

Chapter 2

Literature Review

2.1 Definition of agricultural extension

Agricultural extension is a service or system assisting farm people through educational procedures that improve farming methods and techniques aiming increased production efficiency and income, better their levels of living, and lift the social and educational standards of rural life (Maunder, 1972).

Zainuddin *et al.* (1987) defined agricultural extension as an informal out-of-school educational service designed to train and influence farmers to adopt the new ideas and technologies in agriculture and home economy. Extension is, however, not only limited to agriculture at the farm, but it also concerns on the societal changes that will enable farm people and rural non-farm people to make a total adjustment to their own life.

Farmers view extension as a form of assistance to improve their know-how, efficiency, productivity, profitability of their farms, and contribution to their family then community, and society. Politicians, planners, and policy makers in developing countries view extension as a policy instrument to increase agricultural production, achieve national food security, and alleviate rural poverty (Contado, 1997).

2.2 Objectives of agricultural extension

The objective of extension is not only to bring about an improvement in farming practices through the application of new sciences and technologies, but also promote the social, cultural, recreational, intellectual and spiritual life of rural people (Arnon, 1989). When new practices are adopted or when new skills are learned and used, it is believed that the goal of helping people has been reached. The new

knowledge is important if people would like to raise their income or standard of living, which will enable them to contribute more to society (Franco, 1966). The purpose of agricultural extension is to help farmers increase their production. It is assumed that, if farmers increase their production, the nation will be better, and also that farm families will be better off (Axinn, 1988). Oakley *et al.* (1985) indicated that the objective of extension is to change farmers' outlook toward their difficulties. Extension is concerned not just with physical and economic achievements but also with the development of the rural people themselves.

2.3 Agricultural extension system in Asian countries

The origin of systematic agricultural extension activities in Asia dates as far as the 16th century in the Philippines, then to middle of the 19th century in some areas of the Indian continent and the beginning of the 20th century in Malaysia. Their objectives and forms were entirely different from what we see today. Most of them were established for promoting export crops for the benefit of the colonial powers. Later on, a great majority of countries created their respective extension system like Thailand created in 1967, Nepal in 1966, and China in 1952 (Tajima, 1994).

Education is the principle objective of agricultural extension system so the effective education requires the use of the educational methods or extension approaches to transfer the improved technologies to farm producers. These extension approaches are hard to apply for all country because of differences of local, regional, and cropping patterns aspects in each country. An example of this is Pakistan, where they use the farmers training, field trials, demonstrations, and T & V approaches. Afore example is Indonesia, where they use the contact farmers, farmers' field workshop, farmer field school, and mass media. The Philippines uses T & V system, participatory, and group discussion while in Thailand, T & V system, demonstration, and on-farm trail were being applied by the extension agents (Jalil, 1994).

One of the biggest constraints of the extension system in Asia is the lack of transportation facilities and other essential equipment need to be used by the

extension field personnel. The extension agents are expected to cover in large distances to their clients but inadequate bicycle or motorbike, where those vehicles could have facilitated their efforts. Materials for demonstrations, publications, posters, and other necessary components for the extension activities are in a serious constraint and absent. In most less developed countries (LDCs), the number of extension workers is so disproportionate to the number of producers that prevents extension programs from significant reaching or influencing the majority of farmers (Swanson *et al.*, 1997).

The actual ratio of one extension agent to farmers varies considerably from country to country. In India and Zambia, it is about 1: 800, whereas it is over 1: 8,000 in Bolivia (Arnon, 1989). Phongprapai and Setty (1988) found in Thailand the ratio of the extension agents to farm family was 1:1,000. One-extension agent had to take care of approximately one sub-district or about ten villages whilst the ratio of extension agent to farmers ranges from 1 to 350 in the Philippines. However, Blanckenburg (1984) found in Asian countries, the number of farmers that an extension agent can actually reach in a year is about 1,000 and stated that if the extension services would make a major impact on rural development, a critical minimum extension density of 1,500 to 2,000 households should be reached. This has great implication for agricultural extension management in countries, where the extension agent to farmer's ratio is still low compared to available farm producers.

2.4 Extension system in Vietnam and in DakLak province

The extension system in Vietnam was officially established in March 1993, followed the 13 CP degree of Vietnamese Government issued. The extension state centre is under Ministry of Agricultural and Rural Development (MARD). There are 61 extension centres in 61 provinces that cover the whole country. Each centre has 25 to 180 staff, who are responsible for introducing the improved technologies to farmers within their province, of which, the number of staff depends on the size of each province (Quoc *et al.*, 1997). Currently, the creation and adaptation of the agricultural technologies as well as the dissemination process of those technologies from the

extension agents to farmers are being carried out mainly by state-funded institutions in Vietnam. The private sector does little in this field except for the distribution of agricultural production materials such as, fertilizers, pesticides and agricultural equipment. Besides the government budget provided, there has been a few budget for the agricultural extension services comes from the subsidy of the local government and foreign NGOs in recent years also.

DakLak extension system was established in 1993. Funding for the extension activities comes from the Central Government and provincial budget resources. The extension structure includes one main office in provincial level, and another 19 sub-extension stations in each district with total of 76 staff from both provincial centre and district stations. In the commune level, there are 68 farmer associations who are working at the 68 category III communes of the province. Quoc *et al.* (1997) stated that the main tasks of the extension agents are transferring the new technologies obtained from research institutes both on crop, and animal husbandry, training farmers, and provide through various means, market, and information on price to farmers aim assisting their economic decision-making.

The provincial extension centre is run under the State Extension Department (SED) and Provincial Department of Agriculture and Rural Development (DARD). Supervisory responsibilities on the extension programs for the whole province were delegated to provincial extension centre. Each extension station of 19 districts supervises the agricultural extension work under its jurisdiction. Changes in the extension organization, technical requirements, and physical facilities have often occurred at all levels like administrative offices, budgeting, capacity building programs, and essential furniture provided. In addition to the government staff, a group of farmers called farmer associations at the category III commune and the contact farmers were selected to help the extension agents to disseminate the relevant information to other farmers.

2.5 Studies on extension impact

Evaluating the impacts of extension programs should be conducted aiming improvements of the extension performance on agricultural adaptive research. Yield can be measured objectively and included as a principle measure of the impact of the extension programs. Cropping intensity, and changes in cropping pattern are also significant indicators as well (Cernea and Benjamin, 1977).

Adoption simply measures the degree to which a technology is being used. Impact refers to the consequences of that use, either described in terms of direct effects, such as higher yield or improved productivity, or in terms of indirect effects, such as improved social welfare or higher incomes, lower prices, protection of natural resources, and farmers access to market (Mosher, 1987). Misra (1997) stated that a simple indicator could measure the impact of the extension on farmer likely yield of crop ha⁻¹ or by constructing the productivity indices.

As the objective of agricultural extension is to help farmers on farm management to increase farmers' production and incomes, its impact must be measured in term of yield obtain from the areas, where followed in accordance with the recommended practices (Benor *et al.*, 1984). However, impact measures posed some problems for farmers who did not directly participate on the extension programs, but gained improved technologies, useful information from participants who have been participated in the use of the technologies distributed from the extension agents (Kristjansone *et al.*, 2002). Similarly, Evenson (1997) found that direct contact with extension personnel was typically not the major source of information to farmers. Information may be diffused to other farmers from ones who were informed by the extension agents. In such cases, there might be little difference in performances between farmers interacting directly with the extension agents and other farmers, and an estimation of the extension impact based on individual extension contacts would erroneously indicate less extension effect.

Agricultural extension programs aim to increase the rate of adoption among farmer-beneficiaries of the recommended techniques in accordance with increasing the crops' product. For instance, In Uganda one of the major constraints to increase production and quality of coffee growers was low standards of management adopted by smallholder farmers, who produce the bulk of coffee, and the study identified that education, frequency contact with extension agents were statistically significant effect and had positive impacts on the poor farmers. Notable, the recommended practices from the extension agents consisted of pest management, fertilization, and pruning techniques all was largely applied by farmers [Kalyebara: URL.2].

By using the Cobb-Douglas production function, estimation of the impact of extension on coffee farms was made in Kenya. Extension plays an important role in increasing crops yield but its effect on yield is not uniform across farmers, and farm yield rise as the number of the extension agents per farm increases [Eversion: URL.3] while Floyd *et al.* (2003) found that the intervention of the extension agent had a large and consistent effect on the adoption due to its positive effect on awareness on new technologies. Its impact was measured by asking the contact farmers whether they followed the extension agents' advises or not by measuring the tangible indicators like crops yield or input applications had increased, remained the same, or decreased with respect to the households over the previous years after consulting from the extension agents.

Khan and Akbari (1986) analyzed the contribution of extension to changes in aggregate productivity and the impact of extension was estimated by the production function as it allows measuring the marginal rate of return to an input. The production function can assign parts of the total return to different sources through estimation the coefficient of the variables, for instance, extension intervention.

It was showed when farmers received one or two visits per crop from the extension workers in yearly season, the value of coffee production rises by about 15 percent compared to the non-contact farmers. The extension agents conducted both group meetings and individual farm visits where typically focuses discussion on

issues related to fertilization, pruning and irrigation techniques. About 80 percent of farmers in Zimbabwe reported that they followed the recommended practices from the extension agents given for their farms. This research applied the linear regression model to estimate the results [Hoddinott: URL.4].

Dejene (1989) found that in Ethiopia the ratio of 1: 2,500 to 3,000 of extension agent to farmers made change in wheat yield attributed to the recommended practices from the extension programs. The average yield of wheat among the contact farmers under the extension programs harvested 30 quintals ha⁻¹ or 1,524 kg ha⁻¹ compared to the yield of the average farmer outside the areas covered by the extension programs harvested 15 quintals ha⁻¹ or 762 kg ha⁻¹.

Another study of Wittaya (1984) found that the contact farmers to extension programs in Chiang Mai got higher yield of rice at 3.7 ton ha⁻¹ compared to the non-contact farmers at 3.2 ton ha⁻¹. The result found that the contact farmers followed the recommended practices from the extension agents guided, and average rice selling price was higher for the contact farmers also as resulted from accessing the market channels with higher price.