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Agroecological Education Aimed at Achieving Food Sovereignty

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Food sovereignty is an alternative approach attempting to resolve the world's current food crisis. This approach emphasizes small-scale farmers as the main actors in a food and agricultural system. It encourages small-scale farmers to fully participate in the decision-making process of national and/or international agreements regarding food and agriculture systems in order to benefit and empower them. Food sovereignty aspires to return the food and agriculture system to a domestic level, which gives freedom to small-scale farmers to produce foods reflecting their knowledge and experience and suited to the local conditions. Agroecology is a management approach aimed at achieving a sustainable agricultural ecosystem utilizing local resources, local wisdom, and local farmers' knowledge in producing foods. Thus, agroecology minimizes production costs, increases the quality and quantity of foods, and gives small-scale farmers more benefits. According to knowledge-sharing, an educational theory for explaining farmer-to-farmer ways of learning, there are three requirements for an effective learning process: (1) a public space to share knowledge and experience; (2) provision of opportunities for every participant to share and exchange their knowledge, views, and experience; and (3) a need for farmers to enhance their competence. The agroecological approach has been practiced and disseminated within farmers' communities at the grassroots level and has shown promising results. Studies showed that by practicing agroecology farmers produced more foods and gained other benefits, suggesting that agroecology could be one answer for the food crisis. Farmers' knowledge and experience are vital to food and agriculture policy-making. Thus, by recognizing farmers' knowledge and understanding their learning processes, a fair participatory food and agricultural system can be achieved, an ideal that the food sovereignty approach strives for. In this paper, we describe the process of sharing knowledge about agroecology within a social movement organization aimed at achieving food sovereignty in Indonesia.

Key words: agroecology, education, food sovereignty, Indonesia, social movement

Introduction

In 2012, the Indonesian government recognized three principles in the provision of food: food sovereignty, food autonomy, and food security (Act No. 8/2012). Previously, Indonesia only aimed toward food safety and food security in its food provision system; by including food sovereignty in its law, policy-makers expect to achieve a more just, fair, and sustainable food system. However, the combination of food sovereignty and food security in the same framework has become a point of debate among academics and practitioners. One group sees food security as a requirement for achieving food sovereignty or vice versa, others see these two concepts as complementary, and some say that food security and food sovereignty are radically different (Chaifetz and Jagger, 2014).

Food security exists when people have access to enough food for an active and healthy life by ensuring the accessibility, availability, and effective utilization

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of food for people (FAO, 1996). However, food security only emphasizes an adequate food supply, but it ignores the food production process. In meeting food demands, monocultural agriculture is supported and chemical inputs are used to drive soil and crop productivity. These practices have negative impacts on natural resources and serious health and environmental implications (Altieri and Nicholls, 2012a), while forcing farmers to become dependent on the industries that provide these agricultural inputs. Climate change, a high rate of biodiversity loss, land degradation through soil salinization and pollution, depletion and pollution of water resources, rising production costs, a decreasing number of farms, poverty, and rural population declines are just some of the challenges causing the reconsideration of the food security approach for tackling food problems (Velten *et al*., 2015).

Food sovereignty, an approach popularized by a transnational agrarian movement called La Via Campesina, is an alternative solution that emphasizes supporting the local food system. Food sovereignty is the right of people to have access to healthy and culturally appropriate food produced through sustainable methods and their right to define their own food and agriculture systems (Nyeleni, 2007). Food sovereignty strives to empower farmers by promoting agroecological practices. Agroecology is a management approach to achieve a sustainable agricultural ecosystem using local resources, local wisdom, and local farmers' knowledge in producing foods, and external agricultural inputs are replaced by natural processes (Altieri, 1999, 2009; Holt-Giménez and Altieri, 2013; Wezel *et al*., 2009). In this approach, on-farm interactions receive greater emphasis because they improve the efficiency of the farming system while reducing the use off-farm inputs (Altieri and Nicholls, 2012a). Practicing agroecology could free farmers from their dependency on the agricultural industry. By practicing agroecology, farmers are motivated to plant many crops that are suitable to the local environment, and they do not have to rely on the agricultural industry for seed and agricultural inputs.

In practice, however, Indonesia still leans toward food security instead of food sovereignty. Industrial and monocultural agriculture are still highly supported by the government, revealing a lack of commitment to promoting food sovereignty. Although the Ministry of Agriculture supports organic farming, according to some agroecology academics, "organic farming" is based on different principles than those of agroecology (Gliessman, 2013). For example, organic farming still supports the planting of monocultures, and the process of certifying an organic commodity in accordance with the National Standard of Organic Food System is lengthy and expensive, which can harm small-scale farmers (Mayrowani, 2012).

The lack of communication between the government and farmers and other citizens is another problem in promoting food sovereignty. In Indonesia, the extension service is the main government agency communicating information and knowledge to promote rural and agricultural livelihoods. There are 5002 extension officers provided in West Java, and this number still shows a large gap between government extension services and the actual number of farmers in the field (PUSDATIN, 2012). Many farmers cannot access information on farming practices and agricultural policies that affect their lives, making it difficult to achieve food sovereignty, which encourages participation by local farmers and citizens in defining their food system. Thus, it is necessary for the Indonesian government to improve communication with local farmers to achieve the goal of food sovereignty.

Academics, non-governmental organizations, and social movements have made efforts to mainstream agroecology to farmers. Previous research has focused on promoting agroecology and sustainable agriculture in higher education institutions in the Nordic region, the American Midwest, and Indonesia (Francis *et al*., 2011; Lieblein *et al*., 2012; Murtilaksono, 2014) and promoting agroecology by using a farmer-to-farmer approach in Latin America (Rosset and Martínez-Torres, 2012; Rosset *et al*., 2011). In this paper, we focus on agroecological education for small-scale farmers who cannot access extension services, with an emphasis on identifying the best methods for educating farmers about agroecology. The aims of this paper are: (1) analyzing the knowledge-sharing process in promoting agroecology within a farmers' social movement organization in Indonesia; (2) exploring agroecological practices by farmers and how those practices could support food sovereignty; and (3) recommending an agroecological education approach that supports food sovereignty.

Agroecology and Food Sovereignty

How should we interpret agroecology through the food sovereignty approach? Food sovereignty empha-

sizes striving for farmers' rights, such as their right to produce food that suits their knowledge and experience accumulated by living in a certain environment over time (Kerr *et al*., 2016). This local knowledge includes what crops are suitable for the environment, what foods are chosen by local people, and how to deal with seasonal changes, pests, and weeds. In contrast, the main goal of the agriculture industrial system is maximizing the quantity of food by planting monocultures and using chemical inputs (Woodhouse, 2010). In this system, local wisdom and knowledge are ignored in order to meet food demands nationally and globally, forcing every farmer to produce certain crops in a way that is controlled by the system. The agriculture industrial system causes land degradation and climate change and produces food that is less healthy and nutritious for people (Holt-Giménez and Altieri, 2013). In contrast, agroecology is the application of ecological concepts to agricultural systems, with the aim of developing an ecological structure that limits the use of external inputs and allows the necessary interactions among species for the system to function (Altieri and Nicholls, 2012c). Thus, the agroecological approach uses local resources, local wisdom, and local farmers' knowledge in producing foods (Koohafkan and Altieri, 2011). By practicing agroecology, the rights to use and manage lands, water, seed, livestock, and biodiversity are placed in the hands of those who produce food and not of the corporate sector (Nyeleni, 2007).

The term agroecology has several different interpretations, being seen as: (1) a science, movement, and practice; (2) a transdisciplinary, participatory, and action-oriented approach; and (3) a policy (Wezel *et al*., 2009). As an applied science, agroecology uses ecological concepts and principles for the design and management of sustainable agroecosystems where external inputs are replaced by natural processes such as natural soil fertility and biological control (Altieri and Nicholls, 2012b). Gliessman (2007) defined agroecology as "the science of applying ecological concepts and principles to the design and management of sustainable food systems," which emphasize practical application. This definition highlights the transdisciplinary nature of agroecology because it uses methods from various disciplines (e.g. biology, ecology, agronomy, and social sciences) and acknowledges local knowledge in producing foods (Méndez *et al*., 2012).

The effects of agroecological approaches can be viewed at the plot or field scale, with analyses of crop–insect and crop–weed interactions emphasizing natural processes (Wezel *et al*., 2009). These approaches must be connected to the broader food system, that is, to the regional level. To truly achieve the goals of agroecology, however, it has to be incorporated with social sciences and/or social movements, which highlights the interpretation of agroecology as a movement and a practice. As a movement, agroecology strives to extend alternative agricultural approaches through social networking or partnerships while responding to ecological and environmental challenges. The agroecology movement is action-oriented, aiming to get farmers to adopt alternative techniques that are more environmentally friendly, ecological, and/or organic.

In considering agroecology as a practice, Altieri and Nicholls (2012a) noted five principles for the design of an agroecological system; it should (1) enhance the recycling of biomass; (2) strengthen the immune system of agricultural systems through enhancement of functional biodiversity – natural enemies, antagonists, etc.; (3) provide the most favorable soil conditions; (4) minimize losses of energy, water, nutrients, and genetic resources; and (5) diversify species and genetic resources in the agroecosystem. To achieve agroecological principles, Altieri and Nicholls (2012a) proposed five practices (Table 1). The main concerns were the diversification of farming systems and livestock integration, which drive positive effects on the biodiversity that underlies the complementary relationships between plant and animal species, as well as the better use of sunlight, water, and soil resources and natural pest control.

Koohafkan *et al*. (2012) noted several requirements of agroecological practices that are strongly related to achieving food sovereignty. In addition to the use of natural resources in farming, these requirements include using participatory methods to educate and to empower human capital related to agricultural systems. Koohafkan *et al*. (2012) also noted that social integration is important in maintaining agroecological principles. According to an agroecological perspective, the main concern is not just the environment but also the people living there. This idea is highly interlinked with the goals of food sovereignty. Although agroecology is technology driven, it is also intensively knowledge driven and thus related to socioculture. Farmers have to be placed as the main actors in the

Table 1. Designs of diversified farming systems (adapted from Altieri and Nicholls, 2012a)

Farming System	Traits
Crop rotations	Temporal diversity in the form of cereal–legume sequences. Nutrients are conserved and provided from one season to the next, and the life cycles of insect pests, diseases, and weeds are interrupted.
Polycultures	Cropping systems in which two or more crop species are planted within certain proximity result in biological complementarities that improve nutrient use efficiency and pest regulation, thus enhancing crop yield stability. Polycultures show greater yield stability and less productivity declines during a drought than do monocultures.
Agroforestry systems	Trees grown together with annual crops, in addition to modifying the microclimate, maintain and improve soil fertility as some trees contribute to nitrogen fixation and nutrient uptake from deep soil horizons, while their litter helps replenish soil nutrients, maintain organic matter, and support complex soil food webs.
Cover crops and mulching	The use of pure or mixed stands of grass and legumes (e.g., under fruit trees) can reduce erosion and provide nutrients to the soil and enhance biological control of pests. Flattening cover crop mixtures on the soil surface reduces soil erosion and lowers fluctuations in soil moisture and temperature, improves soil quality, and enhances weed suppression, resulting in better crop performance.
Crop–livestock mixtures	High biomass output and optimal nutrient recycling can be achieved through crop–animal integration. Animal production that integrates fodder shrubs planted at high densities, intercropped with improved, highly productive pastures and timber trees, all combined in a system that can be directly grazed by livestock enhances total productivity without the need for external inputs.

food system, meaning their participation is the most important in defining local farming practices. In building a fair and just food system through the practice of sustainable agriculture, the education of farmers regarding agroecological practices is also needed.

Knowledge-sharing

According to the educational theory of knowledge-sharing, there are three requirements for an effective learning process: (1) a public space to share knowledge and experiences; (2) the provision of opportunities for every participant to share and exchange their knowledge, views, and experiences; and (3) an underlying need to enhance participants' competencies (Hara, 2009; Lee and Yang, 2000). There are three steps in the knowledge-sharing process (Fig. 1): knowledge retrieval, knowledge exchange, and knowledge creation (Huysman and de Wit, 2003).

Internalization is a learning process in which an individual gains knowledge from an organization, group, or institution, and this process is referred to as knowledge retrieval (Zaffar and Ghazawneh, 2012). In contrast, externalization is a learning process in which members of organizations, groups, or institutions share their knowledge and experience, resulting in a shared knowledge in the group; this process is referred to as knowledge exchange (Huysman and de Wit, 2003). Objectification is a learning process in which knowledge becomes an objective reality, resulting in collective knowledge in the community. Over time, these processes could lead to knowledge creation, in which groups propose new approaches that are suitable for their needs and objectives (van Aalst, 2009). The knowledge-sharing theory is a suitable

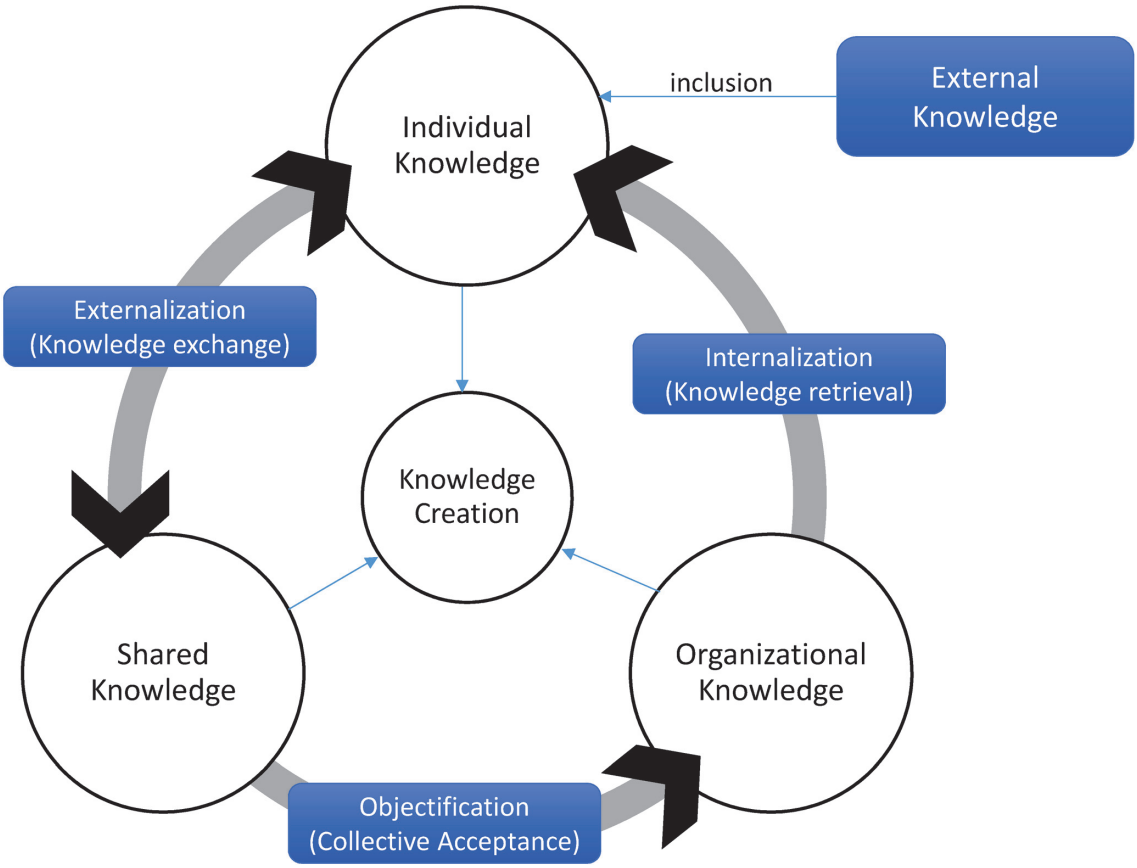

Fig. 1. The knowledge-sharing cycle (adapted from Huysman and de Wit, 2003)

framework for our analyses of farmers' knowledge and the learning process within a farmers' organization aimed at practicing agroecological farming and achieving food sovereignty.

Methods

We used a qualitative descriptive method for this research (Creswell, 2009). Horticultural farmers in Bogor, West Java, who were members of Serikat Petani Indonesia (SPI) were chosen as the research subjects. SPI is a farmer organization with members across Indonesia that has established its own education and training center (known as PUSDIKLAT). The PUSDIKLAT center was built in 2005 in Babakan, Dramaga, Bogor, but in 2010 it was moved to Cijujung, Ciampea, Bogor. We conducted observations, informal discussions, and semi-structured interviews with farmers from two villages in Bogor, Babakan and Cijujung, in order to assess the farmers' knowledge. We also used documents to analyze the knowledge-sharing process of SPI, by studying the organization's education and training curriculum and reports about the learning process.

The collected data were transcribed and grouped as they related to food sovereignty, agroecology, and knowledge-sharing. We processed the data using QSR Nvivo Pro 11, a qualitative research software that was used for coding and mapping the collected data (Richards, 1999). Secondary sources, such as literature and previous research on agroecology, sustainable agriculture, and education, were also used in this study.

Agroecological Education in SPI

SPI has established its own curriculum for educating and training its members. There are three main topics in the curriculum: sustainable agriculture, entrepreneurship, and organizational issues (Table 2). PUSDIKLAT provides in-class and out-of-class sessions, with the former used for discussing agroecological principles, entrepreneurship, and organizational issues and the latter used for demonstrating agroecological practices.

Table 2. SPI PUSDIKLAT curriculum

Class	Location	Topics
Agriculture theory	In and out of class	Sustainable agriculture
		Agriculture ecosystems
		Land productivity, restoration, and fertilization
		Anatomy and physiology of plants, plant protection
		Harvest and post-harvest
Entrepreneurship	In class	Farming business analysis
		Co-op education
		Co-op management
Organizational education	In class	Managing organizations

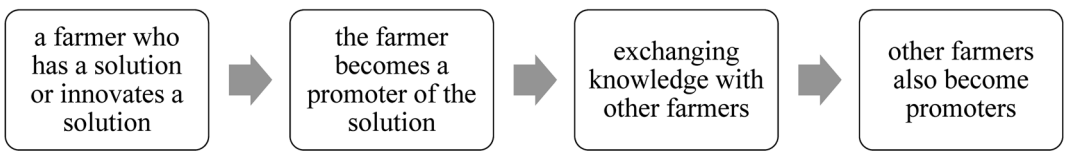

Fig. 2. Farmer-to-farmer knowledge-sharing (adapted from Rosset *et al.*, 2011)

For in-class sessions, a facilitator is needed to explain the principles of agroecology in depth. The facilitator could be an SPI board member who has experience in practicing agroecology or other parties, such as agriculture academics and practitioners. For out-of-class sessions, expert farmers who already have experience in practicing agroecology are encouraged to share their knowledge with other farmers. This farmer-to-farmer method is considered to be an effective approach for promoting innovation to farmers (Fig. 2) (Rosset *et al.*, 2011). However, this method is based on the assumption that there are farmers, referred to as promoters, who have innovated new solutions or rediscovered traditional solutions to problems common among many farmers and are willing to share this information with their peers.

Our research, however, shows that in the knowledge-sharing process at PUSDIKLAT not only farmers but also facilitators, scientists, and practitioners serve as promoters. It is unwise to demand that small-scale farmers serve as the sole source of agricultural innovation and solutions, especially for those who have no access to outside information. The collaboration between facilitators and farmers is necessary to ensure success of the knowledge-sharing process and the sustainability of agroecological practices for small-scale farmers. After transferring knowledge to farmers, facilitators supervised farmers in practicing agroecology while finding and encouraging farmers to become promoters to other farmers. If this knowledge-sharing process can be sustained, knowledge creation (innovation and solutions) could be expected from farmers.

Each out-of-class session is held on a farmer's land. When demonstrating new agroecological practices, the farmer usually allots a small portion (approximately 300 m^2) of the land so it won't disturb production. After the agroecological practices have been demonstrated, participants discuss the advantages and disadvantages of these practices and most decide to choose agroecology as their farming principle. Of course, a few farmers reject adopting agroecology, because it is a long process.

As a movement, SPI activities are not limited to those occurring at PUSDIKLAT. Knowledge-sharing also occurs during other activities, such as collective

Table 3. Classification of SPI's famers

Characteristics	Environmentalist	Independent	Profit-minded
Age and occupation	Old farmers with years of experience; farming as their main job	Young farmers; farming as their main job	Old farmers with years of experience; do side jobs
Farming experience	Practiced conventional farming before joining SPI	Never experienced conventional farming	Practiced conventional farming before joining SPI
Concerns	Have great concern for protecting nature	Have good consciousness to stop depending on agricultural inputs from industry	Have great concern for the survival of their family
Perception of information	Open to new information	Open to new information and stated the need for new information and knowledge	Open to new information, as long as it fits their interests
Willingness to share with others	Willing to share with other farmers	Willing to share with other farmers, willing to volunteer as leader or promoter of new innovation	Passive or hard to get to share their knowledge with others

action by protesting; participating in regional meetings, seminars, and conferences; and attending comparative field trips in other countries. During these activities, farmers gain knowledge not only about agroecology but also about agricultural policies, the government's stances on ensuring the rights of farmers, and the importance of achieving food sovereignty. One farmer who actively participated in these activities shared his experiences with other farmers and became a promoter among his peers. Another joined a comparative field trip to India and attended a seed conference in Bali, and after these experiences he became a promoter, not only in Bogor, but also in another region of Indonesia.

Thus, considering knowledge-sharing theory, the classes taught at the public space of PUSDIKLAT and other activities ensure that the knowledge-sharing process occurs between SPI board members and farmers. These activities gave farmers access to information, as well as more experiences to broaden their perspectives about agriculture and the food system that affect their lives. To better understand farmers' knowledge about agroecology and food sovereignty, analyzing each step in the knowledge-sharing process (internalization, externalization, and objectification) is necessary.

The Knowledge-Sharing Process in SPI: Agroecological Education Aimed at Food Sovereignty

We first identified the internalization process in knowledge-sharing within SPI. We asked questions that could elicit participants' stances about agroecology and food sovereignty. Based on these interviews, Table 3 outlines how three classes of farmers internalize information about agroecology and food sovereignty from SPI activities.

Environmentalist and independent farmers were the ones who actively participate in more activities provided by SPI and were identified as promoters for their peers. In contrast, the more profit-minded farmers tend to be followers as long as they are able to earn a living from their farm income. This kind of farmer is also passive in expressing opinions, making it difficult for them to become promoters. This classification helps us to understand how farmers incorporate knowl-

edge gained from SPI into their daily activities. This understanding will, in turn, help us to introduce agroecology to farmers by using different approaches, for example, by emphasizing environmental issues, independence issues, or economic issues.

The externalization process occurs when promoters begin to exchange their knowledge and opinions about practicing agroecology with other farmers. Farmers who hear about agroecology and food sovereignty start to question the advantages and disadvantages of agroecological practices, and this is where promoters share their stances on agroecology and food sovereignty. Promoters explained that agroecology drives farmers to be more independent from industrial agriculture, protects the natural environment, and minimizes food production costs. This kind of exchange is necessary to promote agroecology and ensure the sustainability of knowledge-sharing with regard to practicing agroecology.

The internalization and externalization processes encourage the objectification process or collective acceptance of agroecology and food sovereignty among SPI members. SPI farmers identified themselves as "organic" farmers (see our discussion of the use of this term in the next section), and only by practicing agroecology could they identify themselves as members of SPI. Agroecology is not only seen as collective knowledge by SPI farmers, but also as collective action in achieving food sovereignty. Whether for environmental, independence, or economic reasons, they practice agroecology on their farms. Collective acceptance could follow because SPI farmers have activities that bring them into contact regularly, not only with farmers in the same village but also with those from other regions. By maintaining intensive interactions within this farmers' organization, discussions regarding the importance of agroecology are maintained and can encourage the sustained use of agroecological practices.

This kind of education is in accordance with what Paulo Freire referred to as "conscientization," meaning the awakening of critical awareness (Freire, 2005). By raising their awareness, people can affirm their identity, differentiate themselves from others, and become more creative in transforming themselves to be more independent. Raising critical awareness results in collective knowledge, identity, and action. The members of SPI identify themselves as farmers who protect the environment and encourage farmers' rights by practicing agroecology as their collective action. They stated that farmers who do not join SPI have no guidance or knowledge of alternative, sustainable farming practices; when they share this knowledge with other farmers, it is difficult because the traditional farmers' main concern is producing foods faster using conventional practices to gain immediate profit.

Our research shows that SPI has created a space for member farmers to obtain information and internalize it with their own experience, share problems and solutions with other farmers, and objectify all of the information and knowledge as shared knowledge within SPI. This process shows that knowledge-sharing exists within SPI and it motivates farmers to practice agroecology. SPI has also opened networks with many participants to support their activities, such as academics, practitioners, and even government officials, which assists those farmers who do not have access to extension services. The decision to join SPI made farmers immediately begin practicing sustainable agriculture.

Agroecological Practices and Food Sovereignty

According to our interviews and observations, farmers in SPI are already practicing some of the agroecological farming system concepts reported by Altieri *et al*. (2015) (Table 4). In their daily activities, however, these practices are more commonly known as "organic farming" than as "agroecology." Only when we described agroecology did they confirm that their agriculture system is indeed agroecology. The term "organic" is more familiar among the farmers, as well as among the consumers of their products. SPI has built some networks to sell the products to specific stores or kiosks that demand organic products.

When we asked about their understanding of agroecology, almost every farmer explained that it requires the use of agricultural inputs from nature and that no chemical inputs are to be used. The use of pesticides is especially prohibited. Pest control is achieved and fertilizer is made by processing other natural resources from the field. However, they admitted that their practices are not purely agroecological, because they still bought manure from the store. Thus, farmers realize that they should have their own livestock to support their agroecological practices, which would decrease their costs in producing foods and minimize the use of chemical inputs, making the food healthier.

The farmers also produce their own seed for crops

Table 4. Designs of diversified farming systems by farmers of Serikat Petani Indonesia

Farming System	Traits
Crop rotations	Never planting the same crops after harvesting; for example, after harvesting spinach, basil or chives are planted.
Polycultures	Planted two crops within beds, such as okra and yam, basil and chives, eggplant and spinach. No rule in what to planting like this, as long as there are two crops in beds.
Agroforestry systems	No trees are being planted, with the exception of banana trees. An agroforestry system is not needed in these fields because the vegetable crop is relatively short, so trees would block the sun for these crops and the roots from trees would hamper land productivity.
Cover crops and mulching	Planting tall vegetable crops first, followed by short vegetable crops. This works as cover crops, mulching, and suppressing weeds. In the rainy season, hay collected by farmers from their own fields is used as mulch.
Crop–livestock mixtures	Goat manure and chicken manure are used as fertilizer. Goat manure is obtained from livestock in the neighboring village, whereas chicken manure is still bought from the store.

such as spinach, caisim, corn, and basil, whereas other seed is purchased from other farmers. The only seed that they bought from the store is *kangkung* (*Ipomoea reptans*), because they have limited land and the seeding process can take up to 4 to 6 months. Their own seed is also being sold to other farmers, especially spinach seed. Buying and selling from farmers gives more benefit than buying from stores, they said. Seed produced by farmers is more productive and adaptive, whereas seed from the store is expensive, less productive, and less adaptive. Knowledge in producing their own seed is critical because it drives farmers to become more independent, thus supporting food sovereignty. Considering the fact that they don't have any access to information and high-quality seed from the government, self-producing seed is very important in maintaining their agriculture activities. Apart from this, the SPI farmers' social network is important for buying and selling their self-produced seed and ensuring their ability to remain independent from industrial agriculture.

Soil conditions have also become an important issue in determining crops to be planted. Special treatment is needed when planting a new crop so it can adapt to the soil conditions. For example, the farmers decided to plant chives, but the initial results were poor. After a farmer returned from an agroecological field trip to India held by La Via Campesina, where he gained knowledge about making organic fertilizers, he used these fertilizers on the chives and had good results. This knowledge was shared with other farmers in these two villages, and they have incorporated this practice into their farming methods.

Our research found that agroecological practices push farmers to become more independent and resilient, which supports the goal of food sovereignty. Tapping into existing local potential (ecology, culture, local wisdom) needs to be recognized by facilitators and/or the Indonesian government as an approach to promote agroecological practices. Thus, it is important for facilitators and the government to expand their understanding of local potential so that agroecology can be promoted more effectively.

Conclusion

Agroecology is a knowledge-intensive practice, and education is critically important to ensure sustainable agriculture. Farmers using agroecological practices have to know how to produce agricultural inputs from natural resources, self-produce seed, manage their soil

conditions, and choose what kind of crops are suitable for the local environment. Having this kind of knowledge can free farmers from being dependent on industrial agriculture and reduce farming costs. Thus, by practicing agroecology farmers can be empowered.

However, transferring agroecological knowledge is not enough to ensure sustainable agriculture. Broadening farmers' perspectives so they have a stance on agroecological practices is also essential, so they have more personal motives and reasons for farming in this way. Broadening farmer's perspective can drive the internalization, externalization, and objectification process of farmers. Our findings indicate that the SPI organization is playing an important role in encouraging knowledge-sharing about agroecology and food sovereignty.

Dialogue is critical in knowledge-sharing. Acknowledging farmers' ways of learning about agroecology and food sovereignty can only be achieved through dialogue. By speaking with farmers, we were able to identify how farmers internalize, externalize, and objectify knowledge from this organization. Understanding this process will help in the development of messages and information that best fit the farmers' knowledge-sharing process.

In designing agroecological practices, facilitators have to expand their understanding of local knowledge so every region has its own unique agroecological approach that is suitable to local conditions, resulting in environmentally friendly farming methods that meet the health and nutritional demands and preferences of local food consumers. More data on local conditions (ecology and local knowledge) in Indonesia are needed so that facilitators can design appropriate agroecological practices for each region.

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