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**Agriculture Extension in Viet Nam:
An Assessment and Reform Options**

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ABSTRACT

In 2015, Viet Nam began transforming its agriculture extension and advisory services to improve the efficiency and competitiveness of its agricultural sector and thus improve the livelihoods of its farmers. Despite these recent efforts, however, farmers continue to face many challenges and constraints. This paper evaluates the performance of the current extension and advisory system, identifies challenges faced, and analyzes constraints and opportunities for further reforms. Finally, it provides recommendations for both policy makers and practitioners regarding possible improvements in extension and advisory services in Viet Nam by focusing on contextual factors as well as the performance and quality of the extension services being provided. Results of this study show that Viet Nam requires a well-capacitated extension system. Even though the Vietnamese public extension system has undergone several changes in recent decades, supply-driven extension remains the main operating method, rather than demand-driven extension services. Steps such as promoting public-private partnerships, linking farmers directly to markets, and increasing the capacity of extension workers can improve the current agriculture sector. Also, it is crucial for the extension system to focus on enhancing the quality of food hygiene and safety and to adopt climate-smart techniques to ensure sustainability and long-term growth.

Keywords: Agriculture extension, agriculture transformation, demand-driven extension, Southeast Asia, Viet Nam

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1. INTRODUCTION

A well-functioning extension system is crucial for increasing agricultural growth in a developing country. Extension and advisory services can build the resilience of farmers by increasing their access to inputs and knowledge (Davis, Babu, and Blom 2014). Demands on public-sector extension systems include helping farmers cope with climate change and other threats to their natural resources, such as soil and water. These challenges require the extension system to go beyond its traditional methods of technology transfer and create other forms of knowledge sharing.

Rice production and consumption (both domestic and international) play a vital role in Viet Nam's agricultural development strategy. Agricultural extension is designed and implemented by the Ministry of Agriculture and Rural Development (MARD), and the provincial governments play a crucial role in its ongoing transformation. In this paper, we identify challenges faced by Viet Nam's agriculture sector and provide possible solutions to improve the efficiency of agriculture, forestry, and fishery extension in Viet Nam. Through this paper, we seek to answer various questions: What are the enabling factors and policies that could improve the state of Viet Nam's agriculture sector? What organizational and management steps should be taken to do so? How can coordination between different players improve the current extension services provided? And how can we involve the private sector in providing extension services?

Enabling Environment or Policies

When the Vietnamese public extension system was developed in 1993, it was organized into five levels (central, provincial, district, commune, and village) (Bo 2012). The system focused on the supply side, with the aim of increasing production and decreasing poverty through 19 key agriculture, forestry, and fishery extension programs for the development of rice, maize, industrial crops, food crops, and fruit trees, among others.

In 2007, Viet Nam became part of the World Trade Organization, with the aim of improving the lives of smallholder farmers. At that time, the country's agriculture extension services included applied

techniques to increase productivity and competitiveness, and to improve the quality, safety, and hygiene of agricultural products. The focus of the extension system remained on increasing production and decreasing poverty among farmers. Extension activities focused on development and replication of agro-forestry-fishery production models in the direction of good agricultural practices; applying the farming techniques of “three decreases, three increases” (decreasing pesticide, fertilizer, and seed, while increasing output, productivity, and quality) and “one must, five down” (required use of certified rice seeds combined with decreases in seeds sown; crop protection chemicals, nitrogenous fertilizer, and water used; and postharvest losses); implementing high-tech agriculture; and linking the value chain from production to consumption in the field pattern / model farm model. Along with the government, research institutions, universities, private extension providers, and nongovernmental organizations (NGOs) also provide extension services. However, the burden of extension mostly falls on the public sector.

In 2015, renewal of the agriculture extension system began. Currently, extension and agricultural production support is mainly responsible for implementing key policies of the agriculture sector, which include restructuring the agriculture sector, developing new rural areas, enhancing the quality of food hygiene and safety, and adopting climate-smart techniques. Key extension activities include establishing demonstration sites; conducting field days and training; and organizing science/technology forums on crops, livestock, veterinary care, forestry, water resource management, agroforestry processing, and engineering (Bo 2012). In addition, the extension system provides farmers with information related to new policies and market prices, aimed at improving the sector’s efficiency and competitiveness as well as farmers’ livelihoods. Even though the Vietnamese public extension system has undergone several changes, supply-driven extension remains the main operating method (Bo 2012).

Viet Nam is undergoing agricultural transformation to transition from a production-oriented system to a market-oriented service system (Friederichsen et al. 2013). The objective of this transformation is to find new ways to help agricultural producers access and market their production. Several communities have taken steps to develop market-driven extension models. Improving extension

and advisory services can promote the application of appropriate techniques and production methods, linking farmers to the market.

History of Extension in Viet Nam

From 1993 to 2004, the Department of Agriculture and Forestry Promotion, under MARD, was assigned the function of national-level management of agricultural production and extension activities. Similarly, the Fisheries Department, under the Ministry of Fisheries, managed fisheries-related extension activities. In 2005, the national government reorganized the extension system, establishing the National Agricultural Extension Center (separated from the Agriculture and Forestry Promotion Department) under MARD and the Fisheries Extension Center under the Ministry of Fisheries.

In 2008, when MARD and the Ministry of Fisheries were merged, the National Fisheries Extension Center was merged with National Agricultural Extension Center . In 2010, the government again reviewed extension services, and the National Center for Agriculture and Fishers Extension officially became the focal point for guidance on agricultural extension throughout the country as well as for cooperation with regional and international extension organizations.

Also, in 2010, the government introduced a policy of socialization and diversification of agricultural extension services to mobilize resources from organizations (Box 1.1). The objective of this approach is to encourage two-way information flow and build farmer-led, demand-driven extension.

Box 1.1 Principles of agricultural extension activities

Derived from the needs of farmers and the agricultural development requirements of the state, the government's extension system aims to promote the proactive and voluntary participation of farmers in extension activities. The extension services identify strong links between management agencies, scientific research institutions, enterprises, and farmers. The extension services aim to provide demand-driven services focusing on the content and methods of agricultural extension suitable for different regions, geographical areas, groups of farmers, and ethnic minority communities. Central agricultural extension projects funded by the state budget shall be selected by mode of selection or competitive bidding prescribed by the Ministry of Agriculture and Rural Development. Local agricultural extension projects funded by the state budget shall be selected by mode of selection or competitive bidding as prescribed by the presidents of the people's committees of the same level.

Source: Viet Nam, Ministry of Justice (2010).

At the provincial level, there are agriculture (or agriculture and fisheries) extension centers under each province's department of agriculture and rural development. Agricultural extension stations exist in 596 districts and towns (95.5 percent of districts and towns in the country), and 51 provinces and cities—87.2 percent of the country at the commune level—have grassroots extension workers.

Agricultural Extension Funding Sources and Their Management

The government has decentralized agricultural extension, bringing it from the central to the local level, in order to promote demand-driven extension services. Between 2011 and 2014, approximately 240 billion Vietnamese dong (VND) were allocated per year by the central government. Between 2011 and 2013, local (provincial and district) extension budgets totaled VND 400 billion per year nationwide. Other sources of funding included international projects, at approximately VND 30–35 billion per year, and the private sector, accounting for VND 20–30 billion per year in 2010. The central agricultural extension fund is allocated through two main channels, the National Agricultural Extension Center (60–65 percent) and other units under MARD (35–40 percent). In addition, the National Agricultural Extension Center mobilizes different forces to implement extension projects through the provincial agricultural extension system (about 45 percent) and through other local units (55 percent). The level of investment for extension differs between provinces and cities.

Table 1.1 Investment in extension services

Amount of local and state investment for extension	Group of provinces and cities
More than 10 billion VND/year	5 provinces/cities (Hanoi, Ho Chi Minh City, Kien Giang, Hai Phong, and Dong Nai)
5–10 billion VND/year	15 provinces/cities
2–5 billion VND/year	23 provinces/cities
Less than 2 billion VND/year	20 provinces/cities
Less than 0.5 billion VND/year	6 provinces (Cao Bang, Bac Kan, Ninh Thuan, Thai Nguyen, Ha Tinh, and Bac Lieu)
There is big difference in the level of investment in agricultural extension among localities. Many localities find it difficult to allocate budgets, especially those in mountainous and agriculture-based provinces.	

Source: Authors' compilation.

Note: VND = Vietnamese dong.

Socialization of Extension Work Is Critical to the Success of Extension

The adoption rate of any new extension techniques and practices that are taught to farmers will be higher if the farmers see a positive impact on their incomes. Moreover, if agricultural extension models include reciprocal capital from farmers or enterprises, the success rate is higher, creating more motivation to stimulate replication. At an April 22, 2014, workshop titled “Renovation of Agricultural Extension Services for Agricultural Restructuring Project,” former MARD Minister Cao Duc Phat concluded that Viet Nam should promote socialized and public-private partnership mechanisms to attract the participation of enterprises in agricultural extension work, thereby coordinating private and state resources. Examples of socialization as an operating method are presented in Box 1.2.

Box 1.2 Examples of socialization of extension work

In 2009, Dak Nong Province launched the Public-Private Partnership (PPP) Program, developed to sustain coffee production in Dak R’Lap, Dak Song, and Tuy Duc districts. With money from the federal budget as well as project funding, the provincial agricultural extension center supports the development of PPP farmer groups, offers training in new techniques and management approaches, and organizes production (guiding farmers on how to maintain the nutrient balance of soils and crops by using fertilizer and preservatives).

The Doan Ket Co-operative, representing 15 farmer groups, cooperates with agricultural material suppliers to provide inputs for production, and cooperates with coffee purchasing companies to promote product consumption. The Nestlé Company supports 50 percent of the cost of seed for reforestation with 23,000 trees. After four years of implementation (2012–2016), the program had established linkages between farmers, businesses, and investors in the form of general buying (buying inputs) and general selling (selling coffee beans). A total of 1,174 households participated, with an area of 2,249 hectares of coffee. As a result, a stable yield of 3.1 tons per hectare (13 percent more than under traditional farming) resulted in a VND 16 million per hectare per year increase in farmers’ income, a 50 percent reduction in greenhouse gas emissions, and a 40 percent decrease in use of water from the irrigation system.

Source: Authors’ compilation.

Overview of Current Approaches and Providers

Viet Nam's agriculture sector is being transformed into a pluralistic system involving farmers, the private sector, and NGOs. Since 2014, the national extension system has focused on the agricultural sector restructuring plan, including developing rural areas, increasing food safety, and promoting hygiene. In addition, the public extension system is responsible for enhancing the capacity of agricultural extension staff and collaborators, strengthening the application of information technology in agricultural extension, increasing the connection between farmers and enterprises, and formulating policies on agricultural extension in line with requirements and production practices. Public extension enhances the function of consultancy in extension services by encouraging paid consultancy for extension services. Box 1.3 presents an example of an innovative model used for the extension system in Lam Dong Province.

Box 1.3 Model used for the extension system in Lam Dong province

Lam Dong Provincial People's Committee has promulgated a plan for restructuring the agriculture sector toward enhancing value-added and sustainable development. To promote the role of agricultural extension in restructuring Lam Dong's agricultural sector through 2020, agriculture promotion activities will focus on the following modalities:

1. Renovate the approach to extension
 - Content: Extension content comes from the needs of farmers. *"Farmers are customers."*
 - Quality: Under the socialization of extension, farmers choose which agricultural extension services have the best quality.
2. Use innovative methods in extension activities
 - Increase the application of information technology
 - Provide professional consultancy services
3. Renovate extension activities
 - Information and communication:
 - Apply information technology to modernize agricultural extension services by using the Internet, radio, television, and mobile phones
 - Disseminate not only technical but also market information, trade promotions, product standards and other technical regulations related to economic integration, and policies to encourage value chain linkages
 - Provide information on weather, the agricultural calendar, pests, and mitigation of and adaptation to climate change to help farmers and businesses improve production and business efficiency

Continued

Box 1.3 Continued

- Training, fostering of technology transfer:
 - Make close connections with scientific institutes, universities, and research centers to receive new technical advances for timely transfer to local production
 - Train farmers on value chains from production to market development and educate enterprises engaged in production and market development.
 - Apply participatory training and increase practical training to develop self-reliant farmers, with extension officers playing the role of promoting, directing, and facilitating.
- Developing and effectively implementing extension projects and models:
 - Make the agricultural extension model or project focus on the development of strategic farm produce that has competitive advantages and a good market. Promote the public-private partnership model, encouraging linkages between enterprises/cooperatives and farmer cooperative groups.
- Consultancy and extension services:
 - Expand the types and improve the quality of agricultural extension consultancy services to raise the practical, market-driven capacity of extension workers and supplement funding for extension activities.

Source: Authors' compilation.

2. EVALUATION

Methodology

To identify challenges faced by Viet Nam's agriculture sector and provide possible solutions, we conducted the following desk review. The purpose of this desk review is to assess the current situation of agricultural extension in Viet Nam by searching the literature for the enabling factors and policies that could improve the state of Viet Nam's agriculture sector.

Contextual Factors

Policy Environment

The most common method of extension is provision of input subsidies, useful because it allows farmers to adopt new technology at a lower risk. However, if adoption is limited to the time the subsidy is available to farmers, the change in their practice will not be permanent. Another drawback is that input subsidies decrease any motivation for the extension system to become more market driven. Finally, this model finances agricultural extension mainly from subsidized funds, with a lack of private-sector counterparts, thus limiting the possibility of replication and self-sustainability.

Capacity of Service Providers

The National Agricultural Extension Center (2016) reported that grassroots extension workers (commune extension workers and village extension collaborators) have been the weakest group in the extension system: in 2016, Viet Nam had about 20,000 grassroots extension workers at the commune and village levels, but only about 24 percent of commune extension workers had a college degree. Most of the commune extension staff are trained in one specialized discipline, but they carry out multidisciplinary extension services, such as animal husbandry, cropping, plant protection, and veterinary services. Extension collaborators are mainly heads of cooperatives, heads of villages, or chairpersons of social organizations in villages and hamlets, more than 55 percent of whom have not yet received professional training in agriculture or agricultural extension.

Along with the quality of extension workers, there is also a shortage of quantity. On average, about 20 percent of extension workers retire or resign each year, equivalent to a loss of 5,600 staff per year. Therefore, the new training needs for the extension system are 5,000 people per year. However, Viet Nam is experiencing a shortage of additional human resources as the number of students enrolled in agriculture extension schools declines.

Demand for and Supply of Extension Services

On the demand side, farmers account for nearly 70 percent of the population and about 50 percent of the labor force in Viet Nam. In 2016, Viet Nam had more than 8,700 agricultural enterprises with a workforce of about 380,000. It is forecast that over the period 2017–2020, the number of agricultural enterprises will increase by about 10 percent per year.

According to results of the 2016 Rural, Agriculture and Aquaculture Census from the General Statistics Office (Viet Nam, GSO 2016), Viet Nam has 9.32 million households engaged in agriculture, forestry, and fisheries; 33,488 agri-farms; 10,446 agricultural cooperatives; and 2,262 large-field farms.

On the supply side, at present, there are nearly 17,200 people working in the specialized agricultural extension system, of whom 90 are members of the National Center for Agricultural Extension. At the provincial level, about 1,900 people work in extension, at the district level approximately 4,000 people, and at the commune level approximately 11,200 people. Village-level extension collaborators comprise approximately 18,000 people.

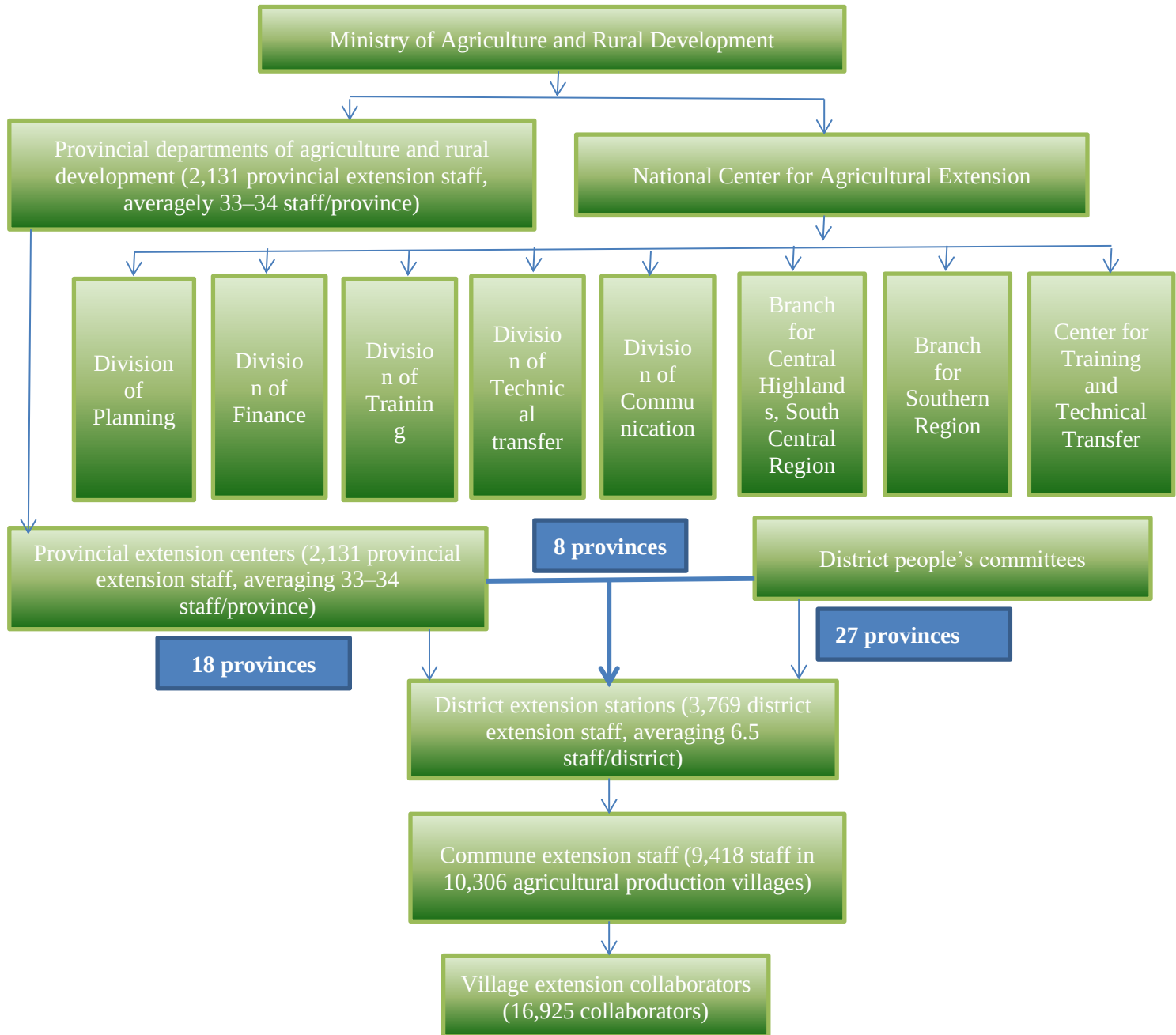
Extension Service Characteristics

Organizational Structure

MARD leads all activities of the provincial departments of agriculture and rural development and of the National Center for Agricultural Extension. The National Center for Agricultural Extension heads the divisions of planning, finance, training, communication, and technical transfer as well as a branch for the Central Highlands and South Central Region, a branch for the Southern Region, and the Center for Training and Technical Transfer. The provincial departments of agriculture and rural development guide

the provincial extension centers and district people's committees, which manage district extension stations, commune extension staff, and village extension collaborators. Figure 2.1 provides the organizational structure in detail.

Figure 2.1 Organizational structure, Viet Nam agriculture and rural development



Source: Author's compilation

Capacity of Staff

The capacity of agricultural extension staff to transfer technical advice to farmers is limited. A study by the National Center for Agricultural Extension (2016) showed that 87 percent of provincial extension workers had the capacity to undertake their assigned tasks. At the district level, about 81 percent of extension workers had the capacity to meet work requirements. At the community level, about 63 percent of extension workers had the capacity to meet job requirements. Overall, agricultural extension workers lacked an orientation toward market information for farmers and were not able to effectively connect farmers with enterprises. Young extension workers have limited capacity and lack practical knowledge and extension skills. The current extension staff needs to be trained on new extension skills and techniques because they are familiar with only the old way of doing things.

According to the National Agricultural Extension Center (2016), the 47 extension service providers outside the national government's extension system have, on average, 10 extension workers each. Out of these, 2 percent have PhD degrees, 8 percent have master of science degrees, 66 percent have other university-granted master's degrees, and 24 percent have undergraduate degrees. However, the age of these officials is quite high, so their ability to participate in extension activities is also limited.

To strengthen the capacity of agricultural extension staff, the National Center for Agricultural Extension conducts trainings of key staff members as resource trainers to retrain grassroots extension workers (there are currently 180 of these resource trainers for 63 provinces and cities). It also offers 314 different training courses for provincial and district extension staff, 41 of them on extension and 273 on professional and technical skills.

Management

Since 2011, MARD has applied the mechanism of bidding for extension projects. MARD is responsible for establishing the projects and the bidding process. Since 2011, the Central Extension Fund has been allocated through two main channels (the National Agricultural Extension Center and other units under MARD).

To implement central extension projects and agricultural extension, the National Agricultural Extension Center is responsible for selecting the implementing agencies through a thorough procurement process. Local agricultural extension centers such as businesses, research institutes, and universities are encouraged to participate in bidding alongside other extension service providers. According to statistics on completed bids, 45 percent of the implementation agencies are provincial extension systems and 55 percent are other local extension service providers.

Extension Fund to Assist Farmers in Applying and Replicating Effective Extension Models

Since 2002, the Hanoi People's Committee has piloted the country's first agricultural extension fund run by a city. The results of a 2017 review show the sustainability of the model. Hanoi Agricultural Extension Fund is a nonprofit organization and has actively provided support by providing farmers with updated knowledge and advanced farming techniques for the past 15 years.

The extension fund management mechanism is a way to move public service delivery toward autonomy.

Advisory Methods

The activities of a standard extension process include technical training, demonstrations, study tours, communication, and providing farmers with updated knowledge and new farming techniques.

In recent years, Viet Nam's extension system has concentrated the majority of its funding (75 to 80 percent) on building an extension model. Funding for communication and management is limited to 18–23 percent. Support activities for farmers to apply and replicate advanced models are available only in the pilot Hanoi Agricultural Extension Fund.

Table 2.1 Structure of central extension funds

Structure of agricultural extension funds	Central extension 2011–2013	Central extension since 2014
Extension project (demonstration/model)	80%	75%
Regular tasks: Information, propaganda, training	18%	23%
Management, inspection	2%	2%

Source: Authors compilation

Performance and Quality of Service Provided

Governance and Policy Environment

Relevance

The policy of socialization of agricultural extension activities is suitable for Viet Nam's extension system. Although there is a clear mandate on the mobilization of social resources and socialization of agricultural extension activities, there is not yet any documentation of lessons learned or good practices for mobilizing social capital for public-private agricultural extension activities. The current policy of allocation and management of agricultural extension funds is not creating incentives to mobilize private resources for agricultural extension.

Effectiveness

The majority of state-funded extension models are effective only at a small scale and difficult to replicate due to financial constraints and limited access to market and land. The inspection and supervision of extension quality has not been carried out regularly. Extension activities are still based on performance indicators such as the number of training courses provided or the number of participants, with no method to evaluate the results of these activities. Mechanisms with which to evaluate the effectiveness of these extension activities need to be developed.

Efficiency

Contributions of social extension organizations should be encouraged and promoted. It is not strictly a requirement to coordinate and attract enterprises to collaborate in extension activities. The national

administrative extension system is subsidy based, not market driven. There is a lack of coordination between researchers and extension workers.

There are many limitations on monitoring and evaluating the quality and efficiency of extension activities. Results of extension activities are mainly based on reports, and there is a lack of coordination between the central and local levels to monitor and supervise the quality of extension activities.

Sustainability

There was some initial success in mobilizing private investment and diversifying investment resources to fund extension and advisory services. Between 2009 and 2014, funds from the central budget accounted for only 24 percent of extension funding, local budgets accounted for 66 percent, and other sources accounted for 10 percent.

However, the level of agricultural extension investment varies between localities and regions. In provinces dominated by agricultural households, limited funds are provided by the central government, resulting in limited or nonexistent extension services. Currently, investment for extension activities is still limited, meeting only about 10–20 percent of local production demand, while social investments in agricultural extension activities make up approximately 10 percent.

Impact

Despite government intervention, Viet Nam's agricultural production is fragmented and does not add value. In addition, farmers overuse chemicals, fertilizers, and pesticides due to lack of knowledge, resulting in unsafe agricultural produce, land degradation, environmental pollution, and surplus produce. Agricultural extension services are not well organized and are unable to meet farmers' needs for technical assistance and marketing techniques.

Organization and Management (Including Performance)

Relevance

The functions and tasks of the National Center for Agricultural Extension need to be updated and adjusted to meet the current requirements. The National Agricultural Extension Center is a governmental unit

under MARD and is responsible for implementing agricultural and fishery extension activities.

Agriculture; forestry; salt making; fisheries; processing and preservation of agricultural, forestry, and fisheries products; and rural development nationwide are within the scope of central management under MARD.

MARD's responsibility is to participate in forming long-term, five-year, and annual development policies and plans as well as agricultural and fishery extension programs and projects. It is also responsible for implementing agriculture and fishery extension projects and programs approved by the ministry.

Effectiveness

The National Agricultural Extension Center has unclear functions and tasks, leading to duplication of work by different units in MARD. Coordination is required between the units and international agencies to avoid duplication of work. According to Viet Nam, MARD (2008), the National Agricultural Extension Center has the task of "reporting" without the task of monitoring and evaluating the quality and effectiveness of local extension activities.

To acquire new knowledge and make agricultural advances, Viet Nam will require a move to high-technology agriculture along with improvement in the quality and productivity of agricultural production.

Efficiency

In some localities, agriculture has been gradually transformed into an extension service delivery model through the construction of an agricultural extension service.

Sustainability

The majority of extension models are difficult to replicate when the extension project ends because there is no further support from the government. Implementation of extension projects without the participation and contribution of enterprises and farmers leads to unsustainable extension models. For sustainable models, enterprises must be mobilized to invest and advance input materials for farmers and enterprises to

buy and sell agricultural products. However, private enterprise is still reluctant to collaborate with extension units because such collaborations make costs higher. Viet Nam has a policy to pilot public-private partnerships in agriculture extension, but there is no report on lessons learned through implementations in this direction.

Impact

Viet Nam annually spends \$500 million a year to import 8,000 tons of seeds of all kinds, and \$12.4 billion to import materials for agriculture (Hanel, 2011). Ninety percent of pesticides and 90 percent of flower seeds are imported. This shows that Viet Nam does not have a well-organized knowledge flow system that transfers scientific research results into production. Also, collaboration among government extension agencies, scientists, farmers, and enterprises for extension purposes is low.

From 2015 to 2017, agricultural producers were unable to sell their produce, resulting in a surplus crisis. Surplus stocks are risky because 90 percent of Vietnamese agricultural products are unprocessed. The 2015–2017 surplus indicates that extension and advisory services have focused on the supply side—farming techniques—and provided farmers with little or no postharvest processing information. This is because the extension system is not well organized and lacks demand-driven services for farmers.

Capacity and Training of Personnel and Organizations

Relevance

Between 1995 and 2015, the National Center for Agricultural Extension compiled 40 different materials and 30 training tool kits for providing effective extension, and organized approximately 6,000 training courses that were attended by 210,000 participants. The National Center for Agricultural Extension, in collaboration with other partners, has organized several training courses to provide farmers with the knowledge and resource they require.

Effectiveness

In 2014, the National Center for Agricultural Extension initiated a project to evaluate the current capacity of the extension system and provide solutions to improve its performance. During this project, a survey

was conducted in 20 provinces and cities representing different ecological regions. Investigators gathered information from state management agencies on agricultural extension, units involved in the implementation of central and local agricultural extension programs and projects, and farmers. According to the National Agricultural Extension Center (2016), 87 percent of provincial extension workers have the capacity required for their assigned tasks, 81 percent of district extension officers have the required capacity, and approximately 63 percent of community extension workers were qualified to meet the requirements of their work. The remaining staff needed professional training in order to effectively provide services.

Efficiency

Extension training activities can be further improved by involving private-sector extension providers. Ngan, Dung, and Babu (2015) explained how tailored technical assistance provided by a private company in Viet Nam can increase the knowledge and livelihoods of small-scale rice farmers. This will provide an opportunity for public and private extension workers to collaborate and share knowledge. Constantly training extension workers is also a key to keeping them informed of new techniques and practices. All of these changes will bring more benefits without increasing the budget for extension.

Sustainability

The sustainability of face-to-face training will be dependent on funds allocated from the central budget. Between 2011 and 2016, central budget allocations for agricultural extension activities declined. Currently in Viet Nam, no innovations or new tools about teaching and learning are being developed for extension staff. Online learning techniques and distance learning programs could be developed to provide extension services. Such techniques have been proven successful and effective in reaching multiple farmers at once and providing them with the information and resources they need. Table 2.2 shows the budget allocated for extension by the central government.

Table 2.2 Budget allocation to extension by the central government

Period	Central budget extension funding (VND billion)
2011–2014	VND 240 billion/year
2015	Hosted 24 projects, costing VND 99.95 billion Managed 11 projects, costing VND 17.1 billion
2016	Hosted 21 projects, costing VND 83 billion Managed 9 projects, costing VND 11 billion
2017	Hosted and managed 13 extension projects, with a total cost of VND 76.8 billion

Source: Agriculture Newspaper (2016, 2017).

Note: VND = Vietnamese dong.

Impact

According to the results of a study conducted by the National Center for Agricultural Extension and Fishery Extension on the effectiveness of agricultural extension work for the period 2009–2014, 60 percent of farmers successfully applied the techniques they learned, 36 percent were partially able to apply what they learned, and 4 percent did not apply the techniques learned during extension trainings. These results prove that extension services need to be more effective and demand driven in order to provide farmers with the information and resources they require.

Extension Approaches Used

Relevance

Viet Nam’s public extension approaches aim to serve poor and smallholder households. However, the services provided focus mainly on technical production. Most local extension workers do not provide access to market information, marketing products, and agricultural mechanization information. Only some local extension workers in some provinces (such as Thanh Hoa, Quang Tri, Ha Tinh, and Bac Giang) provide policy information and market prices to farmers.

Effectiveness

According to the results of a study conducted by the National Center for Agricultural Extension (2016), 89 percent of respondents said that agricultural extension is effective and has a positive impact on production. More than 70 percent of respondents stated that agricultural trade fairs were organized

effectively and had a good impact on production. However, after demonstrations, 70 percent of respondents rated the models as highly efficient and well replicable, 94 percent evaluated the models as effective, and 88 percent thought the model could be maintained and extended to production.

Except for a few provinces in southern Viet Nam that provide extension consultancy services such as seed supply, most extension workers do not provide agricultural materials, laboratory testing, or sample analysis.

Efficiency

Viet Nam's agricultural production system is too dispersed and small. However, its beneficiaries are large in number (9.32 million farm households) and scattered. Therefore, using traditional techniques can be very expensive. According to the National Agricultural Extension Center (2016), the current level of government investment of VND 600 billion per year for agricultural extension will meet only 10–20 percent of production needs. Other sources of investment from various resources will meet about 10 percent of production needs, leaving about 70–80 percent of producers without access to any extension services. If the investment is to stay at the same level, Viet Nam needs to study and renovate its extension system in order to reach out to more beneficiaries. According to Dzong (2017), 24 million people in rural areas use the Internet, 90 percent of rural people use telephones, and 50 percent use smartphones. However, there are currently no strategies in place to utilize the Internet or smartphones in extension work to increase efficiency and reduce the costs of extension activities.

Sustainability

The sustainability of using demonstrations as the main method for extension is low because demonstrations are unreplicable at scale. Viet Nam's current agriculture extension system faces financial constraints and lacks capacity. Because farmers are used to receiving financial support from the central government, creating a more sustainable system is crucial (Huong and Petlock 2016).

Impact

Results from the **National Agricultural Extension Center** (2016) show that 65 percent of farmer respondents want to participate in demonstration activities; 89 percent want to participate in training courses; 76 percent require agricultural extension information; 69 percent require technical advice; and 47 percent want to participate in extension activities through extension clubs, groups, and farmer groups. Thus, the government should identify strategies to increase the efficiency of and investment in the current extension system.

Cross-Cutting Issues

Gender

In general, women have low access to agricultural extension services, production inputs, and capital, compared with men, in Viet Nam. Although women account for nearly half of the livestock-keeping labor force, only 20 percent of the training courses on agricultural extension for livestock involve women. Approximately 80 percent of rural women are involved in cultivation; however, only about 10 percent of them are involved in cultivation courses. The majority of public service providers at the grassroots level are men, and they often consider male farmers (household heads) as their target audience for extension activities. Even though women undertake most of the work related to agricultural production, they are less likely to attend training courses.

Nutrition

Agriculture is directly linked to nutrition, and the fundamental purpose of agriculture is not just to provide food and raw material but also to grow healthy and well-nourished people (Fan and Pandya-Lorch 2012). Increasing knowledge about malnutrition and its causes at the farm household level through agricultural extension can improve food security (Babu et al. 2016). In Viet Nam, 23 percent of children under the age of 5 years (1.6 million out of 7.2 million) are stunted (FANTA 2014). The issues of overweight and underweight exist simultaneously (also known as the double burden of malnutrition) as a result of poor diets, which can have long-lasting impacts on health, education, and productivity.

Climate Change

Climate change is a well-recognized challenge globally. The agricultural sector is the most important contributor to climate change and is also the most affected by it (Patra and Babu 2017). Rice is one of most cultivated crops in Viet Nam, and rice cultivation contributes to high levels of greenhouse gas emissions, thus contributing to climate change (Patra and Babu 2017).

In 2016, Binh Dien Fertilizer Joint Stock Company cooperated with the National Agricultural Extension Center to implement a program titled Intelligent Rice Cultivation to Respond to Climate Change in the Mekong Delta for the summer-autumn crop of 2016 (Bamomoi, 2016). Sixty-five farmers in the Dong Thap province participated, learning useful knowledge for smart rice production in response to climate change. Participating farmers reduced their production costs by reducing the cost of seeds, fertilizer, pesticides, and crop care. Their average cost to produce a kilogram of rice was lower than that of the control field by VND 500–VND 1,000 per kilogram. Participating rice growers earned a profit of 50 percent, compared with the government’s target of 30 percent for rice farmers. Due to the results achieved in 2016 and again in winter-spring 2017, the National Agricultural Extension Center will replicate the program at a single production site with a total area of 30 hectares.

In addition, the Integrated Coastal and Mangrove Protection Program for climate change adaptation, together with the National Agricultural Extension Center, has launched coordinated activities in the agricultural sector, helping farmers in five provinces (Soc Trang, Bac Lieu, Ca Mau, Kien Giang, and An Giang) apply techniques and measures to implement smart rice cultivation methods to adapt to climate change.

Age

Young agricultural extension staff account for a large proportion of total staff. Since 2016, the National Center for Agricultural Extension has organized many training courses to encourage young extension workers. The training contents focus on basic knowledge of extension activities, application of information technology in agricultural extension activities, and methods and skills for agricultural extension training, enabling staff to perform assigned tasks locally.

3. CONCLUSION AND POLICY RECOMMENDATIONS

This section discusses the results of the desk review on the performance of extension services in Viet Nam. It also addresses questions such as these: What methods are working and why? What are the reasons for success or failure? How can the policy environment be improved? And what training or capacity is needed by individual agents?

Agricultural extension approaches such as involving enterprises have shown a positive impact on farmers. In extension models, it is necessary to involve local business owners because they understand current market demand, what products to produce, the quality of the products, and the farming process. Such local companies will guide and encourage farmers to follow the process and at the same time sell the necessary products to farmers. This model has been proven in production practices in some provinces. The software system uses rules to assess the current situation and make recommendations accordingly.

One of the reasons for lack of success in extension in Viet Nam is that agricultural and fishery extension centers are not technical research units or economic units that participate in the market, but instead are assigned to advise farmers on production and consumption. In fact, agricultural extension centers are public, because they operate using government funds. However, due to financial and capacity (institutional and individual) constraints, they are unable to meet farmers' needs.

The policy environment can be improved by changing the structure of central government budget expenditures for agricultural extension. The extension system plays the role of monitoring, evaluation, and communication. Investment should be made to support post extension models (linking capital, technical advice, and guidance) to ensure sustainability. Developing tools for farmers to monitor and evaluate the quality of extension services is crucial so that offerings can be improved to better serve them. Also, policies supporting producers (users of agricultural extension services) to participate in evaluating and supervising the quality of agricultural extension services should be established. The central government should provide tools for beneficiaries to evaluate the quality of extension services and organizations.

Improving collaboration between farmers, extension agents, and researchers is also a way to improve services.

Strengthening the capacity of extension agents is required. Because incentives for extension agents are low, increasing incentives can improve the extension services provided.

Policies supporting research, as well as development of information technology systems and solutions supporting digital learning, can improve the current extension services available without increasing the financial burden.

Another possible solution is to encourage the private sector to fill the gaps left by the public sector. This solution can reduce the financial burden on the government.

The government should improve coordination among key players, both local and international (Babu and Blom 2017), and encourage public-private partnerships. Efforts to increase the role of the private sector, NGOs, and farmer groups in the extension system should be made in a systematic manner. An expansion of the extension system to include the private sector will increase its efficacy. Steps should also be taken to avoid duplication of work and increase the number of beneficiaries (Babu and Blom 2017).

The central government has investment programs to mobilize intelligence and creativity in the development of electronic extension methods that use the Internet of things and big data. This is also important to achieve and sustain food security for the country. The government forms a platform of business networks, commercial cooperatives, and processing enterprises in rural areas. The government is responsible for developing a network that provides farmers with the input, equipment, credit, and knowledge they require. Government should also try to develop networks that participate in the electronic agricultural extension platform to connect with producers. This will create an environment that encourages rural farmers to participate in the development of market-oriented production in a convenient and sustainable way.

Ending hunger, malnutrition, and poverty requires a well-capacitated and harmonized food system. Steps to improve the current extension system can improve food security and reduce malnutrition.

Strategic efforts are needed to strengthen the institutional and individual capacity of extension agents to increase their effectiveness.

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