The Roles of Field Assistant of Pesticide Company in Indonesia: A Qualitative Study

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Abstract. The pesticide market in Indonesia is highly competitive which leads the companies to constantly develop marketing strategies. Pesticide companies assign Field Assistants (FAs) to execute the promotional efforts and knowledge delivery to farmers to increase the sale. This study aimed to investigate FA roles as a promotional agent in technology dissemination to support their tasks in demand creation and technology adoption, respectively. The study was conducted from October to December 2020 in North Sumatra Province. Data was collected by interviewing individual FA representing five pesticide companies, both multinational and local companies. The descriptive qualitative method was used by employing an inductive theoretical model, then analyzed with coding techniques using NVivo. The result revealed that among 10 emerging roles from coding, the most dominant role was stakeholders’ engagement; whilst the least one was understanding farmers’ problems. The role also addressed an environmental issue through a stewardship program funded by the company. There were variations in the implementation of those roles among companies due to their limiting factors. Thus, FA roles are mainly working on promotional efforts embedded with extension activities in terms of knowledge transfer to farmers, technical advisory, on-farm demonstration plot, and expose or farmer field day.
1. Introduction

The vast growth of pesticide industries in Indonesia is caused by increasing market demand through the years. This circumstance leads companies to compete, to do research and development of new products, to produce, and to distribute pesticides in the market. With this intense competition, companies attempt to develop marketing strategies at their best. Therefore, pesticides demand creation as part of marketing strategy becomes critical to compete successfully in the market. Pesticide companies assign Field Assistants (FAs) as representatives in the field to bridge the company interests with farmers as their main consumers and market as well. In the marketing mix concept concerning pesticide companies, FAs are often considered as actors who execute the promotional strategies. FAs become the most important marketing tool for promoting pesticides to farmers [7]. Pesticide companies that do not assign FAs in the field meet challenges to market their products [13].

Some advantages are identified from having FAs or agricultural extension workers of private companies, including (1) acquiring updated knowledge and strong information support because they are directly connected to companies; (2) being supported by improved technology material because the company usually has an advanced technology development division; (3) providing knowledge as well as business solutions for farmers because they are active actors in the market; and (4) having high mobility and discipline under modern corporate culture [25]. An experience showed by Agricultural extension workers of private companies in Lembang, West Bandung who have implemented persuasive-participatory and educational-participatory methods by involving stakeholders, educating them on good agricultural practice, and solving problems with products from the companies. They provided information, consultation, guidance, and assistance according to farmers' needs [24]. In addition, a study by [4] on the role of private extension in Southwest Nigeria showed that farmers’ participation in private organizations programs was high due to the quality of the extension delivery services. [10] mentioned that private extension of a sugarcane company in Pakistan delivered better services to the farmers such as improved seed provision, timely information, latest research information, solution, motivation to adopt improved technology, skill improvement, and training/workshop.

Previous studies have shown that private extension system has played an important role in agricultural technology dissemination. Nevertheless, other studies also found that many farmers were not fully satisfied with the role of agricultural extension workers of private companies due to various reasons [2,8]. For example, private extension workers from pesticide companies only focused in Pakistan on weeds, pests, and diseases identification and control as well as the use of their products, while farmers expected them to provide information on comprehensive technology packages, from soil analysis to post-harvest and marketing. Thus, such a selective approach does not provide optimal benefits for farmers [2].

Study on analyzing FAs as marketing development officers and extension workers based on farmers’ perspective has attracted the attention of many researchers in recent decades [2,5,11,18,23,24,27,28]. However, there is no comprehensive study to describe and analyze the roles of FAs from pesticide companies in Indonesia based on FAs' perspective. This study aims to investigate the FAs' roles as promotional agents in technology dissemination to support their tasks in demand creation and technology adoption.

2. Method

The study was conducted from October to December 2020. The interview of key informants as the main step of data collection was held in the Serdang Bedagai Regency of North Sumatera Province. In this area, rice is the main crop and the second-largest contributor to food crop production and harvested area in North Sumatera. Key informants of this study were Field Assistants (FAs) from 5 pesticide companies, consisting of 3 multinational and 2 national pesticide companies. The multinational companies are represented by alphabetic codes A, B, and E, whilst the national companies are symbolized by C and D.

This study applied a qualitative research approach. Qualitative research can be defined as “an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human
problem” [8]. The research was conducted by individual interview using a set of semi-structured questionnaires to each informant. According to [20], an individual interview is one of the classical methods of data collection. The key informants were recruited by call and message invitations based on information from the rice farmers on the research site. Therefore, it can be implied that the key informants were active and recognized by the farmers in particular notably by the farmer group leader. There were 30 open-ended questions to be posed in the interview. To explore more findings, a focus group discussion (FGD) was also employed in this study. The data analysis aimed to process from specific to general themes (inductive method). The inductive method is an approach to generalize a model or a theory [22]. The inductive process in this research is followed by comparing the result with personal experiences or with existing literature on the topic according to [8].

To analyze the data, the interview data in the form of audio were converted into transcripts (in Bahasa). These transcripts were coded and analyzed using NVivo. As for the FGD, the research team arranged a meeting that was held in Bogor-West Java by inviting representatives of the pesticide companies. The validation of the findings both from the interview and the FGD was also done. Data source' triangulation was set up to complement the findings from the farmer's perspective. These data were collected by interviewing 36 rice farmers at the research site. Triangulation defines “the use of more than one method or source of data in the study of a social phenomenon so that findings may be cross-checked [6]. To increase the quality of the research, a discussion among researchers was undertaken to enrich the findings following the observations from each researcher in the team.

3. Results and Discussion

3.1. An Overview of the Promotion Activities by Pesticide Companies

Pesticide companies are assisted by employees worked in the field in order to support the companies in achieving their marketing goals. At the regional level, the marketing activities are executed by a regional manager who has work plans and responsibilities to introduce the company's products and to achieve the sales targets. A regional manager oversees several FAs who actively engage with farmers and other stakeholders where they work with. FAs also have sales targets in their working sites. The consideration in choosing a working area is that the location covers a wide planting area of a certain commodity by the company’s product. FAs have direct contact with farmers vis-à-vis so that they can involve farmers in their activities.

FAs usually use various methods to introduce pesticides and one of them is by conducting an on-farm demonstration plot in the co-operator farmers’ land. An on-farm demonstration plot is a media for education that allows farmers to witness the company’s product performance. This method can be used as an important tool to educate farmers in solving agricultural problems [21]. From the demonstration plot, farmers are expected to learn agricultural practices and then try in their lands [9]. Co-operator farmers are selected based on the land area where large-scale farmers, farmer group leaders, or respected persons in the village become a priority because they usually have the capacities to influence other farmers. The other organized activity is farmers meeting in the village scope to increase farmers’ awareness, for example on how to analyze and to overcome pests and diseases and what required active ingredients to control them. Ultimately, the company products need to be disseminated more widely, FAs will hold a larger scale of demonstration plot namely Farmer Field Day (FFD). In this event, farmers from different villages and regencies, village officials, agricultural extension workers, agricultural officials, and other stakeholders will be invited. FFD is expected to increase the large number of farmers who intend to use the company’s product for pest and disease handling. According to [17], a demonstration plot might be more useful to increase the adoption level of new technology since FFD is conducted in a short period; yet, the organization cost for FFD is frequently cheaper. Aside from the promotion and dissemination activities, FAs have a role to monitor the use of pesticides or application of the company’s products at the farmer's level as a part of the after-sales services. They ensure that farmers use the pesticide according to its recommendation. They also prevent the occurrence of inappropriate use and assure that the products are effective to control pests and diseases. Many roles
performed by FAs are aimed at gaining the trust of farmers which in the end is expected to increase product sales and help FAs to influence other farmers to purchase similar products. Interpersonal communication between farmers is found as a significant factor to boost the dissemination of innovation [19]. This finding is similar to the research result by [13], 67-82% of respondents revealed that the fellow farmers are the main source of information on pesticide knowledge.

3.2. Analysis of Field Assistant Roles using Qualitative Software

The previous researchers commonly observed FA roles regardless of which company FA belongs to. Further identification of the intricacies of FA roles from the FA’s point of view showed that the competitiveness between different companies was very intense causing the very slight price difference between retailers for the same products. Moreover, there was no price disparity between suppliers and retailers especially for products classified as very fast-moving products which are usually well-known brands. It induced the retailers to sell more pesticides from well-known brands to farmers in order to increase the sales volume and profit. In addition, the pesticide companies competed with each other to maintain the loyalty of their current customers or to attract new potential customers.

The output of coding analysis from interviews with five FA representatives illustrated that FA roles can be summarized into 10 roles, namely: self-capacity building, technical advisory, understanding farmers' problems, competition coping strategy, on-farm demonstration plots, organizing FFD (Farmer Field Day), stakeholders' engagement, knowledge transfer to farmers, after-sale services, and ex-post evaluation. After clustering, those roles indicated the existence of interconnected (see figure 1). From the outermost grouping, indirectly, product promotion activities packaged in dissemination covers derived roles of the self-capacity building. It can be argued that their experiences on the dissemination activities have contributed to the FA’s performances. The pesticides companies also conducted regular training both internals and externals to enhance FA’s competencies on particular topics such as plant pests and diseases, marketing and sales, product knowledge, occupational safety, and leadership. Meanwhile, capacity building related to the technical issue was regained from sharing among FAs or between FA and their leaders through group chats as well as direct informal meetings at the coffee shops.

Figure 1. Result analysis of clustering by word similarity on roles.

Technical advisory and understanding farmers' problems roles are connected, but they did not remotely connect to the role of competition coping strategy. The technical advisory role was carried out simultaneously when the sales team distributed products to the stores, and this role was performed along with the on-farm demonstration plot activity. However, the role was excluded from planned activities since it was depended on the needs. In line with the flows of FAs’ roles, FAs gained insight over characteristics, farming problems, habits, and other social aspects that ensue in farmers’ and local
communities’ entities. Meanwhile, FA’s main responsibility as a mandatory of the company has been implied in the competition coping strategy role, which whose derivative roles were mostly dissemination. The related dissemination roles of FAs were illustrated by the on-farm demonstration plot role that was stimulated by the roles consisting of organizing FFD, stakeholder's engagement, and knowledge transfer to farmers. On-farm demonstration plots role also involved several activities like seeking information, establishing relationships with various stakeholders, selecting co-operator farmers, determining target locations, planning, and executing.

Even though the FFD was carried out after the on-farm demonstration plot had been accomplished, the FAs had started working from the very beginning to achieve the success of the FFD. After the promotional activities have ended with the FFD accomplishment, the role of FAs continued, namely after-sale services and ex-post evaluation. Co-operator farmers of on-farm demonstration plots and FFD participants often still contacted FAs for consultation on pest and disease problems and information about pesticides that were not understood by farmers. FAs also evaluated whether there had been an increase in product sales at that location. The role of knowledge transfer to farmers was usually easy to do after gaining the farmers’ trust, for example, the willingness of farmers to use their land as an on-farm demonstration plot. This bonding relationship continued in the willingness of the co-operator farmers to follow FA advice in pesticide application. According to FAs, some farmers preferred individual consultations, both in-person and online, which usually took place outside of the FA’s designed activities. Co-operator farmers usually were more open-minded to new things and often became a reference for other farmers. They have opportunities to improve their knowledge on plant pests and diseases control and the appropriate use of pesticides; yet, co-operator farmers are also the target of competitors as an entry point for product promotion. This was the reason why after-sale service is also part of the FA roles.

Of the 10 FA roles that can be generated from the coding as a result of interviews, a hierarchical analysis was carried out to analyze the roles of FAs based on the ranking (see figure 2). The treemap as the output of the analysis showed that stakeholders’ engagement occupied the largest (most important) role of FA. However, the FAs have a responsibility to their companies to increase product sales. This is in contrast with field extension officers who also have dissemination activities but different goals. Government field extension officers aim to increase farmers' knowledge as an indicator of success, whilst for FA, increasing farmers' knowledge is only a step that will help success in product promotion indicated by the value/amount of product sales. In the stakeholder engagement role, FA activities include gathering information, assessing prospective co-operator farmers, gathering support from farmer group leaders and community leaders, approaching field extension officers who foster target farmer groups, requesting permits from village officials/the district agricultural office, as well as seeking agreements or cooperation agreements with stakeholders. One of the FAs stated that if the on-farm demonstration plot was carried out on the land of traditional leaders, then the farmers living in the area would easily accept the promotional activities carried out by FAs. In general, the intense competition amongst pesticide companies also encouraged FAs to perform the whole role with equal capacity.
3.3. FA Roles Related to Environmental Issue

Based on the FGD result, FA roles are embedded with environmental responsibility which is pesticide companies’ concern. In line with those promotional functions, FAs also carry out knowledge delivery to farmers regarding pests and diseases handling. This knowledge needs to be disseminated to the users because pesticides are toxic substances. Pesticides require specific handling so as not harm to the environment but still work effectively to control pests and diseases. The excessive and unwise usage of pesticides might cause negative impacts such as environmental and biodiversity degradation [1,12,14] resistance, a resurgence of current pests and diseases, emergence of new pests, reduction of natural enemy population, and health problems on humans and other living creatures [15,16,26]. Therefore, the proper and wise use of pesticides is very important for environmental sustainability.

According to existing regulations, the pesticide companies should maintain and participate in environmental sustainability concerns through conducting a stewardship program. Stewardship is an ethical responsibility under the management of pesticide companies, from production, distribution, usage, to disposal management. Stewardship activities also include effective pesticide management to maximize the benefits of pesticides yet to minimize the risks through continuing education to their users. Through the stewardship program, the company attempts to preserve od communication with farmers to increase farmers’ awareness. The services and guidance on the proper doses of pesticide usage at the farmer level become a part of the product marketing mechanism. Hence, the stewardship program is also a part of the marketing strategy to ensure that the product lifecycle will be last long. Findings from the FGD of pesticide companies, among others, stated that pesticide companies, especially at the multinational level, had to pay attention to the environment so that stewardship program becomes one of the main concerns and part of the company management. Unfortunately, at the field level, the implementation of this program couldn’t be fully seen in the product promotion activities that were carried out by FAs. In the future, stewardship programs should be more internalized in the promotion activities.

Furthermore, still referring to the result of FGD with pesticide companies, their representatives stated that there are possible differences in the level of attention and implementation on consumer and environmental protection programs related to the use of pesticides depending on the company’s capacity and commitment. In Indonesia, there are two associations of chemical pesticide companies, namely CropLife and CropCare, where each association also has a different rule and nature of the organization. CropLife consists of multinational pesticide companies, while CropCare’s members are from national pesticide companies with more diverse levels of technology among its members. The associations also stated that the government regulations are crucial as the imperative reference for the pesticide companies.
and the whole pesticide’s market chains to be responsible for consumers' safety and environmental sustainability. It is also recognized that the synergy among local governments and extension services with stewardship programs of the pesticide companies has not been intensively and extensively implemented. The company stated that it has limitations in implementing and assisting the stewardship program, in terms of coverage area and the number of FAs. The existence of effective collaboration with extension services is expected to elevate the farmers' knowledge and the proper application of pesticides.

From a regulatory perspective, the Government through the Ministry of Agriculture has made efforts to improve the control of pesticide use by the amendments to Ministry of Agriculture Regulation No. 39 of 2015 into Regulation No. 43 of 2019. The revision in substance includes: (1) the criteria for the banned of carcinogenic substances which formerly only referred to the IARC (International Agency for Research on Cancer) guidance, recently also refers not only to the IARC but also FAO/WHO JMPR (The Joint FAO/WHO Meeting on Pesticide Residues) as additional guidance, and (2) the criteria for the banned pesticides which formerly only referred to the established list of banned pesticides, then it has been revised that the banned pesticides are determined on active ingredients and (or) its additives as well as the result of the required test. The revision of pesticides’ regulation is also a form of complying with the participation in international agreements such as the Rotterdam Agreement.

3.4. Data Triangulation Based on the Information from Farmers

For triangulation purpose, a brief cross-check was also carried out with rice farmers in the Melati II Farmer Group, Melati II Village, Perbaungan District, Serdang Bedagai Regency, North Sumatera Province. The farmers are familiar with FA informants from five pesticide companies whose working areas cover this village. Also, the rice farmers are the end consumers in the pesticide marketing chain. The sample farmers consisted of 36 rice farmers who had the characteristics of (i) average age of 48 years (ranging from 31 to 72 years), (ii) average of 10 years of education (high school level), (iii) average of 20 years of farming experience (ranging from 2 to 50 years) and (iv) 79% landowners with an average area of arable rice fields of 0.55 hectares. Farmers in this village appeared to have active group meetings and as many as 74% of farmers claimed that they had received training on pesticides.

The cross-check results from 36 rice farmers showed there were different sources of information referred to and considered by farmers when purchasing pesticides (see table 1). From table 1, it can be seen that FA was one of the reference sources of information according to 33% of respondents. The source of information, that was mostly accessed by farmers, was fellow farmers as much as 56%, then followed by government field extension officers (50%). Retailers/kiosks also had nearly the same contribution as the FAs. Regarding this distribution, it was important for FAs to have good communication with stakeholders as a source of information to expand the dissemination of pesticide products. Thus, the role of stakeholders engagement was a vital role for FAs in carrying out its product promotion mission. This result corresponded with a study conducted in five provinces in Indonesia on food crops, horticulture, and plantation subsectors in 2020, that about 23-45% of farmers mentioned FAs as a source of information and knowledge related to pesticides [13].

| Source of information (%) | Farmers' considerations (%) |
|---------------------------|----------------------------|
| Landowner                 | The result of training     |
|                           | 8%                         |
| Parents                   | The result of the on-farm demonstration plot |
|                           | 14%                        |
| FA                        | Other farmers recommendation |
|                           | 28%                        |
| Retailers/kiosks          | Active ingredients        |
|                           | 36%                        |
| Farmer group leader       | Brand                      |
|                           | 53%                        |
| Government field extension officers | Function/effectiveness |
|                           | 58%                        |
| Fellow farmers            | Quality                    |
|                           | 75%                        |
|                           | Price                      |
|                           | 78%                        |

Note: the percentage refers to the number of voting farmers divided by the total farmers (n=36)
Farmers have many reasons when choosing to use pesticides. For instance, farmers chose affordable price (78%) and pesticide quality (75%) as the main consideration when buying pesticides. This decision corresponded with the farmer’s need regarding the killing power from the products to decrease attack levels. About 58% of farmers were concerned with the function according to the specific pests and diseases attack. Product brands were considered by 53% of farmers that also indicated loyalty to the products. Results of general dissemination activities such as on-farm demonstration plots and training were only selected by a few farmers (14%) as a consideration when farmers purchase pesticides. In this case, it showed that promotion programs were still competitive considering that farmers ultimately chose prices over product brands. However, when farmers have trusted a certain brand of pesticides and the products worked effectively in decreasing the attacks, then the sales of those products tended to increase.

As mentioned earlier in the previous discussion, an emerging issue relating to chemical pesticides is an environmental issue. Based on the interviews and observations in the field, it showed that the farmers' awareness of environmental issues is still less. During the individual interview, the farmer was also asked about factors causing the difficulty in controlling pests and diseases based on the farmer's perception. The highest answer was pests' resistant (42%) and ineffective function of pesticides (33%). This perception has implications for farmers to replace with other pesticides. Indeed, the replacement or rotation of pesticides is important to prevent pest and diseases resistance. [3] affirmed that insecticide rotation is one of the essential components in resistance pest management so the choice of appropriate chemicals should be done carefully.

![Figure 3. Tree chart of findings’ formulation on farmer’s decision in using pesticides.](image)

The findings of this study are also illustrated in the tree chart’s formulation that explains farmers’ decisions to use pesticides based on the sources of accessed information (see figure 3). Furthermore, the tree chart clarified FAs position among other stakeholders as sources of information, as well as it also portrayed the identified motives of each stakeholder. The motive for addressing an environmental issue emerged only as a concern of the pesticide companies and the government. Discussion about this issue from the company’s perspective has been presented previously (see 3.3). Whilst, the Government paid attention to the environmental issue to keep the sustainability of natural resources and also as an obligation along with international pressure against actions that cause the environmental damage. Besides, the Government has another motive that deals with its’ performance achievement or its’ obligation such as food security related to food production. Additionally, the chart showed that the other stakeholders have distinctly different motives. It also implies that not all stakeholders have the same notion on environmental issues.
4. Conclusion
It can be inferred that FA in carrying out product promotion to farmers, also performs similar stages of dissemination which is generally conducted by agricultural extension. This strategy will increase farmers’ knowledge of the products, while at the same time also promoting farmers to apply the pesticides according to the recommendation. Demonstration plots, Farmer Field Day (FFD), and one-on-one communication are found to be the most of FA’s concerns. This study also reveals that stakeholders’ involvement plays an important role since farmers do not consider FA as the main source for obtaining pesticide information. In addition to this role, FA also brings corporate mission which is known as environmental responsibility. In practice, this role is carried out by educating, training, providing examples of the safe and wise use of pesticides, as well as proper disposal of pesticide waste. Considering that FA does not seem to explain much on the effects of using pesticides, this study suggests that government extension officers can complement FA’s tasks in counseling about the effects of the pesticides by collaborating to utilize the dissemination channel that has been opened by FA properly.

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