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ATTITUDE AND BEHAVIOURS OF PESTICIDE DEALERS ON PEST MANAGEMENT IN TURKEY: A STUDY OF NEVSEHIR PROVINCE

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ABSTRACT

The aim of the study was to determine the structure, knowledge level, functions in pest management and opinions of pesticide dealers in Nevsehir province. Complete counting method has been employed in 2018 to acquire survey data from 50 pesticide dealers located in the Central, Derinkuyu, Gülsehir, Ürgüp, Kozaklı, Avanos, Acıgöl and Hacıbektas districts of Nevsehir and the results have been assessed on a percentage ratio. It has been observed that majority of the pesticide dealers are male (84%), university graduate (78%), and mostly experienced and a graduate of agricultural faculty (76%). Pesticide dealers have indicated that among pesticide groups, it is insecticides that are selling most (66%), they are getting pesticides from wholesalers (62%), paying in cash (66%), they are in constant contact with agricultural organizations (66%) and they are having problems with regards to the diagnosis of physiological and pathologic diseases (58%). Farmers have stated that they are consulting the pesticide dealers on how, when and how much pesticide to use (86%), getting recommendations on pesticide selection (64%), that price is a major factor in buying pesticide (48%), they are applying the suggested pesticide dosage in a medium level (58%) and that pesticides are partially effective (50%). Pesticide dealers have stated that look for licenced (44%) and economical pesticides (36%), that they are not in favour of pesticides being sold with prescription (46%), that integrated pest management and early warning system is implemented in low levels only (34%), that they are introducing the products to farmers (44%), that pesticide companies are introducing new products (68%) and that majority of the farmers are not using bio-pesticides.

KEYWORDS:

Pesticide dealer, pest management, pesticide, Turkey

INTRODUCTION

Almost all of the crops that are grown and are making up the main food source of the world are under the threat of disease, insects and weeds. Today, one of the methods of control in agriculture is pesticides, used for protecting crops from insects, disease and weeds and for yielding high quality crops [1]. It is known that in cases where pesticides are not used, there is up to 60% loss in quality and yield of the crops. Therefore, just like in the rest of the world, it is inevitable for Turkey to use plant protection products to control pests that lead to loss of crops [2]. The global pesticide market was worth 58.5 billion USD in 2015, increasing to 60.2 billion USD in 2016 and by 2021 it is expected to rise by 5.5%, reaching 78.7 billion USD [3]. 80% of the world pesticide market is held by the developed countries and Turkey's share in the market is 0.06% [4]. Among the pesticides in the world, herbicides are ranked first by a share of 47%, followed by insecticides by 29% and fungicides by 19%. In terms of pesticide consumption amounts, Latin American countries are leading the list while Japan, China, Malesia and New Zealand are the other countries with higher pesticide consumption rates [5]. In Europe, Netherlands and Italy are the countries with high pesticide usage ratios. The amount of pesticide consumption is thought to be 1.3 kg ha⁻¹ in Turkey [6]. As of 2016, the amount of pesticide consumption is 50054 tons in Turkey and of the total pesticide consumption amount, 41% is fungicides, 21% insecticides, 20% is herbicides, 14% is other groups while 4% is acaricides. In terms of pesticide consumption per region, 30% of total consumption took place in Mediterranean, 19% in Marmara, 18% in Aegean, 17% in Central Anatolia, 12% in Southeastern Anatolia, 3% in Black Sea and 1% Eastern Anatolian Region. As of 2016, there are 5355 licensed plant protection products, 361 licensed active substance and 6786 pesticide dealers selling these products in Turkey [7]. Even though not included in the top ten countries in terms of market size, Turkey came to the forefront as the country with the greatest positive growth among the markets with greater volumes.

Nevşehir province is located in Central Anatolian Region between 38° 12' and 39° 20' northern latitudes and 34° 11' and 35° 06' eastern longitudes, within the Central Kızılırmak Basin, just outside the Derinkuyu district located within the Konya basin. The total agricultural area of Nevşehir is 340863 ha and 67% of this area is used for growing field crops, 22% for fruits-grapes and 18% for vegetables and ornamental plants. In addition to the Central district, there are another 7 districts in Nevşehir and the most commonly grown field crops are cereals, potato, dry beans, grapes, walnut, apple; as vegetables pumpkin seed and tomato [8]. Furthermore, 2017 data indicate that in Turkey, 30.6% of pumpkin seed production, 12.5% of wine grape production, 9.1% of dry beans production and 6.3% of potato production takes place in Nevşehir [9]. The acquired data indicate that the location of the study, Nevşehir and its districts have an important place in Turkey with regards to pumpkin seed, wine grape, dry bean and potato cultivation. As of 2016 a total of 362401 L (137639 L herbicide, 33535 L insecticide, 3575 L winter and summer oil, 1582 L fungicide) pesticide is being used in Nevşehir. 3.8% of all the pesticide used in Central Anatolian Region is being consumed in Nevşehir [10].

Today, it has become a necessity to use pesticides in pest management in order to protect the crops and to prevent the threat of hunger and hence the use of pesticides has increased greatly in the whole [11]. Previously conducted studies indicate that in terms of knowledge source in pesticide use, farmers are availing of pesticide dealers that provide input to agriculture [12]. It has been reported that in the past decade in USA the importance of pesticide and seed dealers and agricultural cooperatives providing agricultural input has increased in terms of training and knowledge transfer [13]. Similarly, in a study conducted in Turkey it has been reported 58.5% of the producers in Konya are in contact with pesticide dealers in terms of pest management [14]. In Antalya, around 40% of the tomato farmers are reported to make use of pesticide dealers as a source of information [15]. In Isparta province, 25.69% of apple farmers have been reported to rely on the recommendations of pesticide dealers to make their pesticide selection [16]. 54% of the apple farmers in Korkuteli-Antalya stated that they consult pesticide dealers when deciding which pesticide to choose [17]. Kalıpcı et al. [18] reported that 35.8% of the cereals farmers in Konya are consulting pesticide dealers on which pesticides to use. 68% of the vineyard farmers in Manisa are reported to consult pesticide dealers for pesticide selection [19]. 48.8% of the farmers in Samsun are reported to base their pesticide selection on pesticide dealers recommendations [20]. 88.9% of potato farmers in Nevşehir have stated that they seek recommendations from pesticide dealers [21]. A great majority of almond farmers in

Adıyaman stated that they receive recommendations from pesticide dealers for pesticide selection and for determining the dose of pesticides [22]. Gözener et al. [23] reported that majority of the tomato farmers (90.28%) in Tokat-Kazova define their pesticide dosage on the basis of recommendations provided by pesticide-fertilizer dealers.

It has become clear that a great majority of the farmers in Nevşehir province are relying on pesticide dealers with regards to receiving information pest management, pesticide selection and dose adjustment. However, it should not be forgotten that use of pesticide in pest management brings along many problems, such as the negative effects on humans and environment. The aim of the study was to determine the structure, knowledge level, functions in pest management and opinions / observations of pesticide dealers in Nevşehir province.

MATERIALS AND METHODS

Materials. As there were no previous studies conducted on the attitudes and behaviours of pesticide dealers with regards pest management in Nevşehir province, this current study has been based on the Provincial Directorate of Agriculture and Forestry's data in 2018 [9]. The main material of the study consisted of original data acquired through questionnaires from 50 pesticide dealers, 18 in Central, 9 in Derinkuyu, 6 in Gülşehir, 5 each in Ürgüp and Kozaklı, 4 in Avanos, 2 in Acıgöl and 1 in Hacıbektas.

Methods. There are 50 pesticide dealers in Nevşehir, Central, Derinkuyu, Gülşehir, Ürgüp, Kozaklı, Avanos, Acıgöl and Hacıbektas districts, who have been presented with survey forms during face to face interviews and the answers given to each question have been presented in quantity and ratio. The number of surveys in the study has been determined by using "Complete Counting Method" and survey has been done with all of the main mass [24]. Data acquired from the surveys have been transferred into Microsoft Excel package program.

RESULTS AND DISCUSSION

It has been determined that of all the pesticide dealers, 84% is male, 16% is female, 78% is university graduate, 10% is college graduate, 8% is higher school graduate and 4% is primary school graduate. University graduates have graduated from agriculture faculty, 3.3% from departments of field crops, 25.60% from plant protection, 17.9% from soil science and plant nutrition, 15.4% from horticulture science while 7.8% graduated from of animal science; 48% of the pesticide dealers have been granted their licence during the past 8 years, 24% received it

18 years ago, 18% did so 28 years ago while 6% received it 38 years ago (Table 1). In parallel to our findings, it has been reported that a majority of the pesticide dealers in Isparta province are male and about half of them have been established during the 2000's, and 87.5% of the pesticide dealers in Şanlıurfa have a work experience spanning over a decade [25, 11]. Similar to our findings, studies on the subject have reported the ratio of university graduate pesticide dealers as 60% in Şanlıurfa, 61.5% in Adana, 67%, in Antalya, 79% in Konya, 69% in Isparta, and 64% in another study in Konya [26, 27, 11, 28, 25, 29]. Same authors have reported that almost all university graduate pesticide dealers are graduated from agriculture faculty and the agricultural engineering pesticide dealers are mostly graduates of field crops and soil department. In contrary to our findings, only 17.46% of the pesticide dealers in Eastern Anatolian Region are reported to be agricultural engineering [30].

Of the pesticides sold in pesticide dealers, 66% are insecticides, 24% are fungicides and 10% are herbicides (Table 2). It has been reported that of all the pesticides marketed by pesticide dealers in Şanlıurfa, 42.2% are herbicides, 41.3% are insecti-

cides and 16.6% are fungicides, and another study conducted again in Şanlıurfa has reported that of all the pesticides sold, 36% are herbicides, 34% are insecticides, 16% are plant growth regulator while 14% are fungicides [11, 31].

62% of the pesticide dealers that they buy pesticides from wholesaler dealer, 22% directly from the manufacturing company while 16% purchase it from regional offices, 66% of pesticide purchase is made against future payment while the remaining 34% is paid for in cash (Table 3). Similar to our findings, 45.5% of the pesticide dealers in Konya province stated they are acquiring pesticide from wholesaler dealer while 27.3% are getting it from regional offices [29]. In contrary to our findings, 50% of the pesticide dealers in Şanlıurfa stated that they purchase pesticides from regional offices, 30% directly from manufacturing company and 20% from wholesaler dealer [31]. Similar to our findings, pesticide dealers in Konya stated that they buy pesticide with further payment in 55% and in cash payment in 45%; while those in Şanlıurfa buy pesticide with further payment 83.3% of the time and against cash payment 16.7% of the time [29, 31].

TABLE 1
Demographic information of pesticide dealers

Gender	Number	Percentage (%)
Man	42	84.00
Woman	8	16.00
Total	50	100.00
Education status	Number	Percentage (%)
Primary school	2	4.00
Higher school	4	8.00
College	5	10.00
University	39	78.00
Total	50	100.00
Department	Number	Percentage (%)
Plant protection	10	25.60
Field crops	13	33.30
Horticultural sciences	6	15.40
Soil science and plant nutrition	7	17.90
Animal science	3	7.80
Total	39	100.00
Licence year	Number	Percentage (%)
1980-1990	3	6.00
1991-2000	9	18.00
2001-2010	14	28.00
2011-2018	24	48.00
Total	50	100.00

TABLE 2
Distribution of pesticides marketed in pesticide dealers

Pesticide groups	Number	Percentage (%)
Insecticide	33	66.00
Fungicide	12	24.00
Herbicide	5	10.00
Acaricide	-	-
Other	-	-
Total	50	100.00

TABLE 3
Pesticide supply and pesticide intake method of pesticide dealers

Pesticide supply	Number	Percentage (%)
Wholesaler dealer	31	62.00
Regional offices	8	16.00
Direct manufacturing company	11	22.00
Total	50	100.00
Pesticide intake method	Number	Percentage (%)
Cash payment	17	34.00
Future payment	33	66.00
Total	50	100.00

TABLE 4
Pesticide dealers contact status with agricultural organizations

Contact status	Number	Percentage (%)
Constant contact	32	64.00
Sometimes contact	16	32.00
No contact	2	4.00
Total	50	100.00

TABLE 5
Problems encountered by pesticide dealers in solving plant protection problems of farmers

Problems	Number	Percentage (%)
Disease diagnosis	15	30.00
Insect diagnosis	4	8.00
Weed diagnosis	2	4.00
Physiological and pathological diseases diagnosis	29	58.00
Total	50	100.00

TABLE 6
Observations of pesticide dealers on farmers buying pesticide

Observations	Number	Percentage (%)
What for the pesticide?	7	14.00
How much of pesticide use??	23	46.00
When and how much of the pesticide?	20	40.00
Total	50	100.00

In terms of being in contact with agricultural organizations, 64% of the pesticide dealers stated that they are in a constant contact, 32% are sometimes contact while 4% are not in any contact at (Table 4). Similar to our findings, 47.77% of the pesticide dealers in İçel province are in constant contact with agricultural organizations, 41.11% are sometimes contact, while 11.11% do not have any association with the agricultural organization [32]. 46.9% of the pesticide dealers in Konya are in constant contact with agricultural organizations, 40.8% are sometimes contact while 12.3% do not have any contact at all [14]. It has been reported that the pesticide dealers in Antalya province have a moderate level of contact with agricultural organizations [12]. Contrary to our findings, it has been reported that in Isparta province the cooperation between pesticide dealers and agricultural organizations is weak [25].

58% of the pesticide dealers stated that they are having a lack of knowledge in terms of distinguishing between the symptoms of physiological

and pathological diseases, 30% in disease diagnosis, 8% in insect diagnosis and 4% in weeds diagnosis (Table 5). Similar to our findings, 55% of the pesticide dealers in Konya stated that they are having difficulties in disease diagnosis, 24.5% in distinguishing between the symptoms of physiological and pathological diseases and 12.2% in insect diagnosis [14].

When purchasing pesticides from pesticide dealers, 46% of the farmers are asking how to apply the pesticide, 40% ask when and how much of the pesticide to use and 14% ask what for the pesticide is used (Table 6). Similar to our findings, 80.0% of the pesticide dealers in Şanlıurfa stated that the farmers are asking questions about the quantity and timing of the pesticides they are buying [26]. 30.6% of the pesticide dealers in Konya stated that the farmers are asking questions about how to apply the pesticides they buying, 32.7% ask about the timing and dosage of the pesticide, 34.7% ask about the purpose of pesticide [14]. Pesticide dealers in Şanlıurfa reported that 60% of the farmers ask the purpose of use of the

pesticide they buying while 40% ask about how to apply the pesticide [31].

Pesticide dealers have reported that in terms of pesticide selection, 64% of the farmers rely on pesticide dealers, 20% rely on the agricultural organization, 8% rely on the neighbouring farmer while 8% rely on their own experience (Table 7). Similar to our findings, 62.2% of the farmers in Adana and 66.7% of the farmers in Antalya (Elmalı and Korkuteli) province are reported to base their pesticide selection on the recommendation of pesticide dealers [27, 12]. In contrary to our findings, 46.9% of the farmers in Konya base their pesticide selection on the recommendations provided by their neighbouring farmers, 30.6% on pesticide dealers recommendations, 22.5% on their own experiences; 29% of the farmers in Şanlıurfa base their pesticide selection on their own experience, 23% on neighbouring farmers, 19% on pesticide dealers and 10% rely on the agricultural organization [14, 31]. Pesticide dealers reported that 48% of the farmers base their pesticide buying on price, 30% on brand, 12% on company name and 10% on active substance (Table 7). Similar to our findings, pesticide dealers in Konya reported that 44.9% of the farmers base their pesticide buying on price, 30.6% on brand, 14.3% on company name and 10.2% on active substance [14]. 79% of the pesticide dealers in Şanlıurfa and 45% of the pesticide dealers in Isparta stated that producers base their pesticide selection on price [11, 25]. The surveyed pesticide dealers stated that 50% of the farmers partially follow the recommended pesticide dosage, 36% do not follow

at all, 12% follow at a medium level while 2% of them follow the recommendations all the time (Table 7). Similar to our findings, pesticide dealers in Antalya, Denizli, Isparta, Konya, Niğde and Karaman provinces stated that more than half of the producers (54.5%) follow the recommended pesticide dosage [33]. According to the pesticide dealers, 44% of the farmers believe that the pesticides are fully effective, 36% believe they are partially effective, 12% believe they are not effective at all while 8% believe they are partially destroyed. Similar to our findings, pesticide dealers in Konya stated that 53.1% of the farmers believe pesticides are partially destroyed [14].

58% of the pesticide dealers stated that they recommend pesticides on less effective for beneficial organisms, 24% on being economic, 12% on being specific, 6% on licensed pesticides in use (Table 8). In contrary to our findings, 22% of the pesticide dealers in Şanlıurfa are reported to be choosing non-licensed and cheap pesticides [11]. Even though the pesticide dealers in Antalya, Denizli, Isparta, Konya, Niğde and Karaman provinces have different criteria when it comes to recommending pesticides, it has been reported that the foremost criteria in all provinces is having a licence [33]. Similar to our findings, pesticide dealers in Isparta province stated that their first priority when recommending a pesticide is license, followed by being less effective for beneficial organisms and thirdly having less harm on human and environmental health [25].

TABLE 7
Observations of pesticide dealers on farmers pesticide selection, pesticide buying, dosage recommendation and effectiveness of pesticides

Pesticide selection	Number	Percentage (%)
Own experience	4	8.00
Neighboring farmer	4	8.00
Pesticide dealer	32	64.00
Agricultural organization	10	20.00
Total	50	100.00
Pesticide buying	Number	Percentage (%)
Price	24	48.00
Active substance	5	10.00
Company name	6	12.00
Brand	15	30.00
Total	50	100.00
Dosage recommendation	Number	Percentage (%)
Never	18	36.00
Partially	25	50.00
Medium level	6	12.00
All the time	1	2.00
Total	50	100.00
Effectiveness of pesticide	Number	Percentage (%)
Fully effective	22	44.00
Partially effective	18	36.00
Not effective	6	12.00
Partially destroyed	4	8.00
Total	50	100.00

TABLE 8
Pesticide dealers criteria which are taken into account

Criteria	Number	Percentage (%)
Licensed pesticides in use	3	6.00
Being economic	12	24.00
Less effective for beneficial organisms	29	58.00
Being specific	6	12.00
Less damaging to the environment and human health	-	-
Total	50	100.00

TABLE 9
Pesticide dealers approach to pesticide sales with prescription

Approach	Number	Percentage (%)
Participate	19	38.00
Not participate	23	46.00
Hesitant	8	16.00
Total	50	100.00

TABLE 10
Observations of pesticide dealers about integrated management and early warning practices

Observations	Number	Percentage (%)
Never	8	16.00
Lower level	9	18.00
Sometimes	16	32.00
All the time	17	34.00
Total	50	100.00

46% of the pesticide dealers stated that they do not participate pesticides being sold with prescription, 38% said they participate prescription while 16% are hesitant (Table 9). Similar to our results, 42.5% of the pesticide dealers in Antalya, Denizli, Isparta, Konya, Niğde and Karaman provinces stated that they do not participate pesticides to be sold with prescription, while 46.2% of them participate it [33]. In contrast to our findings, Tezcan [30] reported that unlike Adana province, most of the vendors in Mersin, Antalya and Bursa provinces participate pesticides being sold with prescription, while in Adana province only 15% of the pesticide dealers want pesticides to be sold with prescription. 67.3% of the pesticide dealers in Konya participate pesticides being sold with prescription while 32.7% are not participate it [14]. With regards to the prescription system, 29% of the pesticide dealers in Şanlıurfa stated that producers are not aware of this system, 28% do not wish to lose time by getting a prescription issued, 23% said there is a lack of technical personnel while 15% stated that non-prescribed pesticides are being sold [31].

Pesticide dealers stated that integrated pest management and early warning system is applied all the time with a ratio of 34%, sometimes by 32%, at a lower level by 18%, and never by 16%. In the study, it is seen that the farmers do not have sufficient knowledge about integrated pest management and early warning system according to the opinions of the pesticide dealers (Table 10). Similar to our findings, 49.7% of the pesticide dealers in Antalya, Denizli, Isparta, Konya, Niğde and Karaman provinces

reported insufficient level of knowledge in terms of integrated pest management while 35.2% follow the early warning system [33].

When the product introduction of pesticide dealers to farmers is evaluated; 64% of the pesticide dealers state that they are doing a product introduction, 20% stated they sometimes make an introduction while 16% said they never do any introduction. Parallel to our findings, Gül et al. [33] reported that 74.5% of the pesticide dealers in the surveyed provinces are doing product introduction works and the producer oriented informing works are mostly performed in Niğde, Karaman, Konya and Isparta provinces.

Making an assessment of the pesticide companies' habits on making introductions for new products; 68% of the pesticide dealers stated that introduction is made for new products, 24% stated it is done sometimes while 8% stated no introduction is made for new products. In contrast to our findings, 69.4% of the pesticide dealers in Konya stated that pesticide companies are not sufficiently introducing new products to them while the remaining 30.6% stated sufficient introduction is being done [14].

According to pesticide dealers, 74% of the farmers are not using bio-pesticide for disease and insects control, 20% is sometimes using bio-pesticide while 6% is using bio-pesticide. Same to our findings Gül et al. [33] the pesticide dealers in the surveyed provinces stated that producers are mostly employing chemical control methods when trying to overcome diseases and insects and that level of biopesticide use is really low. By the way

that the potato farmers in Nevsehir and almond farmers in Adiyaman province are not aware of bio-pesticide, this data overlaps with our findings [21, 22]. It has been reported that farmers prefer chemical control and herbicide and acaricide consumption is higher than other pesticide groups in Aydın [34]. Doğan and Günden [35] reported that the improvements in pesticide dealers, their contribution to residue management and their reflections on farmers will be reflected.

CONCLUSION

The pesticide dealers in the study are male and university graduates, university graduates are graduates of agricultural faculties, 1/3 of them are graduates of field crops, young and individual businesses. As more than half of the pesticide dealers consist of agricultural engineering other than plant protection department, many non reversible negative developments may occur in pest management practises. Considering that the pesticide dealers work as a kind of pest management consultant unit under the Turkey conditions, we believe that the conditions for becoming a pesticide dealer needs to be reviewed.

In connection to the crops in Nevsehir, farmers have stated that they are mostly buying insecticides from pesticide dealers for controlling diseases and insects particularly for cereals, potato, vineyard and fruit growing. At this point, it is highly important that the pesticide dealers are recommending pest specific insecticides that do not harm useful beneficial organisms. Pesticide dealers are procuring pesticides mostly from wholesale offices and they pay in instalments. Pesticide dealers in a better financial position are able to provide pesticides in a more affordable price and better payment terms and therefore they are in a more advantageous position than the other pesticide dealers. More than half of the pesticide dealers are cooperating with the agriculture organizations. In connection to this, pesticide dealers must be in cooperation with agricultural organizations as more than half of the pesticide dealers in Nevsehir are not graduates of plant protection departments, and in order to raise the level of communication training programs, seminars and panels need to be organized for pesticide dealers with other institutions and organizations. It has become clear that around half of the pesticide dealers are not sufficiently equipped for the disease diagnosis. Indeed, this is something that could be expected. Because diseases diagnosis in plants is something that requires expertise and more than half of the pesticide dealers are having difficulties in disease diagnosis. As a result of this, wrong diagnosis leads to wrong treatment, and wrong treatment leads to unsuccessful pest management, reducing the level of confidence of the farmers

towards pest management and pesticide dealers. It has become clear that farmers would like to receive information on how and when to use the pesticides they are buying. However, considering that the farmers want the pesticides they are using to completely terminate the diseases, insects and weeds it must not be forgotten that they may ignore the side effects of pesticides on humans and environment.

According to the pesticide dealers, more than half of the farmers consult the views of pesticide dealers when selecting pesticides, while a quarter of them consult the views of the agricultural organization. This is an indication that farmers are not sufficiently consulting agricultural organizations on the issue of pesticide selection, which is indeed something to be worried about. Price seems to be the first criteria in pesticide selection. As the pesticide industry is foreign dependent in Turkey, pesticide prices are increasing over the input costs by each year. When this is the case, farmers are unable to buying most suitable pesticide because of the technical and financial conditions and they base their selection on price. Half of the farmers have stated that they partially follow the recommended pesticide dosage while the other half do not follow the recommended pesticide dosage. Pesticide over-dosage has negative impacts on human and environmental health and leave residues on the crops. Furthermore, unnecessarily applied pesticides are also increasing the input costs. In connection with the pesticide dosage, about half of the farmers believe that pesticides are only partially effective. In this case, farmers are over applying pesticides, threatening human and environmental health and cause pesticide residues on crops.

When pesticide dealers need to recommend a pesticide, the main factor they consider is the effect of the pesticide on beneficial organisms, followed by economical and then being specific. It is thought provoking to know that pesticide recommendations do not include pesticides that are less harmful to humans and environment. In the meantime, farmers prefer the price of pesticides, regardless of whether they are licensed or not. The surveyed pesticide dealers mostly believe that the prescription system is not preventing the farmers to use their desired pesticide in a dosage they wish. By the way, one fifth of the pesticide dealers did not provide any opinions on this issue. It has become clear that the level of awareness of pesticide dealers and farmers in terms of integrated pest management and early warning system is not sufficient. Considering the new developments that take place in the world and in the European Union, training programs are clearly required to raise awareness.

Even though pesticide dealers are organizing introductory meetings to farmers with regards to new products and pesticide manufacturing companies are doing the same to pesticide dealers, constant introduction about the formulation, area of

effect, type of effect and other properties of new pesticides is highly important for ensuring that pesticides are used in an effective and correct manner. According to the pesticide dealers, a great majority of the farmers is preferring chemical control methods (pesticide use) when dealing with disease and insects and their level of knowledge about the eco friendly biological control methods is low. In this context, farmers oriented informing meetings need to be organized and at the same time, pesticide dealers should be informed about innovations in biological control.

In conclusion, pesticide dealers need to be informed about the developments related to advancing technology and furthermore, they need to be provided with informative training courses in collaboration with agricultural organizations and related companies. It should not be forgotten that any improvements for the pesticide dealers will have positive reflections on the farmers too.

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