative recommends.

Byun says her husband reads the directions on the bottle before using pesticides, uses the indicated amount and completes the spraying within one hour.

When the red pepper crop begins to be damaged by anthracnose (caused by a fungus), he uses more pesticides. Byun says that they use several different types of pesticides, but she does not know their names.

Byun does not think she needs the protective overall when spraying because she follows the directions and stops within 1 hour. She wears long-sleeved clothes, long pants, cap, and rubber boots but not goggles, mask or gloves. Whenever she and her husband finish spraying pesticides, they take a shower, but do not wash their clothes every time. Used pesticides bottles are put in the barn. Empty bottles are sent to the Korea Resource Recycling Corporation. Throughout the 30 years of involvement in farming, she has never been educated on the use of pesticides.

Symptoms that occur after using pesticides

Byun does not know the symptoms of pesticide poisoning but she thinks that pesticides can be absorbed through the skin or be inhaled. After using pesticides for anthracnose, she has red eyes, dizziness, nausea, headache, breathing problems, etc. However, she has never gone to hospital or taken any medicine for these symptoms. She thinks that the symptoms are normal for a farmer to experience.

Recognition of the hazards posed by pesticides

Byun does not know how dangerous pesticides are and that pesticides can remain in the crops, pollute the environment and cause serious health problems. She thinks that the farmland and potable water are not polluted as a result of pesticide use. Byun believes that it is not possible to cultivate crops without using pesticides because of falling yields and pest attacks. She has not even thought that she could cultivate crops without using pesticides.

Case 6

- Name : Byun, Dong Soo
- Age : 60
- Sex : Male
- Date of interview : July 21, 2002
- Area : Hoengseong-gun Gangwon Province

General information about the farmer

Byun Dong Soo lives in Hadaeri, Wochunmyun, Hoengseong-gun, Gangwon Province and has been cultivating crops with his wife for over 30 years. He mainly cultivates rice and grows pumpkins by the side. He is educated up to elementary school level and his farm size is 2,000 pyung.

Purchasing habits and method of using pesticides

Byun uses Furadan on rice and pumpkins. He purchases pesticides that the salesman recommends in the Hoengseong pesticides shop. He buys pesticides only at the agricultural cooperative and the agricultural guidance center.

Byun reads the directions on the bottle before using pesticides, relying on his farming experience to guide him on the amount to use and ratio for mixing. He keeps to the indicated amount and completes spraying within one hour. He wears a protective overall, long-sleeved clothes, long pants, cap, rubber boots, goggles, mask and gloves. After he finishes spraying, he washes the clothes and then keeps them away carefully. After using pesticides, he always takes a shower and washes his hands and feet before taking a meal. Opened pesticide bottles are hung up or put in a box. Empty bottles are sent to the Korea Resource

Recycling Corporation. He has never been given safety education on pesticides in the agricultural cooperative or shops he purchases the pesticides from.

Symptoms that occur after using pesticides

Byun knows that pesticides are very dangerous. He is aware that pesticides may remain on his skin after he uses them. After he sprays Mokdoyul for rice and anti-anthraxose pesticides for red pepper, he has experienced symptoms such as sweating, dizziness, nausea, fatigue, and headaches. But he does not think these symptoms are serious. When he feels these symptoms, he just takes a rest at home till he feels better. He has not been to hospital or taken any medicines for these symptoms.

Another farm worker Park, Mae Chun, a 55-year-old woman who is living in the same village as Byun, often works for others since she does not own much farmland. She often sprays pesticides for 2-3 days on vegetable crops, and she experiences dizziness and nausea at these times.

Recognition of the hazards posed by pesticides

Byun knows how dangerous pesticides are and he worries that pesticides can remain in the crops, pollute the environment and potable water, but he still thinks farmland is not polluted by pesticides. Byun thinks that it is not possible to cultivate crops without using pesticides because of falling yields. He has not even thought he could cultivate crops without using pesticides.

Case 7

- Name : Um, Soon Hung
- Age : 48
- Sex : Female
- Date of interview : July 24, 2002
- Area : Hoengseong-gun Gangwon Province

General information about the farmer

Um, Soon Hung is living with her husband and daughter who goes to high school. She has been cultivating crops for over 30 years, growing rice, potatoes and soy beans on her 1,650 pyung wide farm.

Purchasing habits and method of using pesticides

Her husband usually sprays the pesticides after examining the condition of the crops carefully, discussing with others what kind of pesticides he should use, and finally buying the pesticides at the agricultural cooperative.

For rice cultivation they use Beam soluble powder but no pesticides for potatoes. Um has never heard the agricultural guidance centre personnel discussing pesticides use. She reads the directions on the bottle before using pesticides and uses the indicated amount, keeping to the indicated ratio when mixing the pesticide. Spraying takes 1-3 hours. She wears safety clothing, long-sleeved clothes, long pants, cap, rubber boots, goggles, mask and gloves. When she finishes spraying pesticides, she takes a shower, but she does not wash the clothes she wears every time after a round of spraying. Used pesticides bottles are hung up in the barn. Empty bottles are sent to the Korea Resource Recycling Corporation. She has never been educated on pesticide use.

Symptoms that occur after using pesticides

Um does not recall any skin exposure to pesticides, but said they sometimes inhale the pesticide while it is being sprayed. She knows the symptoms of pesticide poisoning. At one instance, Um experienced terrible headache upon inhaling pesticides during spraying and had to go to the hospital for treatment.

When using Beam (Tricyclazole) soluble powder for rice, she has observed symptoms like congestion of the eyes, dizziness, nausea and headaches. Um said a neighbour, Kim Nam Ok, 73, lost her husband because of pesticide poisoning. When he was 50 years, he fainted while spraying pesticides and was later found to be suffering from kidney complications. The doctor diagnosed his condition as the effect of pesticide poisoning. He was under medical treatment for 19 years, and he died at the age of 71.

Recognition of hazards posed by pesticides

Um knows that pesticides can pollute the environment and potable water, but she still thinks pesticide residues do not remain in the crops. She thinks that it is not possible to cultivate crops without using pesticides because of falling yields. She has not even thought she could cultivate crops without using pesticides.

CHAPTER 4: CONCLUSIONS AND RECOMMENDATIONS

4.1 Pesticide use in Korea

As the survey shows, pesticide use is widespread in Korea. The scenario that emerges from the interviews is a truly worrying one:

- ◆ A full 98% of respondents from all parts of the country reported using them for all kinds of crops. The farmers choose to purchase pesticides from pesticide salesmen (54.6%) more than from any other source, followed by the agricultural cooperative (44.9%).
- ◆ When farmers decide to use a particular pesticide, they tend to follow their neighbours' experiences (37%), salesmen from the pesticide retail store (26%), workers at the agricultural cooperative (17%) and the agricultural guidance center (15%). Neighbours' experiences are the main influence on farmers' choice of pesticides.
- ◆ It is common for farmers not to store equipment properly. Many think that proper safety clothing is not necessary when spraying pesticides. More seriously, when farmers experience symptoms of pesticide poisoning, less than half of them (40%) go to the hospital or buy pills in drug store. Although 45 % of the farmers reported that they suffered various symptoms after spraying pesticides, some 36 % have not had safety education in using pesticides.
- ◆ Most of the farmers read the directions when using pesticides. However, there are still farmers who never read the directions and do not follow the directions and indications on pesticide labels. About half of the farmers do not follow the amount of pesticides indicated for use. Pesticide retail stores strongly influence farmers about what pesticides are available or which ones to use.

4.2 Pesticide use in Hoengseong-gun

Interviews with farmers in Hoengseong-gun

The survey of farmers in Hoengseong-gun provides interesting comparisons with farmers in the rest of Korea:

- ◆ Here 94% of the respondents use pesticides and 6% don't. All farmers who tend to orchards use pesticides, 91% use them in the field, and 90% use pesticides on their rice crop. As for farming without pesticides, 80% thought it is impossible because of insect pests. For rice growing, the most popular pesticides are IBP (22%) and tricyclazole (16%). For grains, Gramoxone (63.6%) is most used.
- ◆ 60% of those who apply the pesticides are husbands, 22% are wives, 8% are sons, 4% are husbands and sons, and 4% are daughters.
- ◆ Farmers learn about the pesticides they use from the pesticide retail store (37%), agricultural cooperative staff (31%), the experience of others (20%), agricultural guidance center (2%), and advertisements (2%).
- ◆ 82% of the respondents always read the directions. However, 8% read them once in a while and 8% never read the instructions. But 96% of the respondents say they follow the directions in using pesticides, while there are 4% farmers who do not follow them.

- ◆ In deciding on the amount of pesticide to use, only 58% of the respondents follow the directions on the ratio for preparing the spraying solution. Others depend on their own experience (22%), the agricultural cooperative (10%), agricultural guidance center (8%) and neighbours (4%). Even though the farmers try to stick to the directions, there is still a strong perception that more is better. While 82% use the amount as directed, 18% use more than the prescribed amount.
- ◆ All respondents stop spraying as directed before the crop is harvested.
- ◆ The farmers are spending less time in one application of pesticide. 69% spend less than an hour, 22% spend 1-3 hours and 9% spend 3-5 hours in one application of pesticides.
- ◆ 39% of the respondents don't wear the safety outfit, while 61% do. 66% don't wear the outfit because it is uncomfortable, 23% say it is not necessary, 2% think it's too expensive, and 1% did not know where to buy one.
- ◆ As for the disposal of pesticide bottles, 63% take them to the Korea Resource Recycling Center, 23% burn or bury empty bottles or bags, and 6% throw them in the garbage. Responsible disposal habits appear to be growing among farmers.
- ◆ 92% read the indication labels, and of them, 90% follow the indications and 10% don't.
- ◆ More than half know the symptoms of pesticide poisoning. 81% have experienced the effects of pesticide exposure to their skin. 39% had experienced the effects of inhaling or swallowing the pesticides during application.
- ◆ 24% have experienced the effects of pesticide poisoning. 79% had headaches, 4% stomach aches, and 14% skin diseases. When poisoning occurred, 67% rested at home and 17% sought treatment at a hospital. 8% took medication supplied by a pharmacy, and 8% took antidotes. 20% don't have access to treatment for pesticide poisoning and 28 said that there aren't any hospitals nearby.
- ◆ 66% have not had safety education in using pesticides. Those who received safety education were instructed by the agricultural guidance center (41%) or agricultural cooperative (41%). 94% of the respondents knew that pesticides are dangerous and 90% said that pesticide residues are dangerous. 33% said that the pesticide residues on farm products are a moderate problem and 28% thought that it's not a problem. Only 24% replied that it's a serious problem. It appears that recognition of the seriousness of pesticide and pesticide residue hazards is still not high.
- ◆ 80% said that farming is impossible without pesticides because of damage by blight and insect pests, 11% cited declining yields, and 9% lack of farm labour. However, 18% say farming is possible without pesticides. 30% would like to stop using pesticides. The number of farmers who want to farm without pesticides is increasing even though it is really not easy to do.

In-depth interviews with farmers in Hoengseong-gun

- ◆ 95% of farmers here use pesticides and 5% do not. Farmers in Hoengseong-gun cultivate red pepper (40%), rice (32%), soya bean and corn (each 5%), and other crops (12%). For rice, 22% of farmers use Kitazin, 15% Beam, and 13% each Furadan and Nonanmae. 23 kinds of pesticides are used by those who grow red pepper. For red peppers, 10 % of farmers use Gramoxone, 10 % use Tie Break, 7 % use Bum and 7 %

use Fastac. 64 % of farmers use Gramoxone and 9 % of farmers use Furadan on other crops.

- ◆ After using pesticides, 24% of farmers said that they experienced sweating, 22% had headaches, 12% dizziness and 7% itching.
- ◆ In Gangwon province, the percentage of farmers who suffer poisoning symptoms after using pesticides is low. There are many small-scale farmers. 36% of farms are less than 1,000 pyung in size and 67 % of farmers finish spraying pesticides within 1hour. 20 % of farmers who have symptoms after working with pesticides say they suffered symptoms after using Nonanmae and Eungbunon for rice cultivation, 14% after using Furadan, 14% with Beam and 11% with Elsan and Kitazin. 58 % of farmers who have symptoms after working with pesticides say they suffered symptoms after using Gramoxone for miscellaneous crops, and 12% with Diatone and Spreader.
- ◆ 28% of farmers said they had headaches after spraying chemicals, 24% had sweating, 7% blurred vision, 14% dizziness, 5% chills and 5% itching. 22% of farmers said they began sweating after spraying chemicals for red pepper, 16% had headaches, 9% itching, 9% dizziness, and 9% thirst. 27% of farmers say they experienced sweating after using pesticides for other crops, 17% had itching, 11% dizziness and 11% headaches.
- ◆ For protective equipment, 80.2% of the farmers wear long-sleeved clothes and pants, 77.9% a hat, 76.7% rubber boots, 54.0% mask and 60.5% gloves. Farmers would rather wear long-sleeved clothes and long pants than short sleeves and pants. 60% of farmers wear hats, rubber boots, mask and gloves, but only 26.7% of farmers wear goggles to protect the eyes.

4.3 Comparison between overall farmers and farmers in Hoengseong-gun

General characteristics of farmers and agricultural conditions

The average age of farmers in Hoengseong-gun is higher than that of farmers overall in Korea. They have mostly been growing crops for more than 30 years. Some 36% of their rice farms are under 1000 pyung, compared to 15% for all Korean farmers because this area is surrounded by wooded highland. 94% of farmers in Hoengseong-gun use pesticides while 98% of farmers overall do. This shows that farmers in all regions widely use pesticides. There is no difference in the amount of pesticides used for specific crops between farmers in Hoengseong-gun and farmers overall. But Hoengseong-gun farmers favour Gramoxone as a pesticide.

The process of purchasing pesticides

Most farmers in Hoengseong-gun purchase pesticides recommended by the salesman in the pesticide store. Only 2% of farmers purchase pesticides at the agricultural guidance center while 15% of Korean farmers do. This indicates that the role of the local government in promoting safe use of pesticides needs to be increased.

Method of using pesticides

66% of farmers overall always read the directions before using pesticides, and 82% of farmers in Hoengseong-gun do so. 82% of Korean farmers follow the indicated amount, while 65% of farmers in Hoengseong-gun keep to the indicated amount.

Safety equipment

Farmers in Hoengseong-gun have not kept their safety equipment well and 69% of them said that they do not think protective clothing is necessary while spraying pesticides. 25 percent of farmers in Hoengseong-gun and 40 percent of farmers overall go to the hospital or take medicine when they are poisoned by pesticides.

Safety education about pesticides

64 percent of overall farmers have been trained on pesticide safety while only 34 percent of farmers in Hoengseong-gun have received such training. More farmers in Hoengseong-gun are poisoned by pesticides than farmers overall. This shows that they are not sufficiently aware of the hazards of using pesticides.

Comparison of survey results between farmers overall and farmers in Hoengseong-gun

	Question		Farmers overall	Farmers in Hoengseong	Comparison
	Spraying of pesticides is done within 1 hour		24.9%	67%	
Protective clothing	Protective equipment is not damaged.		75%	87%	
	Protective equipment is stored in a warehouse.		85%	58%	Farmers in Hoengseong-gun store them carelessly
	Protective clothing must be washed separately.		69%	48%	Farmers in Hoengseong are not conscious enough about the dangers of chemicals.
	It's not necessary to wear protective clothing.		23%	69%	Farmers in Hoengseong are not conscious enough about the hazards of chemicals
Handling of empty pesticide bottles	What is done with empty pesticide bottles	Sent to Recycling Corporation	27%	64%	
		Burnt and buried	46%	22%	
	Chemicals are stored anywhere		1%	15%	More farmers in Hoengseong-gun store pesticides carelessly
	Read directions		99%	90%	Comparable
	Follow directions		87%	90%	Comparable
Knowledge of pesticide hazards	Know the symptoms of pesticide poisoning		86%	67%	Awareness about pesticide poisoning is lacking.
	Skin has been exposed to pesticides		81%	70%	
	Inhaled chemicals		54%	39%	Fewer farmers in Hoengseong-gun have inhaled chemicals than farmers overall
	Poisoned by chemicals		45%	24%	Fewer farmers in Hoengseong-gun have poisoned by pesticides than farmers overall

	Go to hospital or take medicine when having symptoms of poisoning.	40%	25%	Fewer farmers in Hoengseong-gun have gone hospital or taken medicine than farmers overall
Hazards of pesticides	Hospital is near the home	57%	72%	Fewer farmers in Hoengseong-gun have been trained in pesticide safety than farmers overall
	Trained on safe handling of chemicals	64%	34%	
Awareness about hazards of chemicals	Cautious towards hazards of pesticide residues	29%	24%	Farmers in Hoengseong-gun less worried about pesticide residues than farmers overall
		15%	28%	
	Intend to cultivate crops without using chemicals	40%	30%	A lower percentage of Hoengseong-gun farmers intend to grow chemical-free food

4.4 Recommendations

Due to the high usage of pesticides in Korea, farmers are suffering symptoms of pesticide poisoning such as sweating, headaches, dizziness, itching, and so on. The amount of pesticides used varies for different crops and some pesticides with special uses have created serious health problems. For rice cultivation, some 11 kinds of pesticides are used. Among these, Nonanmae and Hungbunon have caused many poisoning symptoms. Similarly, some 23 kinds of pesticides are used for red pepper cultivation. Anthrachose and Gramoxone among them have created various health problems. Protective equipment is not sufficient and many farmers just take a rest at the home when poisoning symptoms occur.

CACPK conducted this survey to find out what serious health problems pesticides are creating and to improve farmers' and public awareness on the safe use of pesticides. The survey uncovered several serious problems. First, many farmers rarely use protective equipment while spraying pesticides. Second, although they had symptoms like dizziness, nausea, or quivering eyebrows, farmers just took pills from the drug store and rested at home. Another disturbing finding is that the highly toxic Gramoxone is still used by farmers, and so threatens the safety of farmers and consumers alike.

This survey revealed substantial reasons why farmers could be harmed and how seriously they are being poisoned by pesticides. Farmers are using pesticides without enough information about their hazards. Many farmers have never been educated about the safe use of pesticides. To make matters worse, the farming population is getting older and the size of the farm household has declined, while the size of the average farm and imports of pesticides have been increasing. Elderly people working in farming lack the motivation to adopt new farming technologies and to understand safe pesticide use.

CACPK asked the Korean government to ban pesticides that are causing serious health problems for consumer and farmer safety, and take action to minimize the damage caused by using pesticides. CACPK has launched the "50% cut in pesticide use campaign" and suggested to local governments safety education programs not only for farmers but also the pesticide salesmen.

The recommendations made by CACPK are:

- ◆ First, farmers must be given full knowledge and information about using pesticides. The agricultural cooperatives have just been selling pesticides to farmers without providing sufficient information. In the case of Hoengseong-gun, the pesticide salesman influences farmers' choice of pesticides more strongly than public institutions. However, pesticides salesmen only provide information on the advantages of pesticides to farmers. So, government institutions and farmer organizations must educate farmers and the pesticide salesmen about the advantages and disadvantages of pesticides. Accordingly, the government should set up programs to provide accurate information about pesticides to farmers. In particular, farmers who are living in poverty should be given more training opportunities.
- ◆ Second, farmers must be educated about the safe use of pesticides. Farmers rarely follow the indicated amount of pesticides and do not manage well the use of safety equipment. Only 34% of farmers in Hoengseong-gun have been educated about

pesticide safety. This indicates that farmers are not knowledgeable enough about safety issues and the hazards of pesticides. This threatens farmers' health. As a result, farmers are more likely to be harmed because government institutions and farmer organizations neglect to educate farmers about pesticide safety. In view of this, farmers must be given opportunities to learn about using pesticides safely.

- ◆ Third, special measures must be implemented by the government and pesticide industry such as pesticide safety education programs for preventing pesticide poisoning. The agro-chemical industry should take responsibility for farmers' health problems caused by using pesticides. The industry should also strengthen education for salesmen in retail pesticide stores. The industry should regularly monitor the field practices in the use of pesticides to understand safety issues faced by pesticide users so that they can make safer products, containers, and labelling.
- ◆ Fourth, pesticides which cause poisoning symptoms must be examined thoroughly to find out whether the symptoms are caused by the toxicity of the pesticides or farmers' neglect when using pesticides.

The shocking symptoms of pesticide poisoning described by farmers in this survey, their indifference to their own health, their poor awareness of the hazards posed by pesticide use, the lack of training for farmers in the safe use of pesticides and the pesticide industry's role in pushing these poisons stand as a sharp rebuke to the indifference that allows the tragedy of pesticide poisoning to continue.

For this survey to bear its intended result, the findings presented here must be closely read so that farmers, consumers, regulators, administrators, the pesticide industry and the representatives of all these groups will take the necessary steps towards a future free from harm.

Appendix 1

Use of Pesticides according to crop (1st survey)

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Name	Active ingredient	% of farmers who use the pesticide for			
		Rice	Grains	Vegetables	Other crops
Daisen	Mancozeb	0.4	10.3	35.1	75.0
Kitazin	Iprobenfos (IBP)	15.7	0.8		
Beam	Tricyclazole	14.0			
Machete	Butachlor	13.1	0.4		
Antracol	Propineb		3.8	20.2	
Gramoxone	Paraquat dichloride	3.4	6.4		
Affirm	Emamectin benzoate		8.5	4.0	
Fuchiwang	Isoprothiolane	8.5	0.4	1.3	
Thiolix	Endosulfan	0.4	9.0		
Valimun	Validamycin-A	8.9	0.4		
Gochutan	Carbendazim /		9.0		
Pyreth	Cypermethrin	0.4	6.8		
Furadan	Carbofuran	4.7	2.6		
Padan	Cartap hydrochloride	0.8	4.7	1.3	
Pulbaksa	Esprocarb /	5.5			
Tonido			4.7	2.7	
Allta	Kasugamycin / fthalide	4.7	0.4		
Saeparan			4.7		
Podengdi			4.7		
Ewhanabang		4.2			
Myulsariwang	Buprofezin / soprocarb	3.4	0.4		
Dual	Metolachlor	0.4	3.0		
JuJung				10.8	
Taconil			2.1	4.0	
Bassa	BPMC	2.5	0.4		
Polyoxin	Polyxin B		1.3	5.4	
Parathion	Parathion	0.4	2.1		
Venomil		0.4	1.7	1.3	
Kangtaja	Alpha-cypermethrin /	0.8	1.3		
Fastac	Alpha-cypermethrin		2.1		
EPN	EPN	0.4	0.4	1.3	
Elsan			1.3		

Lebaycid	Fenthion	1.3			
Machine oil	Machine oil			4.0	
Omite	Prorargite			2.7	
Lasso	Alachlor		0.8		
Marshal	Carbosulfan	0.8			
Yamuzin	Chlorpyrifos /	0.8			
Manjangilchi	Acetamiprid / etofenprox			2.7	
Tanjuh			0.4	1.3	
Agmycin	Streptomycin sulfate /		0.8		
Match	Lufenuron	0.8			
Bumerang	Spinosad		0.4		
Didibro			0.4		
Ortiva	Azoxystrobin		0.4		
Spark	Glyphosate-ammonium			1.3	
Syndrom	Benfuracarb	0.4			
Benasol	Probenazole	0.4			
Betase		0.4			
C R A		0.4			
Beamsoaji		0.4			
Miri Z			0.4		
DEP			0.4		
Hanbashi					25.0
Mimic	Tebufenozide	0.4			
Total			100.0	100.0	100.0

II. Process of purchasing pesticides

1. Do you use pesticides when you cultivate crops?

Yes No

2. If you use pesticides, write the name of the pesticides used in farming.

Name of crop	Name of pesticide	Check whether health problems occur or not when using pesticide	How do you manage the problem?

3. Who mainly sprays the pesticides? (Check all who carry out spraying)

Husband () Wife () Son () Daughter ()
Daughter in law () Employee () etc ()

4. Where do you mainly purchase pesticide?

pesticide shop agricultural cooperative manufacturer's salesman etc

5. How do you choose which pesticide to use?

Recommendation of agricultural guidance center
Recommendation of worker at agricultural cooperative
Neighbours' experience
Recommendation of salesman in pesticide shop
etc

6. Where do you learn about the pesticide you are now using?

Agricultural guidance center
Agricultural cooperative
Neighbours
Pesticide shop
Books or advertisements
etc

13. How many times do you spray chemical for a crop?

Name of crop	Number of times pesticide is sprayed

IV. Protective clothing worn when using pesticides

14. Do you wear protective clothing when using pesticides?

Yes No

14-1. If you wear protective clothing, check what you have and what you use.

	Do you have?	Do you use?
Safety clothes	Yes () No ()	Yes () No ()
Gloves	Yes () No ()	Yes () No ()
Protective mask for face and eyes	Yes () No ()	Yes () No ()
Aprons and coveralls	Yes () No ()	Yes () No ()
Boots	Yes () No ()	Yes () No ()
Protective equipment (soap, clothes, activated coal, plastic container, etc.)	Yes () No ()	Yes () No ()

15. Condition of the protective equipment

How long ago did you buy them? _____year

Do you check the equipment for leaks? Yes () No ()

16. How do you store the protective equipment? ()

17. Do you keep your protective clothing neatly?

Yes No

18. Do you wash your protective clothing every time after using chemicals?

Yes No

19. Do you wash your protective clothing with other clothes?

VI. The following questions are about the hazards of using pesticides.

29. Do you know what the symptoms of poisoning are?

Know Do not know.

30. Have your skin been exposed to pesticides?

Yes No

31. Have you inhaled pesticides while spraying?

Yes No

32. Have you had symptoms (headache, stomachache, skin disease) due to pesticide poisoning?

Yes No

32-1. If you had symptoms, what were they?

Headache Stomach ache lumbago skin disease Etc

32-2. How do you treat the symptoms?

Rest at home for awhile

Take medicines

Go to hospital to a cure.

Take an antidote

Nothing.

Etc ()

33. Is there a place near your home where pesticide poisoning can be treated?

Yes No

34. Is the hospital near your home?

Yes No

35. Do you have any transportation to the hospital?

()

36. Has anybody in the family experienced the symptoms of pesticide poisoning besides the survey participant?

Yes No

36-1. If you answered "Yes", which crop is cultivated and which pesticide is used?

(Name of crop: Name of chemical:)

Appendix 3

AGROCHEMICALS MANAGEMENT ACT

Fully Amended by Law No. 5023, Dec. 6, 1995

Amended by Law No. 5153, Aug. 8, 1996

CHAPTER I GENERAL PROVISIONS

Article 1 (Purpose) The purpose of this Act is to improve quality of agrochemicals, to ensure good order in agrochemicals circulation, to encourage safety of using agrochemicals, to contribute to production of agricultural products and preservation of living environments by means of rules and regulations on matters concerning manufacturing, importing, marketing, and utilizing agrochemicals.

Article 2 (Definition) The definitions of the terms used in this Act shall be made as follows: <Amended by Law No. 5153, Aug. 8, 1996>

1. The term "agrochemicals" shall mean fungicides, insecticides and herbicides used for controlling germs, insects, aphids, mires, virus, weeds and other animals and plants which are determined by the Ordinance of the Ministry of Agriculture and Forestry (hereinafter referred to as "diseases by insects"), and other medicine as prescribed by the Ordinance of the Ministry of Agriculture and Forestry, which is utilized to facilitate or reduce the physiological functions of agricultural crops;
2. The term "items" shall mean the kinds of agrochemicals which are composed of the same operative ingredients and are prepared by the same method;
3. The term "technical ingredients" shall mean the materials in which the operative components of agrochemicals are condensed;
4. The term "manufacturing business" shall mean the business as to manufacturing (including processing, hereinafter the same shall apply) and marketing agrochemicals in the country;
5. The term "technical ingredients business" shall mean the business as to manufacturing and marketing technical ingredients in the country;
6. The term "importing business" shall mean the business as to importing and marketing agrochemicals or technical ingredients;
7. The term "marketing business" shall mean the business as to marketing agrochemicals other than the manufacturing business and the importing business; and

8. The term "pest control business" shall mean the business as to the prevention or extermination of the diseases by insects, or as to the increase or decrease of the physiological functions of agricultural crops by virtue of agrochemicals.

CHAPTER II REGISTRATION OF BUSINESS

Article 3 (Registration of business) (1) Every person who wishes to do the manufacturing business, the technical ingredients business and the importing business, shall make a registration with the Administrator of Rural Development Administration.

(2) Every person who wishes to do the marketing business and the pest control business shall make a registration with the Mayor of the City of Seoul, or Metropolitan City or the Governor of Province (hereinafter referred to as "City/ provincial Governor"), provided that the person wishing to do the pest control business for exported and imported plants amongst the pest control businesses shall make a registration with the Director of the National Plants Quarantine Station designated by Presidential Decree.

(3) The pest control business under Paragraph 2 is categorized as the business for exported or imported plants, the business in general and by air, the range of which shall be determined by Presidential Decree.

(4) Every person who wishes to make a registration in accordance with Paragraph 1 or 2 shall be equipped with man-power, facilitated and apparatus which satisfy the requirements as prescribed by the Ordinance of the Ministry of Agriculture and Forestry. <Amended by Law No. 5153, Aug. 8, 1996>

Article 4 (Grounds for disqualification) No person who falls within any of the following subparagraphs is qualified for the registration in accordance with Article 3 (1) and (2):

1. Every person judged as incompetent or quasi-incompetent;
2. Every person who has not been reinstated after having been declared bankrupt;
3. Every person who was sentenced to imprisonment without hard labor or more severe punishment for the breach of this Act, and has not passed the 2 year period from the date the sentence has been completed, or has been decided not to enforce;
4. Every person who was decided to suspend the enforcement of imprisonment without hard labor or more severe punishment for the breach of this Act, and has not completed the period of suspended sentence;
5. Every person who has not completed the 2 year period from the date registration was revoked in accordance with Article 7; or
6. Every legal person who has one or more executives falling within any of the subparagraphs 1 to 5.

Article 5 (Succession to the status of the manufacturers) (1) In cases where those who have made a registration in accordance with Article 3 (1) or (2) (hereinafter referred to as "the manufacturer") die or assign the manufacturing business or engage in a merger with other manufacturers, the successor, the assignee of the business or the legal person who exists after the merger or who is formed by the merger, shall succeed to the status of the manufacturers, provided that the legal persons in existence, or being established after the merger shall not fall within any of subparagraphs 1 to 5 of Article 4.

(2) In cases where those who have succeeded to the status of the manufacturers in accordance with Paragraph 1 fall within any of the subparagraphs 1 to 5 of Article 4, or the legal person succeeding to the status falls within subparagraph 6 of Article 4, there must be a transfer of the status or replacement of the executives as of the date of commencement of the succession or within 6 months after the date of the merger.

(3) Those who have succeeded to the status of the manufacturers in accordance with Paragraph 1 shall file a statement on the succession to the Administrator of Rural Development Administration, City/Provincial Governor, or the Director of the National Plants Quarantine Station within 30 days from the date they succeeded to the status in accordance with the Ordinance of the Ministry of Agriculture and Forestry. <Amended by Law No. 5153, Aug. 8, 1996>

Article 6 (Filing of statements as to modification of business facilities) (1) In cases where the manufacturers modify manpower, facilities, and apparatus in accordance with Article 3 (4), as prescribed by the Ordinance of the Ministry of Agriculture and Forestry, they shall file a statement on the modification to the Administrator of Rural Development Administration, City/Provincial Governor, or the director of the National Plants Quarantine Station. <Amended by Law No. 5153, Aug. 8, 1996>

(2) In cases where the manufacturers discontinue their businesses, or close them temporarily, or reopen the closed businesses, he shall file a statement of the fact to the Administrator of Rural Development Administration, City/Provincial Governor, or the Director of the National Plants Quarantine Station in accordance with the Ordinance of the Ministry of Agriculture and Forestry.

Article 7 (Revocation of registration) (1) In cases where those who have made a registration for the manufacturing business, the technical ingredients business, or the importing business (hereinafter referred to as "the manufacturer", "the supplier of technical ingredients" or "the importer" respectively) fall within any of the following subparagraph, the Administrator of Rural Development Administration may make an order for revocation of the registration of the business, or for closure of the business partially or entirely within the limits of one year in accordance with Article 3 (1), on the proviso that the registration shall be revoked should they fall within subparagraph 1:

1. In cases where they fall within any of the subparagraphs of Article 4, except where the executives falling within subparagraph 6 of Article 4 were replaced within 6 months;
2. In cases where they have failed to file a statement or made a false statement on the succession to the status in violation of Article 5 (3);
3. In cases where they have failed to file a statement or made a false statement on modification of business facilities, temporary closure or reopening of the business in violation of Article 6;
4. In cases where they manufacture, import or market agrochemicals or technical ingredients which are not registered in accordance with Article 8 (1), Article 16 (1), or Article 17 (1);
5. In cases where they have failed to make an indication or made a false indication as to agrochemicals in violation of Article 20;
6. In cases where they have stored, displayed or marketed agrochemicals in such ways as contrary to Article 21;
7. In cases where they have advertised in false or exaggerated ways in violation of Article 22, or without regard to the ways as prescribed by the said Article;
8. In cases where they have handled agrochemicals in ways contrary to such requirements on restrictions on handling agrochemicals as prescribed by Article 23 (1);
9. In cases where agrochemicals are found low in quality on the result of the inspection in accordance with Article 24, or they have failed to submit the record on the inspection, or made a submission of false record following the inspection performed by themselves;
10. In cases where they have refused, interfered with or evaded the inspection or the collection of samples for inspection in accordance with Article 24 (1);
11. In cases where they have failed to comply with the order for removal or destruction of agrochemicals in accordance with Article 24 (5);
12. In cases where they have disobeyed the order for supplement of facilities, or have failed to file statement or have made a false statement on matters concerning the management of agrochemicals in accordance with Article 25 (1);
13. In cases where they have entered false particulars in account books such as the ledger of management of agrochemicals in accordance with Article 25 (2), or have failed to keep the account books; or
14. In cases where they have disobeyed this Act, or such orders or measures as prescribed by this Act.

(2) In cases where those who have made a registration for the marketing business or the pest control business (hereinafter referred to as "the dealer", or "the pest controller" respectively) fall within any of the following subparagraph, City/ Provincial Governor may revoke the registration of the business, or make an order for the closure of the

business partially or entirely within the limits of one year, on the proviso that the registration shall be revoked should they fall within subparagraph 1:

1. In cases where they fall within any of the following subparagraphs of Article 4, provided that one or more executives of the legal person falling within subparagraph 6 of Article 4 shall not be replaced within 6 months;
2. In cases where they fall within subparagraphs 2, 3, 6, 7 or 10 to 13 of paragraph 1;
3. In cases where they utilize or handle agrochemicals in violation of the requirements for safe use or restriction on handling of agrochemicals in accordance with Article 23 (1); or
4. In cases where they disobey this Act, or such orders or measures as prescribed by this Act.

(3) In cases where those who have made a registration for the pest control business for exported or imported plants in accordance with the proviso of Article 3 (2), fall within any of the following subparagraphs, the Director of the National Plants Quarantine Station may revoke the registration of the business or make an order for closure of the business partially or entirely within the limits of one year, on the proviso that the registration shall be revoked should they fall within subparagraph 1:

1. In cases where they fall within any of the subparagraph of Article 4, provided that one or more executives of the legal person falling within subparagraph 6 of Article 4 shall not be replaced not later than 6 months;
2. In cases where they fall within subparagraphs 2, 3, or 10 to 13 of paragraph 1;
3. In cases where they utilize or handle agrochemicals in violation of the requirements for safe use or restriction on handling of agrochemicals in accordance with Article 23 (1);
4. In cases where incidence of death takes place as the result of breach of this Act;
5. In cases where they disobey the order for correction against the disturbances in the pest control business incurred by charging excessively fees or expenses of controlling pests;
6. In cases where the pest controllers for exported or imported plants are out of business for more than one year, or violate the rules of quarantine measures for exported or imported plants which are provided for by the Director of the National Plants Quarantine Station; or
7. In cases where they disobey this Act or such orders or measures as prescribed by this Act.

(4) The details of grounds for measures of revocation or suspension in accordance with Paragraphs 1 to 3 shall be determined by the Ordinance of the Ministry of Agriculture and Forestry. <Amended by Law No. 5153, Aug. 8, 1996>

CHAPTER III REGISTRATION OF AGROCHEMICALS

Article 8 (Registration of domestically produced items) (1) In cases where the manufacturers wish to produce or market agrochemicals in the country, they shall make a registration with the Administrator of Rural Development Administration according to categories of items.

(2) Every person who wishes to make a registration in accordance with Paragraph 1 shall submit an application indicating the specifications under following subparagraphs, attached with documents indicating records on inspection on effectiveness, harmfulness, toxicity and residual quality of agrochemicals by an institute of inspection and research which is designated by Presidential Decree (hereinafter referred to as "the records on results of inspection), to the Administer of Rural Development Administration, together with samples of agrochemicals, on the proviso that the records on results of agrochemicals may not be submitted partially or entirely in accordance with the Ordinance of the Ministry of Agriculture and Forestry in cases where the items are re-registered after the expiry of the period prescribed by Article 11, or where they are determined by Presidential Decree: <Amended by Law No. 5153, Aug. 8, 1996>

1. The name (as for a legal person, its name and the name of its representatives, hereinafter the same shall apply), address, resident registration number of the applicant;
2. The name of agrochemicals;
3. The physic-chemical nature, the kinds of operative and other components, and their contents;
4. The production process of the items;
5. The kinds, the quality of material and the capacity of containers or wrappings;
6. The range of applicable diseases by insects and agricultural crops, and the instruction on utilizing agrochemicals and amount of agrochemicals per use;
7. The shelf life of agrochemicals;
8. The substance of agrochemicals harmful to persons and domestic animals and the ways of de-toxication;
9. The contents of agrochemicals harmful to aquatic animals;
10. The contents of agrochemicals which are inflammable or ignitable, or detrimental to skin, or others;
11. Observations on storage, handling and applications;
12. The place of the factory; or
13. Other requirements for registration of the processed items in accordance with the Ordinance of the Ministry of Agriculture and Forestry.

Article 9 (Scrutiny of documents on application for registration of items) (1) In case of the application in accordance with Article 8 (2), the Administrator of Rural

Development Administration shall order the president of an administrative body in charge of matters concerning agricultural science and technology to examine the documents and to inspect the samples of agrochemicals submitted by the applicant.

(2) The requirements on the examination of the submitted documents and the inspection on the samples of agrochemicals in accordance with Paragraph 1 shall be notified by the Administrator of Rural Development Administration after consultation with the president of central administrative body concerned.

(3) The Administrator of Rural Development Administration shall return the documents on application for registration with reasons, or order the applicant to supplement them in cases where the records on examination of documents and the results on inspection on samples of agrochemicals in accordance with Paragraphs 1 and 2 fall within any of the following subparagraphs:

1. In cases where there are false particulars entered into the application form;
2. In cases where agrochemicals concerned have too minor effects to be regarded as suitable for them;
3. In cases where agricultural crops are to be damaged if the agrochemicals concerned are used according to the instructions described on the application form;
4. In cases where there are possibilities under which persons and domestic animals are to be injured even though the agrochemicals concerned are used or handled according to the instructions on utilizing and handling the agrochemicals concerned;
5. In cases where aquatic animals are susceptible to damage if the agrochemicals concerned are used in large quantity;
6. In cases where persons and domestic animals are susceptible to damage resulting from the residue of agrochemicals contained in agricultural crops if the agrochemicals concerned are used in accordance with the instruction described on the application form;
7. In cases where eco-system is susceptible to damage out of the residue of agrochemicals in the soil of farmland, or where persons and domestic animals are susceptible to damage resulting from consuming the agricultural crops cultivated on the farmland when such agrochemicals are utilized in accordance with the instruction described on the application form;
8. In cases where aquatic eco-system is susceptible to damage resulting from pollution in public waters as defined in subparagraph 4 of Article 2 of Water Environment Preservation Act, or where persons and domestic animals are likely to suffer from damage out of consuming the water when the agrochemicals concerned are used in large quantity; or
9. In cases where the names of the agrochemicals concerned are likely to cause misconception as to their principal ingredients or effects.

(4) In cases where the documents on application of registration are supplemented in accordance with Paragraph 3, Paragraphs 1 to 3 apply mutatis mutandis to the reexamination or the re-inspection of agrochemicals.

Article 10 (Issue of certificate of registration of items) The Administrator of Rural Development Administration shall issue without delay a certificate of registration of items with descriptions of following subparagraphs in consideration of the examination of documents and the results on the inspection on samples of agrochemicals in accordance with Article 9, unless there is any ground for return or order for supplementation falling within subparagraphs of Article 9 (3): <Amended by Law No. 5153, Aug. 8, 1996>

1. The registration number and the date of registration;
2. The name of the manufacturer;
3. The specification provided for by subparagraphs 2, 3, and 6 of Article 8 (2);
4. The place of the factory;
5. The period of validity of registration; or
6. Other requirements prescribed by the Ordinance of the Ministry of Agriculture and Forestry.

Article 11 (Term of validity of registration of items) The period of the validity is 10 years for the registration of items in accordance with Article 8 (1).

Article 12 (Succession to the status of registrant of items) The provisions of Article 5 shall apply mutatis mutandis to succession to the status of the manufacturer who had items registered in accordance with Article 8 (1) (hereinafter referred to as "the manufacturer of registration of items"), provided that such succession takes place only when a statement on the succession to the status as to registration of items is filed by the assignee in case of transfer of business, or by the juridical person in existence or being established after a merger of legal persons.

Article 13 (Registration of modification by application of items) (1) The manufacturer of registration of items who wishes to modify matters concerning the range of diseases by insects prescribed by subparagraph 6 of Article 8 (2), shall submit an application with particulars prescribed by the Ordinance of the Ministry of Agriculture and Forestry and certificate of registration and records on results of inspection as to the modified matters to the Administrator of Rural Development Administration appended thereto, together with samples of agrochemicals. <Amended by Law No. 5153, Aug. 8, 1996>

(2) The manufacturer of registration of items shall file a reasoned statement with the Administrator of Rural Development Administration as to modifications in accordance with subparagraphs 1, 4, 5, or 7 to 13 of Article 8 (2) within 30 days from the date such modifications have been made. The application for renewal of certificate of registration

of items shall be provided when there are modifications as to the particulars in the certificate of registration of items.

(3) The provisions of Articles 9 and 10 shall apply mutatis mutandis to examination and return of documents on applications for registration of items concerning the registration of modification of items in accordance with Paragraph 1 and renewal of certificate of registration of items.

Article 14 (Ex officio revocation of registration of items) (1) The Administrator of Rural Development Administration shall revoke the registration of items in cases where the registrant under Article 8 (1) had items registered in false or other unlawful ways.

(2) The Administrator of Rural Development Administration may modify the particulars of registration of items concerned or revoke the registration of items within the necessary limits where it is considered that harmful effects of agrochemicals as referred to in subparagraphs 2 to 8-1 of Article 9 (3) have been caused or are likely to happen when the items have been used or are to be used in accordance with the instructions described on the application after such items are registered.

(3) The Administrator of Rural Development Administration may modify particulars of registration of items as to the range of applicable diseases by insects or agricultural crops in accordance with subparagraph 6 of Article 8 (2) when it is considered most urgent to control diseases by insects.

(4) The Administrator of Rural Development Administration shall notify to the manufacturer of registration of items details with reasons concerning the modification of particulars of registration of items or the revocation of registration of items in accordance with Paragraphs 1 to 3, or shall renew the certificate of registration of items in case of modifications in particulars of registration of items in accordance with Article 10.

Article 15 (Invalidity of registration of items) The relevant registration of items in accordance with Article 8 (1) shall be invalid in cases where the manufacturer of registration of items discontinues his business as to the items concerned.

Article 16 (Registration of technical ingredients) (1) The supplier of technical ingredients wishing to produce and market technical ingredients shall register them according to their kinds with the Administrator of Rural Development Administration.

(2) Every person who wishes to register technical ingredients in accordance with Paragraph 1 shall submit an application indicating particulars of following subparagraphs, attached with documents on physic-chemical analysis of technical ingredients and records on results of inspection as to toxicity there of by an institute of inspection and research designated by Presidential Decree, to the Administrator of Rural Development Administration together with samples of technical ingredients, on the proviso that he is exempt entirely or partially from submission of the documents according to the Ordinance of the Ministry of Agriculture and Forestry in cases where

he wishes to register technical ingredients as determined by Presidential Decree: <Amended by Law No. 5153, Aug. 8, 1996>

1. The name, address, resident registration number of applicant;
2. The name, and the physic-chemical nature of technical ingredients and the kinds and the respective contents of principal or other components there of;
3. The process as to composition and production of technical ingredients;
4. The contents of technical ingredients with danger of inflammation or explosion;
5. The place of the factory; or
6. Other requirements for registration of technical ingredients as prescribed by the Ordinance of the Ministry of Agriculture and Forestry.

(3) The Administrator of Rural Development Administration shall issue immediately to the applicant a certificate with description of following subparagraphs when the applicant under Paragraph 2 is recognized to comply with the requirements for registration of technical ingredients as determined and notified by the Administrator of Rural Development Administration: <Amended by Law No. 5153, Aug. 8, 1996>

1. The registration number and the date of registration;
2. The name of the supplier of technical ingredients;
3. The subject matters as referred to in subparagraph 2 of Paragraph 2;
4. The place of the factory; or
5. Other requirements as prescribed by the Ordinance of the Ministry of Agriculture and Forestry.

(4) The provisions of Article 12, Article 13, Article 14 (1) and Article 15 shall apply mutatis mutandis to matters concerning succession to the status of the registrant of technical ingredients, the registration of modification by application, the ex officio revocation of registration, and the invalidity of registration with regard to registration of technical ingredients in accordance with Paragraph 1. In these cases, references to "the items" are construed as including "the technical ingredients", and "the manufacturer" as "the supplier of technical ingredients".

Article 17 (Registration of imported agrochemicals) (1) The importer who wishes to import and market agrochemicals or technical ingredients shall make a registration with the Administrator of Rural Development Administration according to items of the agrochemicals or kinds of the technical ingredients, provided that this Paragraph shall not apply to agrochemicals or technical ingredients as used in laboratories or for the purposes of academic research.

(2) Every person who wishes to import the same items of agrochemicals or the same technical ingredients from the same manufacturer as the items of agrochemicals or the technical ingredients registered in accordance with Paragraph 1, and market them, may file a statement to the Administrator of Rural Development Administration in

accordance with the Ordinance of the Ministry of Agriculture and Forestry in place of registration, irrespective of Paragraph 1. <Amended by Law No. 5153, Aug. 8, 1996>

(3) The provisions of Article 8 (2) to Article 16 shall apply mutatis mutandis to matters concerning the application of registration of items, the review of documents on application for registration of items, the issuance of certificate of registration of items, the period of validity of registration of items, the succession to the status of registrant of items, the registration of modification by application of items, the ex officio revocation of registration of items of imported agrochemicals in accordance with Paragraph 1, and the invalidity of registration of items, and the provisions of Article 16 shall apply mutatis mutandis to the registration, the succession to the status of the registrants, the registration of modification, the ex officio revocation, or the invalidity of registration of imported technical ingredients in accordance with Paragraph 1 respectively. In these cases, references to "the manufacturing business" or "the technical ingredients business" are construed as including "the importing business", and "the manufacturer" or "the supplier of technical ingredients" as "the importer", and "the agrochemicals" as "the imported agrochemicals", and "the technical ingredients" as "imported technical ingredients."

CHAPTER IV MANAGEMENT OF AGRO-CHEMICALS CIRCULATION

Article 18 (Supervision of demand and supply of agrochemicals) The Minister of Agriculture and Forestry may, if necessary, require the manufacturer, the supplier of technical ingredients, the importer or the dealer to maintain the stability of the demand and supply of agrochemicals, or the fairness of agrochemicals circulation, and may recommend the National Agriculture Cooperative Federation (hereinafter referred to as "the Agriculture Cooperative Federation: ACF") to store or supply agrochemicals. <Amended by Law No. 5153, Aug. 8, 1996>

Article 19 (Establishment of agrochemicals accounts, and financial support) (1) The ACF shall establish and operate separate agrochemicals accounts for storage or supply of agrochemicals in accordance with Article 18.

(2) The ACF shall obtain approvals from the Minister of Agriculture and Forestry as to its own purported regulations on establishment or operation of agrochemicals accounts in accordance with Paragraph 1. The said Paragraph shall also apply to modification of the regulations. <Amended by Law No. 5153, Aug. 8, 1996>

(3) The Government may provide subsidies or loan funds for public finance within the limits of annual budgets so as to facilitate the operation of agrochemicals accounts in accordance with Paragraph 1.

Article 20 (Indication of agrochemicals) The manufacturer or the importer who wishes to market agrochemicals produced or imported by himself shall indicate on

container or wrappings the name, and the contents of each operative ingredients of agrochemicals, the name of applicable diseases by insects, the shelf period of agrochemicals, and other requirements as determined by the Ordinance of the Ministry of Agriculture and Forestry. <Amended by Law No. 5153, Aug. 8, 1996>

Article 21 (Prohibition of storage, display, or marketing) No manufacturer, importer, or dealer shall store, display or market the agrochemicals falling within any of the following subparagraphs:

1. Any item which has not been registered in accordance with Article 8 (1) or Article 17 (1);
2. Agrochemicals without indication as referred to in Article 20, or with false indication by forge or frond;
3. Agrochemicals whose indication on their containers or wrappings in accordance with Article 20 is so damaged that the agrochemicals are difficult to identify;
4. Agrochemicals which are repacked or whose segments are packed. This subparagraph shall not apply in cases where the importer himself has repacked, or has segmented and packed imported agrochemicals;
5. Agrochemicals without the examined certificate of self-inspection in accordance with Article 24 (2); or
6. Agrochemicals whose shelf life passed the period as referred to in Article 20.

Article 22 (Prohibition of false advertisement) (1) No manufacturer, importer, or dealer shall make false or exaggerated advertisements on agrochemicals which have been manufactured, imported, or marketed by himself.

(2) The ways of advertisements and the scope of exaggerated advertisements on agrochemicals shall be determined by the Ordinance of the Ministry of Agriculture and Forestry. <Amended by Law No. 5153, Aug. 8, 1996>

Article 23 (Requirements for safety in using agrochemicals) (1) The pest controller or other users of agrochemicals shall utilize or handle agrochemicals in safe and proper ways, observing requirements for safe use and restriction on handling.

(2) The requirements for safe use and restrictions on handling under Paragraph 1 shall be determined by Presidential Decree.

Article 24 (Inspection on agrochemicals in circulation) (1) The Administrator of Rural Development Administration, City/Provincial Governor, the Director of National Plants Quarantine Station may authorize relevant officials to inspect agrochemicals and their raw materials which are manufactured, imported, marketed or utilized by the manufacturer, the supplier of technical ingredients, the dealer or the pest controller respectively, relevant account books, or facilities and apparatus, and to collect samples necessary to inspect agrochemicals or their raw materials.

(2) The manufacturer, or the importer shall perform self-inspection on agrochemicals manufactured or imported by himself prior to distribution of them. The agrochemicals which have passed the inspection shall be distributed with the examined certificate of self-inspection as prescribed by the Ordinance of the Ministry of Agriculture and Forestry. In these cases, the records on results of self-inspection on distributed agrochemicals shall be submitted without delay to the Administrator of Rural Development Administration. <Amended by Law No. 5153, Aug. 8, 1996>

(3) The Administrator of Rural Development Administration shall, at the request of the manufacturer or the importer, perform the inspection on agrochemicals prior to their distribution (hereinafter referred to as "inspection by application").

(4) The Administrator of Rural Development Administration may, if it is considered necessary to control the quality of distributed agrochemicals, authorize relevant officials to inspect the agrochemicals concerned.

(5) In cases where safety measures are considered necessary to prevent danger and injury resulting from agrochemicals which do not comply with this Act or orders made there under, the officials implementing the inspection under Paragraphs 1 and 4 may order the agrochemicals to be placed in sealed envelopes, and to be removed and then destroyed.

(6) The requirements for the inspection in accordance with Paragraphs 1 to 4 shall be determined by the Ordinance of the Ministry of Agriculture and Forestry. <Amended by Law No. 5153, Aug. 8, 1996>

(7) The officials implementing the inspection in accordance with Paragraphs 1 to 4 shall produce to the persons concerned the proofs evidencing the authority to do so.

Article 25 (Filing of statement on agrochemicals management) (1) The Administrator of Rural Development Administration, City/Provincial Governor, the Director of National Plants Quarantine Station may order the manufacturer, the supplier of technical ingredients, the importer, the dealer or the pest controller to file a statement on matters concerning management of agrochemicals, or to supplement manpower, facilities, or apparatus which fail to satisfy the requirements.

(2) The manufacturer, the supplier of technical ingredients, the importer, the dealer or the pest controller shall enter the matters prescribed by the Ordinance of the Ministry of Agriculture and Forestry as to manufacturing, importing, purchasing (including acquisition by voluntary transfer) or marketing (including voluntary transfer) into account books such as the ledger of agrochemicals management, and keep them for two years. <Amended by Law No. 5153, Aug. 8, 1996>

CHAPTER V SUPPLEMENTARY RULES

Article 26 (Application for complaints) (1) A person who has made an application for the registration of items or modification of registration of items in accordance with Article 8 (1), Article 13 (1) (including the cases where Article 16 (4) or Article 17 (3) is deemed to apply), Article 16 (1), or Article 17 (1) may, if such measures are taken as return of documents on application for registration, registration of ex officio modification of items, or revocation of registration of items in accordance with Article 14 (1) or (2) (including the cases where Article 16 (4) or Article 17 (3) is deemed to apply), submit complaints in writing to the Administrator of Rural Development Administration within 30 days from the date he is subject to such measures.

(2) In case of the complaint under Paragraph 1, the Administrator of Rural Development Administration shall notify immediately the date and place of hearing to the applicant or his representatives in order to provide for him with an opportunity to give an opinion, providing the applicant or the representative on behalf of him complies with the notification in due respect, or his address is known.

(3) The Administrator of Rural Development Administration shall inquire into matters as to the complaints and notify the results of such inquiries to the applicant within 60 days from the date the application under Paragraph 1 is received.

Article 27 (Protection of privileges of submitted materials) (1) In cases where the relevant applicant of registration requests for the protection of privileges of the materials submitted in accordance with Article 8 (2) (including the cases where Article 17 (3) is deemed to apply), Article 13 (1) (including the cases where Article 16 (4) or Article 17 (3) is deemed to apply), or Article 16 (2) (including the cases where Article 19 (3) is deemed to apply), the Administrator of Rural Development Administration shall not reveal them to the public, on the proviso that they shall be open in the interests of the public.

(2) No person who reads or examines the submitted materials falling within Paragraph 1, for whose protection requests have been made, shall reveal the knowledge obtained from them to the public.

Article 28 (Fees) (1) The person applying for a relevant registration in accordance with Article 3 (1) and (2), article 8 (1), Article 13 (1) (including the cases where Article 16 (4) or Article 17 (3) is deemed to apply), Article 16 (1), or Article 17 (1) respectively, shall pay the fees for the registration concerned, the rate of which shall be determined by the Ordinance of the Ministry of Agriculture and Forestry. <Amended by Law No. 5153, Aug. 8, 1996>

(2) the person applying for an inspection in accordance with Article 24 (3) shall pay to the Administrator of Rural Development Administration the fees for the inspection in accordance with the Ordinance of the Ministry of Agriculture and Forestry. <Amended by Law No. 5153, Aug. 8, 1996>

(3) The institute of inspection and research as referred to in Article 8 (2) and Article 16 (2) (including the cases where Article 17 (3) is deemed to apply) may charge fees, where inspections on harmfulness, effectiveness, toxicity or residual effects of agrochemicals are to be made at the request of the manufacturer, the importer, or the supplier of technical ingredients.

(4) The Minister of Agriculture and Forestry may determine the requirements for the fees as referred to in Paragraph 3. <Amended by Law No. 5153, Aug. 8, 1996>

Article 29 (Hearing) In cases where the Administrator of Rural Development Administration, City/Provincial Governor, or the Director of National Plants Quarantine Station wishing to take measures so as to revoke or suspend the registration of business under Article 7, or modify the particulars of the registration of items, or revoke the registration of items in accordance with Article 14 (including the cases where Article 16 (4) or Article 17 (3) is deemed to apply), the person subject to such measures, or the representative on behalf of him shall in advance be provided an opportunity to give his opinion in accordance with Presidential Decree, provided that the person shall comply with the Decree in due respect, or his address be known.

Article 30 (Exclusion of applications) (1) The Act shall not apply to such agrochemicals or technical ingredients as are produced for export, and exported by the manufacturer or the supplier of technical ingredients, provided that the person wishing to export agrochemicals or technical ingredients, the effects of which are recognized by the Ordinance of the Ministry of Agriculture and Forestry as harmful to persons and domestic animals, shall obtain approvals before exporting them from the Administrator of Rural Development Administration. <Amended by Law No. 5153, Aug. 8, 1996>

(2) The Noxious Chemical Substance Control Act shall not apply to the agrochemicals which are subject to this Act.

Article 31 (Transfer or delegation of powers) (1) The Administrator of Rural Development Administration may transfer some of the powers subject to this Act to the president of an administrative body in charge of matters concerning agricultural science and technology, City/Provincial Governor, or the Director of National Plants Quarantine Station in accordance with Presidential Decree.

(2) The Administrator of Rural Development Administration may delegate some of his duties under this Act to the president of the body concerned in accordance with Presidential Decree.

CHAPTER VI PENAL PROVISIONS

Article 32 (Penal provision) Any person falling within any of the following subparagraphs shall be punished by imprisonment for less than 3 years or a fine not exceeding 15 million Won:

1. Any person who are engaged in the business of manufacturing, importing, or marketing items of agrochemicals or technical ingredients, or controlling pests without registration of business such as the manufacturing business and others in violation of Article 3 (1) or (2);
2. Any person who manufactures, imports, or markets agrochemicals or technical ingredients without registration in violation of Article 8 (1), Article 16 (1), or Article 17 (1);
3. Any person who has failed to make an indication, or has made a false indication of agrochemicals under Article 20;
4. Any person who has stored, displayed, or marketed agrochemicals in violation of Article 21;
5. Any person who has disobeyed an order for collection or destruction of agrochemicals in accordance with Article 24 (5); or
6. Any person who has revealed the submitted materials to the public in violation of Article 27 (2).

Article 33 (Penal provision) Any person falling within any of the following subparagraphs shall be punished by imprisonment for less than one year or by a fine not exceeding 5 million Won:

1. Any person who has made an advertisement in false or exaggerated ways in violation of Article 22;
2. Any person who has refused, interfered with, or evaded the inspection or the collection of samples in accordance with Article 24 (1); or
3. Any manufacturer or importer who has distributed agrochemicals, or any person in charge of inspection who has completed the records on the results of self-inspection in such a false way as is contrary to Article 24 (2).

Article 34 (Penal provision) Any manufacturer, importer, or dealer who has handled agrochemicals in violation of Article 23 (2) shall be punished by a fine not exceeding 3 million Won.

Article 35 (Penal provision) Any person falling within any of the following subparagraphs shall be punished by a fine not exceeding two million Won:

1. Any person who has failed to file a statement in accordance with Article 5 (3) (including the cases where Article 12, Article 16 (4), or Article 17 (3) is deemed to apply), Article 6, or Article 13 (2) (including the cases where Article 16 (4) or Article 17 (3) is deemed to apply), or who has made a false statement;
2. Any pest controller who has utilized agrochemicals in violation of the requirements for safe use or restrictions on handling under Article 23 (2);
3. Any person who has disobeyed the order for supplementation by Article 25 (1) of facilities and others, or who has failed to file a statement on matters concerning the

management of agrochemicals under the said Paragraph, or has made a false statement; or

4. Any person who has failed to enter particulars in accordance with Article 25 (2), or who has entered false particulars into account books such as the ledger of agrochemical management.

Article 36 (Penal provision) Any person other than the pest controller who has utilized agrochemicals in violation of Article 23, shall be punished by a fine not exceeding one million Won.

Article 37 (Penal provision) (1) Any person who has caused danger or damage to persons by manufacturing, importing, marketing, or utilizing agrochemicals, shall be punished by imprisonment for less than 3 years.

(2) Any persons who has caused death or injury to persons because of the activities as referred to in Paragraph 1, shall be punished by imprisonment for less than 10 years.

Article 38 (Double penalty provision) In cases where the managing directors of a juridical person, or the representatives, servants or other employees of a juridical or individual person have committed offenses as referred to in Articles 32 to 35 in connection with the business of the juridical or the individual person, the juridical or the individual person shall be punished by a fine as prescribed by each pertinent provision of the Articles, while the offenders shall be punished.

Article 39 (Confiscation) The agrochemicals which are owned and possessed by the person subject to the punishment in accordance with Article 32, or which are acquired by the third person with knowledge of the fact, shall be confiscated, except for the collection of the value of the agrochemicals because of impossibility of such confiscation.

ADDENDA

Article 1 (Date of enforcement) The Act shall be affective after lapse of one year from the date it is promulgated, except for the proviso of Article 3 (2) of the Addenda which shall be entered into force at the expiry of the one year period from the date this Act is in force.

Article 2 (Transitional measures as to pest control business for imported or exported plants) Any person who has obtained a permit of pest control business for imported or exported plants in accordance with the provisions of this Act before they have been amended at the commencement of this Act shall be deemed to have made a registration under this Act at the date the proviso of Article 3 (2) of the Addenda is in force, provided that man-power, facilities, apparatus or the others are provided to satisfy the requirements of this Act within 6 months from the date this Act is in force.

Article 3 (Transitional measures as to administrative proceedings) The activities in accordance with the provisions of this Act before they have been amended at the commencement of this Act, which are performed by the Minister of Agriculture and Forestry as to registration, revocation of registration or others, or which are directed **towards** the Minister with regard to various application or others, shall be construed as those activities by or towards the Administrator of Rural Development Administration in accordance with the relevant provisions of the Act.

Article 4 (Transitional measures as to registration of items) (1) Items of agrochemicals and technical ingredients (excluding those of imported agrochemicals and technical ingredients) which are registered in accordance with the provisions of this Act before they have been amended at the commencement of this Act, shall be construed as registered in accordance with Articles 8 and 16, and items of imported agrochemicals and technical ingredients amongst the registered agrochemicals shall be construed as registered in accordance with Article 17.

(2) The original period of the validity of registration of items shall be 5 years in spite of the provisions of Article 11, where the registration of items concerned which are regarded as registered in accordance with Paragraph 1 has passed 10 years in accordance with the provisions of this Act before they have been amended from the date such items are notified.

Article 5 (Transitional measures as to the application of penal provisions) The application of penal provisions to the activities prior to the commencement of enforcement of this Act shall be relied on the provisions of this Act before they have been amended.

Article 6 (Transitional measures as to the termination of the Fund for Agrochemicals Management) (1) The Fund for Agrochemicals Management which has been established by the provisions of this Act before they have been amended at the commencement of this Act shall be used by the Administrator of the Fund in accordance with the provisions of this Act before they have been amended, to pay expenses for tests, education, and campaigns for safe use, handling and management of agrochemicals, and expenses for administration of the Fund.

(2) The Administrator of the Fund in charge of using it in accordance with Paragraph 1 shall submit plans for estimated expenses by 30 days before each fiscal year starts, and annual report of the fund to the Minister of Agriculture and Forestry within 60 days from the expiry of each fiscal year.

Article 7 (Relations with other laws and regulations) References to the provisions of the Agrochemical Management Act before they have been amended in other laws and regulations at the time this Act is in force, if there are relevant provisions in this Act, the Act or such provisions there of are construed as referred to in replacement of previous provisions.

ADDENDA <Law No. 5153, Aug. 8, 1996>

Article 1 (Date of enforcement) This Act shall be effective as of the date of enforcement of Presidential Decree concerning the organization of the Ministry of Maritime Affairs and Fisheries, and the Maritime Police Authority in accordance with the modified provisions of Article 41 of the Government Organization Act within 30 days from the date this Act is promulgated.

Articles 2 to 4 Omitted.

NOTES

NOTES

Consumers Korea (CK, formerly CACPK) is a non-profit and non-governmental organisation of consumers in Korea. It is registered with the Economic Planning Board and serves consumers on their rights and providing legal kinds of regulation in favour of consumers, disseminating information to consumers and publishing information on consumer issues like the monthly magazine 'Sobija' (Consumer Report).

Pesticide Action Network (PAN) is an international coalition of citizen's groups and individuals who oppose the misuse and overuse of pesticides, and support the reliance on safe and sustainable alternatives. Established in 1982, the PAN international network presently links over 300 groups in 50 countries, and is coordinated through five regional coordinating centers. PAN is a network and no individual can direct or represent the entire coalition. Participants are free to pursue their own projects to further PAN's objectives, and benefit from their access to the collective resources of the network.

PAN Asia and the Pacific (PAN AP) is based in Penang, Malaysia. We are linked to more than 150 groups, in 18 countries in the Asia Pacific region.

PAN AP prescribes to the following development principles: a participatory holistic approach; a commitment to gender equity and genuine partnership; the need to confront social injustice and global inequities; the value of biodiversity, appropriate traditional and indigenous knowledge systems; and the recognition that our earth is one interdependent living system.



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