

Investgating And Assessing Impacts On The Environment Due To Agricultural Activities In The Land Areas Planned For Residential Land In Go Vap District - HCMC

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Abstract: *Currently, urban agriculture is quite developed in many cities of Viet nam, specially in such large cities as Ho Chi Minh and Ha Noi. Despite of the urban agriculture has brought some positive factors such as providing some agricultural products to consumers in the city and increasing income for the land users, but along with the benefits there are also many environmental issues regarding use of pesticides and fertilizers emerging. This research has been implemented in order to assess status of agricultural activities in land planned for housing and facilities for the residents in Go Vap District - HCMC as well as it's impacts on the environment and thence proposing solutions for reduction of the impacts. The results gained from the research implementation showed that: the urban agricultural acitivities in the land planned for housing purposes are quite a lot; some environmental problems such as odorous dispersal, reduction of soil quality due to concentration of lead and asenic increase; and awareness of people on enviropmental protection and pesticide use is quite would, but it could be improved if there there are better policies and programs regarding environmental protection from the government developed and applied.*

Key Words: *Urban agriculture, urban land, soil quality, environment; pesticide.*

Date of Submission: 23-01-2019

Date of acceptance: 07-02-2019

I. Introduction

Ho Chi Minh City is one of the fastest urbanized cities of Viet nam in the past few decades. The ratio of industries and services compared with the overall economic structure of the city has continuously been increased. In some urban districts of the city, the strong urbanizing process has led to change in the economic structure: from agricultural economy to industrial – service economy, this has brought the conversion of land use towards “from agricultural land to residential – service land”. Therefore, most areas of the land, which were previously used for agricultural purposes, have been converted into residential or service land, and Go Vap District is one of the districts with those status. Along with the speed of urbanization of the district as well as changes in residential land prices, most of the land area previously used for agricultural activities has been sold by owners of land use right. However, due to the high price of the land, only a few people having real needs for housing and people having high income can afford to buy land. Therefore, a large amount of land intermingled in the residential areas are purchased by investors and speculators which have been waiting ‘pick’ price. As a reason many land area have not been used for building houses or residential structures and they have been blank.

While the land was 'waiting for sale', it has been used by people (rented or leased out) for agricultural purposes with very high frequency of intensive farming which leads to affect the environment and almost all of the wards in Go Vap district have the same status. Therefore, a systematic- scientific study of the real status of using land planned for residential construction as well as impacts of that activity on the environment is necessary, and this is also the main reason for the topic: *"Investigating and assessing the environmental impact of agricultural activities in the land areas planned for residential land in Go Vap District - Tp. HCM "*, has been proposed to implement

II. Literature Review

2.1. Overview of urban and urban agriculture

2.1.1 Concept of urban and urban land

Urban can be understood that it is a human settlements area with a high population density with many infrastructures built to serve the living and development needs of the people. Urban areas are created through urbanization and are classified according to urban forms such as cities, towns or suburbs. The term 'urban' often contrasts with the term 'rural', the phrase 'rural' is used to denote rural areas such as villages where population density is not high and mainly operates agriculture: livestock and cultivation.

Urban land, which means that the land is located in an urban area and its periphery informed and limited by the government, each city occupies a certain space, its size is large or small depending on the land area that it occupies.

2.1.2.1. Concept of urban agriculture

Currently the concept of "Urban Agriculture" is quite familiar to people in general and people in urban areas in particular. Urban agriculture can be understood as the process of growing - tending, processing and distributing products through farming such as animal husbandry, planting, tending ornamental plants, exchanging or selling products of the activities to meet the needs of the population community in the urban areas. However, the concept of urban agriculture in this study does not include animal husbandry, processing and distribution of livestock products, it is just limited to cultivation and distribution of agricultural products related to vegetable and ornamental plants.

2.2. The environmental issues related to urban agriculture

It cannot be denied that urban agricultural activities have brought a number of positive aspects such as providing some agricultural products to consumers, increasing income for land users, etc. However, accompanying positive aspects, urban agricultural activities have generated a number of problems related to the natural environment and the social – economic environment as well. No proper urban agricultural practices and shortage of understanding environmental protection as well as using pesticides could affect the environment: polluting soil, surface water and groundwater; polluting the ambient air environment; issues related to urban beauty.

III. Research content and methods

3.1. Research content

In order to achieve the objectives of the project, the following research contents have been taken during implementation of the research.

- Assessing the status of urban agricultural activities in Go Vap District - Ho Chi Minh City: The issues studied in this content include issues such as urban types of agriculture as well as systems; production is being carried out in the studied area and methods of using plant protection chemicals and fertilizers.
- Studying and assessing the real status of using land planned land for construction of houses and public service works to plant ornamental trees and vegetable crops in Go Vap district: The addressed issues in this content are the number of land parcel, area of the land being used for the agricultural activities and the main reasons leading to the land has not been used for the right purposes.
- Assessing soil quality changes of the parcel land due to urban agricultural activities in the studied areas: To resolve this content, land surveying investigating, analysing as well as choosing the place to take soil sample for analyse of some land parameters related to agricultural activities in the studied region.
- Studying and evaluating awareness of the land users and urban communities in the studied area on the relationship between urban agricultural activities and environmental impacts.
- Proposing measures to minimizing the environmental impacts caused by urban agricultural activities: Based on data and information gained from the research, measures related to legal regulations on environmental protection and treatment, education and training causes, supporting tools as well as encouraging subjects and land use rights of the holders of the land being used for urban agriculture purposes,...have being initiated.

3.2. Research Methods

To perform the proposed contents of the research topic, the internal works in conjunction with field survey have been implemented. Details of the methods and data collected during the research implementation are as follow:

- Synthesis and data collection method: The data and information related to the urban development, cultural and social characteristics of Go Vap District as well as the relationship between urban agriculture and environmental activities have been collected. The sources of the documents have been from libraries, newspapers, radio, internet, research works of domestic and foreign authors
- Field surveying combined with interviewing relevant subjects: The data and information such as status of land for urban agriculture; methods and behaviour of people directly using herbicides and pesticides; and awareness of people to environmental protection, have been collected by face to face interview or filling given questionnaire.
- Taking soil samples for analyzing a number of environmental parameters related to the use of fertilizers, herbicides and pesticides. The assessment of soil quality samples is based on the data gained from the research implementation and in conjunction with the current regulations of Viet nam. The soil sample taken

for analysis is performed by a combination of "Stratified sampling" and "Simple random sampling" and the analysed parameters include: pH(KCL); Lead; Arsenic; Total of organophosphate pesticide residue (T.OPs) and total of organochlorine pesticide residue (T.PDF).

IV. Results and Discussion

4.1. Actual situation of farming activities in the land in the study area

According to the results gained from the survey in the research implementation, the Go Vap district presently has about 20 land parcels which have been used for the agricultural activities, each land parcel has area of more than 200 m² and total area of these 20 land parcels are about 51.670 m², accounting for 0.26% natural area of the district. This land has been planned for constructing houses and public service facilities, but these land parcels are not yet used for the right purposes and are being used to grow crops and ornamental plants. The location of the lands are shown in the figure 4.1 below.

In order to having basis to assess the actual situation and the causes leading to not right purpose use of the land in the studied area, the research has conducted surveys and direct interviewing related subjects such as land management officials, owners of land use right and people who directly use land for the purpose of growing vegetables and ornamental plants.

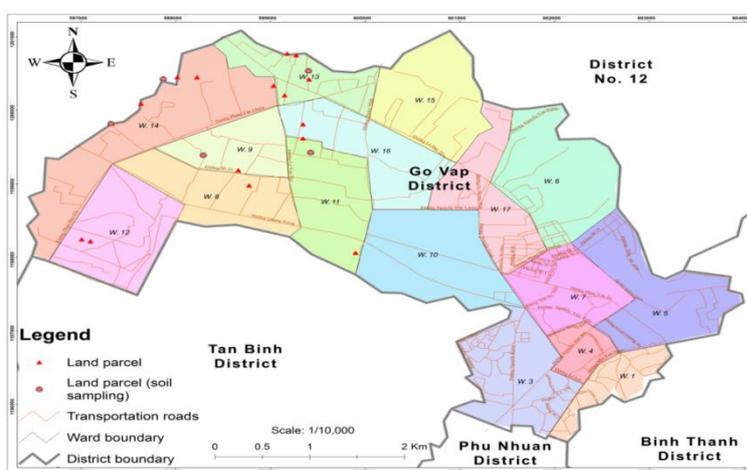


Figure 4.1: The location of land parcels used for urban agriculture in Go Vap District

The data and information gained from the research implementation have revealed that there are 03 main causes for the land that has not been used for the right purposes, that are: land in dispute or not yet agreed on compensation price, the land parcels of this cause group often have quite large area and are mainly planned for construction of public facilities such as schools, parks and greenery areas; land already planned but likely to be adjusted (hanging plan), the land parcels of this cause group are mostly moderate and planned for transportation, or roads, corridors launched; and the third is that owners of land use rights do not have need to build houses, they keep the land as their saving property, characteristics of the land parcels are usually small in size and located in crowded residential areas of the district. The number of the land parcels of each cause group in the studied area is presented in figure 4.2.

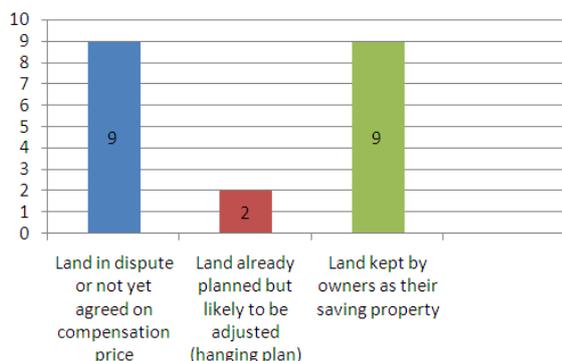


Figure 4.2: Number of land parcels classified by cause groups being used for urban agriculture in the region

From the research data shown in the figure 4.2, it can be seen that the number of the land parcels in dispute or in negotiating compensation prices and the number of the land being kept by owners as savings property is similar with about 9 land parcels of each, total land of the two cause groups accounted for 90% of total land being used for urban agriculture in the studied area, only 02 parcels of the land (accounting for about 10% of the total) planned but likely to be adjusted.

4.2. The status of using pesticides and quality of the land parcels in the studied area

4.2.1. The use of pesticides in the region

4.2.1.1. Kind of pesticides used in the land parcels in the region

In order to have a database for assessment of pesticides being used for planting vegetables and ornamental plants in the studied area, the research has conducted field surveys and interviewed some objects relative to the agricultural activities in the region. The results obtained in the research process showed that there are about 34 brand names of pesticides used and mainly for eliminating pests, only one kind is stimulant. Although the type of pesticide used for cultivation and care of ornamental plants in the studied area is quite diverse, with a total of about 34 types of drugs, but all of these drugs are on the permitted list of Ministry of Agriculture and Rural Development of Viet Nam..

The research results also showed that the selection of using kind of the pesticides by people in the studied area mainly through: watching television; instructions of managers or the agents selling pesticides; advertisement companies supplying or distributing pesticides and herbicides; through word of mouth among the people; and some another. Specific rate of people selecting kind of pesticides and herbicides in use based on sources of supplying information is as follow: 40% of farmers using pesticides based on information gained from watching television; 20% are guided by managers; and the remaining 40% from other sources of information such as word of mouth, advertising by agents or drug suppliers.

4.2.1.2. The ways of using pesticides in the region

One of the reasons leading to inefficient use of fertilizers, pesticides and pollution of the environment is the way of using herbicides and pesticides. If pesticides or herbicides are used beyond the required dosage, it will not only be economically expensive but also its residues would harm the environment, especially soil and water environment. In addition, in the process of using drugs, if not using protective devices or handling packages after being used improperly, it would affect health of not only the users but also the surrounding community.

The field investigation and interviewing objects who directly do agricultural practices in the land parcels showed that there is difference in way of using plant protection drugs and handling packages and bottles containing pesticides among groups of the objectives. The ways of using and handling pesticide and herbices of the people depended heavily on experience as well as understanding of people who have agricultural activities in general and pesticides in particular. The results of the study on the way of using pesticide as well as the pesticides' handling packing, containers and bottles after use in the research area are prented in the figure 4.3 and figure 4.4 below.

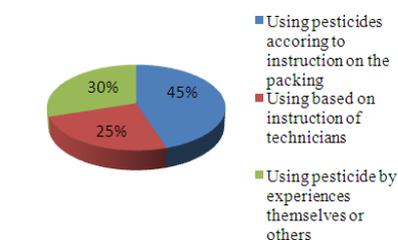


Figure 4.3: The proportion of people using pesticide dosage according to instruction from information sources

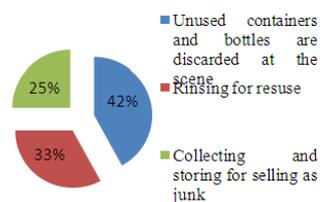


Figure 4.4: Forms of handling pesticide packaging and containers after use

From the data presented in the above figures, it can be seen that 45% of households use pesticides according to the instructions on the packaging; 25% of the urban agricultural practitioners follow the instructions of technicians; and about 30% of the people use the pesticides based on their experience or experience of others. Regarding the way of people handling the bottles, packing or containers of the pesticides after use in the studied area, it is shown that up to 42% of the pesticide packing and bottles discarded at the scene; about 25% of the waste were collected and stored for selling as junk; and only 33% had been rinsed for reuse.

4.2.2 Soil quality of the land parcels in Go Vap district.

In order to have a basis for assessing quality of the soil being used for planting vegetables and ornamental plants in the studied area, the project has conducted 02 field surveys combined with taking soil samples for analysis. There have been 05 soil samples which are representative of soil quality in the studied areas: being cultivated to grow vegetables of all kinds; soil is being used to plant and care for ornamental plants; and land is vacant on which plants, grass and vegetables are naturally grown - this soil sample served as a control sample. The soil samples have been taken April 2018 and November 2018. Detail of location of soil samples taken (it can be seen more at the figure 4.1) and analysed results of the soil samples are presented in table 4.5 and table 4.6 (a) & (b) below.

Table 4.5: Location of soil samples taken in the research implementation process

No.	Sample code	Coordinates of soil samples taken*	Address of sample location
01	Sample 1	X: 0597866; Y: 1200427	Pham Van Chieu Street (extends) Ward 14 - Go Vap District
02	Sample 2	X:0597245; Y: 1199819	106/2 Street 51 Ward 14 - Go Vap District
03	Sample 3	X: 0598288; Y: 1199390	No. 9 Street 3 Ward 14 - Go Vap District
04	Sample 4	X: 0599421; Y: 1199426	No. 193 Street 8 Ward 14 - Go Vap District
05	Sample 5	X: 0599398; Y: 1200538	160/8 Street 1 Ward 14 - Go Vap District

Notes : * - Coordinate system VN 2000

Table 4.6 (a) : Results of analysing soil samples taken on 10/4/2018

No.	Parameters/Unit	Results					Reg.03-MT 2015/Monre
		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	
01	pH _(KCL)	4,16	6,52	6,46	6,24	6,13	
02	Pb (mg/kg)	20,16	72,2	46,21	68,9	71,2	2
03	As (mg/kg)	14.75	4.41	9.02	4.58	5.02	15
04	T.OPs (mg/kg)	ND LOD = 3,3	-				
05	T.PDF (mg/kg)	ND LOD = 0,082	-				

Notes : T.OPs – Total of Organophosphate pesticide residue ; T.PDF – Total of Organochlorine pesticide residue
 ND – Not detected ; LOD – Limits of detection

Table 4.6 (a) : Results of analysing soil samples taken on 10/11/2018

No.	Parameters/Unit	Results					Reg.03-MT 2015/Monre
		Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	
01	pH _(KCL)	6,53	7,02	6,72	6,45	6,67	
02	Pb (mg/kg)	19.8	55.9	44.4	47.2	49,1	2
03	As (mg/kg)	0,75	1,10	0,75	0,80	0,77	15
04	T.OPs (mg/kg)	ND LOD = 1	-				
05	T.PDF (µg/kg)	ND LOD = 1	-				

Notes : T.OPs – Total of Organophosphate pesticide residue ; T.PDF – Total of Organochlorine pesticide residue ; ND – Not detected ; LOD – Limits of detection

It can be seen from the results presented in the tables 4.6(a) and 4.6(b) that:

- The pH_(KCL) index in the soil samples analysed has been different with the trend higher in November 2018, the fluctuation is about ± 69% (the highest pH_(KCL) index in the soil sample taken in November 2018 compared with the lowest pH_(KCL) index in the soil sample taken in April 2018); soil samples taken in November 2018 have a quite similarity of pH_(KCL) index with the fluctuation level is only about 8%, while the fluctuation of pH_(KCL) index in the soil samples taken in April 2018 is quite high: it is about ± 57% (pH_(KCL) index of sample 2 = 6.52/ pH_(KCL) index of sample1 = 4.16).
- The level of total of organophosphate pesticide residue (T.PDF) and total of organochlorine pesticide residue in the soil samples taken in both seasons : dry season - April 2018; rainy season - November 2018), is not detected.
- Regarding the concentration of As in the soil samples, the level of As is different in the analysis periods: the concentration of As in sample 2 taken in April 2018 is lowest with amount of 4.41 mg/kg; the concentration of As in sample 1 taken in November 2018 is highest with amount of 14.75mg/kg. The fluctuation of As level in the samples taken in different seasons is also not similar, it is higher in the dry season (about 3.34 times) compared with that in rainy season (about 1,47 times).
- The concentration of Pb in soil samples is quite high in both seasons and it is higher in the samples taken in April 2018 compared with the samples taken in November 2018, the fluctuation range of it is about 3.6 times (72.2mg/kg-sample2/19.8mg/kg-sample1).

4.4. Assessment of soil quality and causes of soil pollution in the studied area

The fact shows that cultivated land is a place where many pesticide residues are concentrated, pesticides enter soil due to such sources as: spraying to treat soil, pesticide falls into soil during its use (According to the results of many research projects, up to 50% of the pesticides falls into the ground in spraying); rain and flood; and body of creature which polluted by pesticides falls into soil. Despite the pesticides existed in soil are gradually resolved but the rate of the resolve depends on level as well as characteristics of the pesticides used.

Based on the data obtained from the soil quality analysis, it can be seen that acidity level of the soils has changed by location and season, but even the areas which have the highest acidity level still ensure cultivation for some crops. From the research information and data obtained during the study, it is also possible to determine the causes of soil acidity in the studied area due to: traffic factors; kind of farming activities of people; and amount of irrigation water used as well as the frequency of cultivation of vegetables and ornamental plants on the land parcels.

Although the organochlorine pesticide residues and organophosphate pesticide residues in all the soil samples analysed are at under-detectable levels but the concentration of Pb and As in all the soil samples is quite high. Especially, in some soil samples, concentration of Pb is higher than the permissible level for soil used for housing and residential facilities. The concentration of Pb and As in the soil samples analysed compared with the permissible level regulated by Viet nam government are presented in the figures 4.5 and 4.6 below. From the data shown in the table 4.5 and figures 4.5 and 4.6, it can be seen that the concentration of As in the soil samples is still within the allowable limits for residential land but also quite high, in some case it reached upper bound of Vietnam standard: (concentration of As in sample1 taken in April 2018 was 14.75mg/kg compared with the limit of 15mg/kg). The concentration of As in the soil samples taken in dry season (April 2018) is much higher than it in the rainy season (November 2018). In relation to the concentration of Pb in the soil, the analysed results have revealed that concentration of Pb in all soil samples taken in both seasons are much higher than the regulation No. 3-MT :2015/Monre of Viet nam and concentration of Pb in soil samples taken in rainy season is lower than it in the soil taken in dry season. From the data obtained during the study, the causes of high concentration of Pb and As in the soil can be: Lead generated from transportation and industrial production as well as service activities

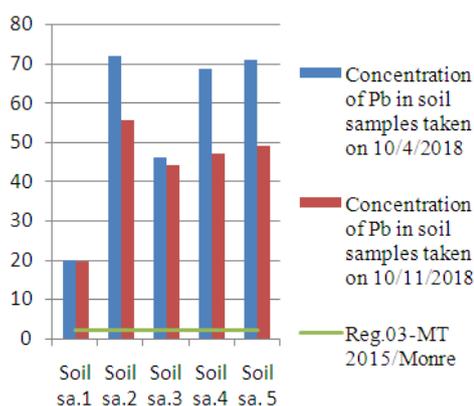


Figure 4.5: Concentration of Pb in soil samples compared with present regulation of Vietnam

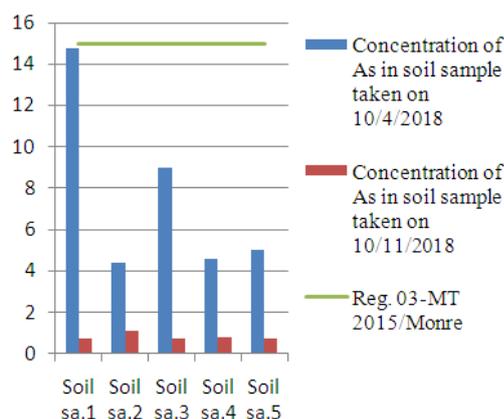


Figure 4.6: Concentration of As in soil samples compared with present regulation of Vietnam

and the lead can penetrate into the soil through air deposition and overflow rainwater; The Asenic in the soil is mainly from the use of pesticides, the level of As in soil samples taken in rainy season is lower than it in soil samples taken in dry season, it could be due to climate and water factors (rain increases capacity of dilution and spread of the pollutants as a results the concentration of contaminants is reduced.

4.4. Current situation of pesticide management system in the district

4.4.1. Organizational structure of the system

In order to efficiently managing environment, the management system of Go Vap District has gradually been formed and improved. Currently, the responsibility of state management of environment and natural resources in Go Vap district is mainly assigned to departments: Department of Natural Resources & Environment and Department of Economics, these departments have responsible for coordinating with other professional departments, organizations in the district and under the direct guidance of Go Vap District People's Committee to implement the state management of the environment in accordance with the exiet policy. The organizational structure of the management system in Go Vap district is shown in the following diagram 4.7.

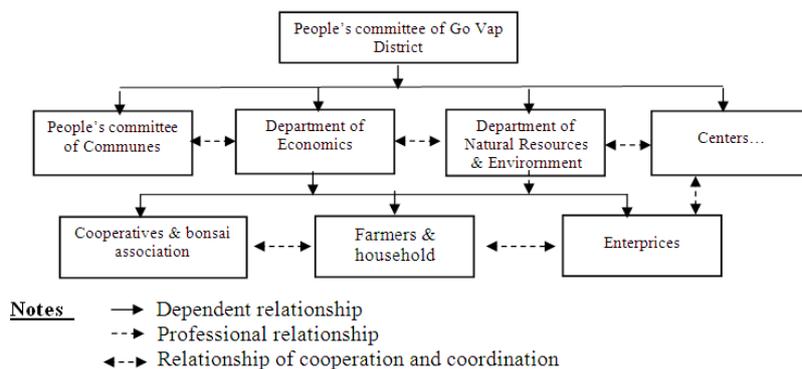


Figure 4.7: Organizational structure of state management system in Govap District

4.4.2. Management solutions are implemented in the research region

In order to raise awareness of land users on environmental protection in general and on pesticides use in part, every three months in one year, the Department of Natural Resources and Environment in conjunction with the Department of Economics and Bonsai Association of the district organse education and training courses. The contents of training programs include: guiding farmers about safety in pesticide use; disseminating “principle of 4 corrections” in the use of pesticides; how to correctly handle packaging and bottles of pesticides after use. The popular method of propaganda is to organize extension workshops, training programs such as: "1 does 5 reduce", "3 reduce 3 increase". In addition, a number of other forms of propaganda have been implemented such as using the commune's radio program, publicizing and rewarding typical cases in the use and management of pesticide topics and so on.

4.5. People’s awareness on using pesticides and environmental protection.

4.5.1. Results of surveys and surveys of people's awareness of using pesticides

In order to have basis and data for analysing and assessing the people’s comprehension and awareness on environmental protection in general and using the pesticides in particular, the research has implemented surveys by distributing questionnaires in combination with interviews in the field, the interviewees were representative of 03 groups of people: groups of people who are suppliers of pesticides; group of users of pesticides; and residential communities living around the land parcels. The collection of information from the groups is done through direct interviews or filling questionnaires. Details of the content and results of the survey are presented in the tables below.

Table 4.7: Ratio of informations related to using pesticides and environment from sources.

No	Group of people	Sources of information			Notes
		Mass media (newspapers, radio, television, posters, advertising)	Friends, experiences,..	Experts, managers and training classes	
01	People directly using pesticides	40%	50%	10%	
02	Pesticide suppliers/agents	70%	-	30%	
03	Residents around the land parcels	80%	5%	-	15% Not given

Table 4.8: People’s viewpoints of pesitcide use and enviropment

No.	Group of people	Using pesticides affect/not affect the environment		Notes
		Yes	No	
01	People directly using pesticides	70%	30%*	*If used correctly according to instruction
02	Pesticide suppliers/agents	80%	20%*	*if used correctly according to instruction
03	Residents around the land parcels	90%	10%**	** Not given

Table 4.9: People’s forms of handling packing and containers for pesticides after use

No.	Forms of handling	Ratio (%)*
01	Putting in a selected location and covering for post-treatment (burning or handing to the garbage collection unit)	20
02	Putting in any place in the land parcel and not covering for post-treatment (burning or handing to the garbage collection unit)	60
03	Disposing in any place and getting to self - decompose	20

Note: * The ratio to total of the interviewees

From the research results presented in the tables, it can be seen that: all interviewed groups having knowledge and information related to urban agricultural activities from mass media, with a relatively high rate of 40% (in the group of people who directly use pesticides) to 80% in the population group around the land parcels; the rate of viewpoint that the use of pesticides affects the environment is also very high in all target groups, especially up to 90% in the residents around the land parcels; and the viewpoint of using pesticides does not affect the environment if used in accordance with the instructions in 02 target groups directly related to pesticide chemicals is quite low, about 20% in the suppliers and 30% in the direct users

4.5.2. Analysing and assessing the people’s awareness on pesticide use and environmental protection

Based on the research results and the KAP model (Practice - Attitude - Practice) which is presented in the figure 4.8, the awareness of people regarding pesticide use and environmental protection in the studied area has been as follow:

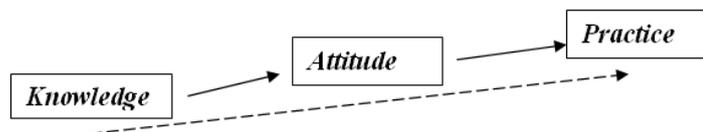


Figure 4.8: levels of the people’s awareness on pesticide use and environment

- Knowledge and understanding of the impact of using pesticides on the environment in all groups of interviewees is mainly obtained from mass media; the group of people directly using pesticide has the knowledge through experience as well as word of mouth of friends and colleagues; and the group of pesticide suppliers has gained knowledge through training courses or consultancy.
- In all the groups of interviewees, the proportion of people with negative attitudes towards using pesticides is quite high; there is also a significant proportion of positive attitudes about using pesticides if the use complies with regulations and technical guidelines.
- Information and data obtained during the study also showed that users' knowledge and attitudes about the use of pesticides and environmental protection decide to handle packaging and bottles after it’s use.

Although the research results showed that awareness and actions of the target groups related to pesticide use and environmental protection in the Go Vap District are quite high and quite similar in some issues, but there are still some differences in perceptions and actions among the groups. From the results obtained in the research process, it can confirm that the causes of awareness (knowledge, attitude and action) of the groups of people related to the use of plant protection chemicals on the land parcels include: accessibility and awareness of target groups on information; professional qualifications and characteristics; economic conditions as well as exposure to work; and the effectiveness of the environmental management system in the region.

4.6. Proposed solutions for improving management of the environment and pesticide use

From the results obtained in the research process, in order to effectively use the land parcels, it is necessary to apply solutions in combination with legal, administrative and educational policies regarding to raising people's awareness on environmental management and use of plant protection drugs in Go Vap District, Ho Chi Minh City.

The proposed solutions could be implemented, as follows:

- Developing a strategy to use plant protection drugs/chemicals in accordance with the current status of urban agricultural activities in the district with such orientations as: reducing risks in using pesticides; improving the effectiveness of pesticide use in terms of techniques, economic production and environmental protection; ensuring safety in pesticide use; and raising awareness, understanding and social responsibility among the pesticide users
- On basis of the Law on Plant Protection it has been issued and developed a list regulating the use of plant protection drugs for the studied area

- Develop a route of reducing pesticide use from now until 2030 and encouraging people in using biological drugs or chemicals of low toxicity.
- Strengthening inspection of pesticide use and application of new technical advances; Reinforcing and enhancing power of the specialized inspection system for plant and environmental protection. Clearly define authority and responsibilities of the governments of the commune and ward level in managing, supervising and inspecting the use of pesticides.
- Developing and reinforcing the organization and policies of the network of plant protection services in the region.
- Promulgating a suitable set of training materials on management, production, business and use of plant protection drugs, training programs for new technical processes and technical advances.
- More considering the content, the program of training agricultural extension workers, farmers and agents selling pesticides in accordance with urban agricultural conditions in Go Vap District.
- Organizing propaganda and advocacy for environmental protection: Promoting communication to raise the sense of responsibility of suppliers of pesticides and farmers directly using land; Providing training courses to improve knowledge of people directly using land for cultivation of crops and ornamental plants; Adding loudspeakers and increasing radio frequency of propaganda programs to implement environmental protection works in general and using pesticides in particular
- Publicizing products and owners supplying pesticides which are not in accordance with regulations as well as the granted business license.
- Increasing fines for violations and for cases of repeated violations.

V. Conclusion

Based on the results obtained in the research process, it could be concluded that:

- (1) In Go Vap District, there are still 11 of 16 wards having urban agriculture but with small cultivated areas and intermingled in residential areas; the plants cultivated in the area are mainly vegetables, ornamental plants and the agricultural practice is mainly by traditional methods, therefore, some environmental problems such as odorous dispersal, pollution of soil and water as well as landscape have been emerged.
- (2) Currently, in the research region, there are more than 20 land parcels having area of more than 200m² which have been planed for housing construction and public service works, being used to cultivate vegetables and ornamental plants.
- (3) The soil quality in the areas with urban agricultural activities has no signs of pollution by organochlorine and organophosphate pesticide residues but in some areas, there is acidic soil in the dry season; Lead in soil of some areas is higher than the prescribed level for residential land according to the existing regulation of Vietnam. Asebic content in soil of the region does not exceed Vietnam standards for residential land, but in some areas it has approached the maximum allowed level for residential land
- (4) People's awareness on environmental protection and pesticide use in the studied region is quite high and quite similar in some issues, although there are still some differences in awareness and action among the groups of people. The reasons related to high or low awareness (knowledge, attitude and action) of people include: accessibility to and awareness on the informations; professional qualifications and career characteristics; economic conditions as well as the level of exposure to work.
- (5) The effectiveness of environmental management in general and management of using pesticides in the studied area in particular is not high due to a number of reasons such as monitoring and supervision, educational activities and propaganda of responsible agencies.

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