

A Review of Policy Constraints and Opportunities for the Sustainable Delivery of Quality Fruit Tree Germplasm in Vietnam

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Abstract – Seedlings of high genetic and physical quality are crucial for effective and sustainable crop production by smallholders in Vietnam. Unfortunately, farmers have little access to quality fruit germplasm and often buy poor quality seedlings. This paper is a review of the current fruit-tree germplasm pathways, germplasm policies, and the opportunities and constraints of those policies. It also provides recommendations to strengthen the management of germplasm. In Vietnam, seed and seedling supply is managed through an insufficient centralized State system, especially at district and commune level. This leads to a situation where fruit-tree seedlings of poor and unknown origin are produced and distributed in many places. Lack of resources, low capacity, and weak law enforcement present major barriers. Fruit-tree germplasm is produced and distributed by formal (FS) and informal (IFS) production and supply systems. The FS, including state-owned institutions and registered private entities, supplies between 10% and 15% of seedlings. The balance, majority of seedlings, is provided through IFS smallholder seedling producers and businesses. A large percentage of these smallholder producers are unable to comply with the requirements necessary for a seedling business and measures designed to strengthen the farmer-producers are limited. Germplasm policies focus mainly on the development of new plant varieties, while quality control of seed and seedlings is neglected. Improvement of the current regulations and implementation at local level, as well as stricter and decentralized seedling management combined with appropriate measures to strengthen the role of smallholder seedling producers are key to sustainable delivery of quality fruit-tree germplasm.

Keywords – Germplasm Policy, Germplasm Pathways, Seedling Production and Supply System, Fruit Tree Germplasm.

I. INTRODUCTION

The genetic and physical quality of germplasm plays a critical role in agricultural systems, determining the upper threshold of productivity and product quality [1]. Access to quality germplasm has significant implications for national food security and its improvement. The delivery of high quality germplasm to agricultural producers must be a crucial priority for the agricultural sector.

In Vietnam, fruit trees play an increasingly important role in the crop production sector. This is particularly relevant in the Southeast and Mekong River Delta, which is responsible for 38% of the nation's total fruit-production [2]. Data from the General Statistics Office (GSO) and the Crop Production Department (CPD) indicate that the country's total area of fruit production is approximately 767 000 hectares, increasing 270% in the last two decades. The area under citrus alone has increased six times. During the same period, fruit production rose by

500% [3]. The growth in fruit yield and productivity is a result of both increased planting and advances in science, delivering new high-yielding varieties. The expansion of fruit-tree planting has created a demand and opportunity for the production of quality fruit-tree germplasm. Better germplasm management and policies could help ensure the sustainability of quality seedling delivery, and greater economic benefit to the fruit sector, consumers, and particularly to smallholder farmers. The Government of Vietnam has initiated improvements to the legal framework, management system, and preferential policies related to plant seed sources in general, and specifically to germplasm of fruit-tree species. As a result of the Government's efforts, quality seed and seedling sources have gradually spread across the crop/tree landscape, to the benefit of farmers [4]. However, despite this success there remain gaps in the management of the fruit-tree seedlings supply system, inappropriate regulations, and inconsistent implementation of existing policies. In practice, fruit-tree seedlings of poor and unknown origin are produced and distributed in many places. Because fruit trees are perennial crops that begin production only after several years, farmers often do not realize their mistake until it is too late. These experiences have been widely reported.

The objective of this study sought to investigate the current fruit tree seedling production and supply system, and analyse the institutional aspects of fruit-seedling management within the broader context of germplasm policies. Specific attention was paid to policies on management and development of fruit-tree germplasm and to the level of Government regulatory enforcement at various points along the seed and seedling production and supply pathways. Throughout the study, constraints, opportunities, and good practices were identified.

This study analysed a wide range of secondary data from across the fruit sector in Vietnam, including: (i) published and unpublished reports from government agencies; (ii) private sector reports in the fruit germplasm production and distribution chains (such as seedling producers, fruit-tree growers); (iii) legal documents and policies related to germplasm management; (iv) online information; (v) newspaper articles; and (vi) journal articles on seedling production and supply system worldwide.

II. CURRENT FRUIT-TREE SEEDLING PRODUCTION AND SUPPLY SYSTEM

Fruit-tree germplasm in Vietnam is produced and distributed through both formal and informal production

and supply systems. The formal system (FS) includes state-owned and -controlled research institutions, centres, and enterprises, such as the Fruit and Vegetable Research Institute and the Southern Horticultural Research Institute. Private companies are also involved. All FS enterprises are required to meet Government regulatory standards and registration. The informal system (IFS) is comprised of smallholder seedling producers and the businesses, owned primarily by farmers.

Based on 2010 data provided by the CPD, FS fruit tree seed and seedling producers operated in 20 provinces, however most were concentrated in the Mekong Delta region (see Table 1). Registration records showed that these businesses provided a very limited quantity of fruit tree seedlings, approximately 33 million seedlings [5]. Compared with actual areas planted in 2010, it is clear that a large portion of germplasm was produced and supplied by the IFS. A report by the CPD also confirmed that household seedling production was the most popular production form for fruit-tree seedlings [6]. According to Dr. Nguyen Minh Chau, director of the Southern Horticultural Research Institute, only about 10% of fruit-tree seedlings were supplied by state facilities; the rest were provided by private companies, smallholder businesses or IFS [7].

The IFS plays a very important role in the seed and seedling supply system in Vietnam. Farmers prefer seedlings from IFS (as reported in [6]) because the IFS: (i) meets the local needs; (ii) is easier to assess; and (iii) is reasonably priced. However, 98% of IFS producers were not officially registered and unable to comply with production and supply regulations as stipulated in MARD Circular 18/2012/TT-BNNPTNT [8]. Cited violations of non-compliance among IFS producers included lack of (i) qualified technical staff to support production activities; (ii) mother trees; (iii) clonal nurseries; (iv) information on seedling standards and quality control; and (v) seedling labelling.

Recognizing the important role of IFS in seed and seedling production and distribution, MARD issued the decision 35/2008/QĐ-BNN, regarding the management of smallholder seed and seedling production. The most significant outcome of this decision entitled farmers to participate in the collection, storage, preservation, and use and distribution of local plant varieties and genetic resources. The farmers were also encouraged to participate in programs on related topics and are eligible to apply for government support as regulated by other legal instruments. However, if farmers produce seed and seedlings for commercial purposes, they are required to adhere to the same regulations in place for seedling producers. A number of the regulatory provisions would be impractical for smallholder farmers due to poor material base, limited technical capacity, and lack of legal knowledge related to seed and seedling production. The optimal method to achieve the Government's objective has not yet been identified. While issuing the decision is the first step, feasibility and practicality require that regulations are adjusted and farmer producer capacity is supported and strengthened. [9].

Successful support of farmer-producers in the rice sector has been recorded [10]. In these instances, regular support was provided through extension networks, provincial seed centers, and local mass organizations such as the Farmers' and Women's unions. Unfortunately, similar stories of success have not occurred for fruit-tree germplasm. Various studies and practices around the world show that enhancing the role of IFS, especially in the developing world, is a vital pathway to improving the delivery of quality planting materials to farmers [11] - [14]. Building the capacity of IFS germplasm producers and distributors, preferential policies for the development of IFS, and clear germplasm quality control guidelines were frequently recommended.

Table 1: Distribution of officially registered seedling businesses

Location	Total	Red river delta	Northern mountainous areas	North Central coast	South Central coast	Central Highland	Southeast Vietnam	Mekong Delta
Provinces, cities	20	2	2	2	1	2	3	8
District, communes	9	0	1	0	0	0	1	7
Private	18	5	1	3	0	0	4	5
Others	21	1	7	3	0	0	6	4
Total	68	8	11	8	1	2	14	24

Source: Survey data of 36 provinces provided by CPD of MARD in 2010

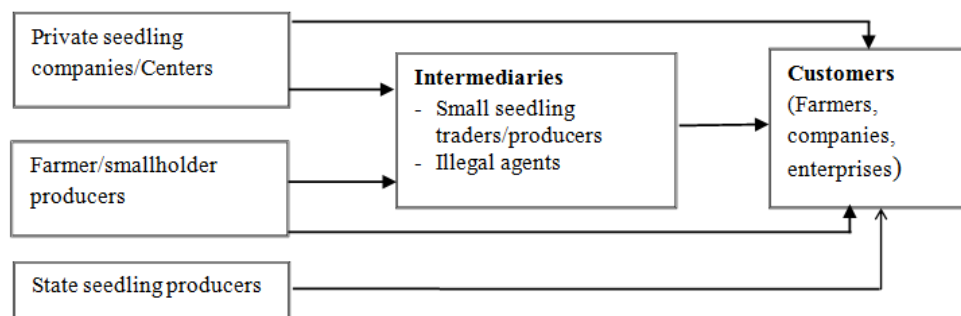


Fig.1. Distribution channels for fruit-tree seedlings

Furthermore, insufficient attention has been paid to the protection of plant varieties. The misuse of germplasm property rights is a common practice [15]. Small-scale seedlings or seedlings purchased from elsewhere have been mislabelled with the name of well-known producers. Newspapers report the widespread sale of fruit seedlings of poor genetic and physical quality [16] or false pedigree [17]. Poor quality seedlings have flooded local markets.

Le TH et al in [8] reported 20% of customers experienced buying poor quality seedlings. Those respondents made an average investment of VND 1.5 million per household. Given the long rotation of fruit-tree species, the estimated financial loss may be as much as VND 22.6 million per household. The missed opportunity costs are incalculable.

The production of both fruit and fruit seedlings is immense in the Mekong Delta. To increase profits, seedling producers also commonly issue false labels for seedlings of unknown genetic quality. Seedling intermediaries, especially in the Central Highlands, sell these poor quality seedlings at exorbitant prices to unsuspecting farmers [18]. Such unscrupulous business ethics has created widespread uncertainty regarding the genetic quality of fruit seedlings. The lack of reliable information regarding genetic origin and the consequences of planting poor quality seedlings intensifies this uncertainty. Along with law enforcement, raising farmer's awareness on the importance of seedling quality and suggesting reliable seedling suppliers could help farmers select reliable seedlings sources.

Seedling Distribution Chains

Study results show that there are five types of actors in the fruit-tree seedling production and supply pathway: (i) farmer/smallholder-producers; (ii) private seedling companies/centers; (iii) state seedling producers; (iv) seedling intermediaries; and (v) customers. Fruit seedlings are supplied primarily either directly to customers or through seedling intermediaries (Figure 1). Customers include farmers, private companies, and government enterprises. Seedling intermediaries include small-scale seedling traders and illegal seedling agents. The latter are individuals illegally engaged in the business without having a license or office space.

According to the survey data [8], small-scale seedling traders typically produce only 10–20% of the seedlings that they sell; the difference is purchased from farmer-producers or seedling companies. Farmer-producers primarily sell seedlings directly to customers; only small quantities are sold to seedling traders or illegal agents. The price of seedlings purchased through illegal agents could be two to three times more expensive than if seedlings were purchased directly from seedling producers or traders.

Private seedling companies sell seedlings to small traders or directly to farmers. State seedling producers distribute seedlings to farmers and companies. They do not sell seedlings to intermediaries, thereby maintaining control of seedling price and genetic and physical quality. In general, the FS distribution chain is well governed and maintains quality. However, the assuring quality in the IFS

seedling chain and combatting illegal intermediaries remain issues.

III. STATE MANAGEMENT OF FRUIT-TREE SEEDLINGS

In Vietnam, germplasm production and supply is managed and controlled by a centralized state system. For perennial industrial and fruit species, several agencies are involved in germplasm management.

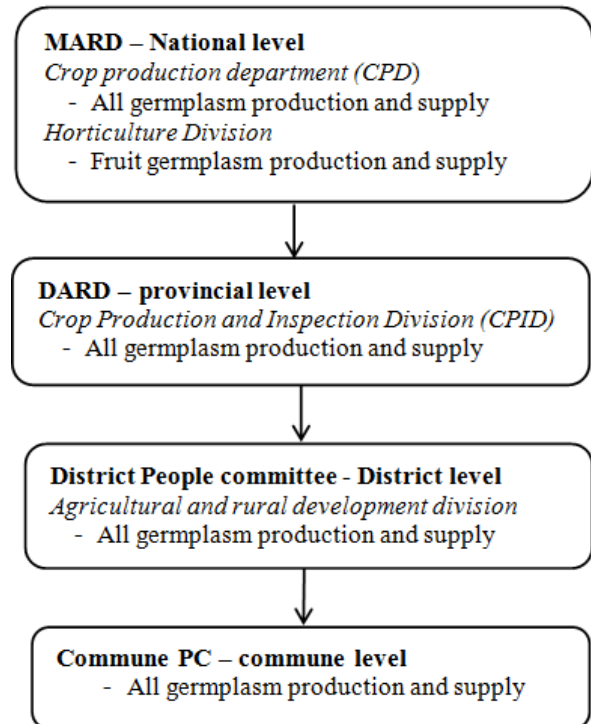


Fig.2. State management scheme of fruit-tree seedlings

At the national level, the CPD of MARD is responsible for the overall management role for germplasm production and supply. The horticultural division of MARD specifically manages the production and supply for fruit-tree seedlings. At the local level, the line agencies of MARD are responsible for seedling management. The CPD of DARD oversees management at the provincial level. The agricultural division of district people's committee is responsible for management at district level. Commune people's committees or ward committees are responsible at the commune level (Figure 2). The role and responsibility of different management levels are specified in different legal documents such as the Circular 18/2012/TT-BNNPTNT and Ordinance 15/2004/PL - UBTVQH11.

In general, all levels are responsible for the management of seedling production and distribution at their level and are well decentralized. However, fulfilment of their regulatory duties remains a challenge. At all levels, lack of attention and specialized, technical staff, and limited financial resources are obstacles.

A. Issues in the seedling management system

In Vietnam, the control and inspection of seed and seedling markets is delegated to different authorities at

different levels. The plant variety list is managed by MARD (as stipulated in the ordinance No. 5/2004/PL - UBTVQH11/Chapter 2, clause 10), a centralized agency. MARD is responsible for making decisions related to the germplasm source list, relying on information provided by agencies at provincial and district levels regarding local, specific species. Managing requests from different agencies regarding local species requires a great deal of time and resources. The local offices do not have enough flexibility to make quick decisions about their species. Experience in other Asian countries has shown that decentralization of germplasm management is indispensable to development of an effective and responsive sector [19]-[24]. While the national agencies maintain control of the germplasm of crops that are vital to national food security, local agencies should correspondingly have the authority to manage species that are popular or crucial in their areas.

At the local level, seed and seedling production and supply are not properly managed due to a shortage of trained staff, lack of facilities, and lengthy processes required for proper analysis. This results in limited capacity to identify and evaluate seed sources in a timely fashion [25]. Consequently, the management and control of certifying seedling quality is handed to seedling producers. These gaps in germplasm management are recognized by MARD and its line agencies [26] and measures to address the issue of low seedling quality have been applied [27]. These include enhancing the control of seedling quality in the market, providing a list of certified seedling producers to the public, and raising awareness among seedling customers. Nevertheless, these methods have been applied focusing on germplasm in particular sector namely forestry.

While a large number of smallholder seedling producers and traders do not meet regulatory requirements, there are no effective measures in place to address this. Unregistered producers continue to operate and proliferate. Potential roles for the Association of Plant Breeders and the Vietnam Seedling Traders Association in the field of germplasm quality and seed and seedling businesses management have not yet been considered.

Aside from decentralization, clearly defined structures, functions and responsibilities of management agencies at different levels, and sufficient resource allocation in key seed production areas are critical to sustain seedling delivery systems.

IV. GOVERNMENT TOOLS AND POLICIES IN FRUIT-TREE SEEDLING MANAGEMENT

A. Legal Framework

A favourable legal framework is important to enable the proper development and management of a viable germplasm sector. Vietnam lacks the seed laws present in China, India and Myanmar that provide solid legal framework for an effective management of germplasm sector. Although regulations regarding germplasm origin are specified in 31 legal documents issued by the National Assembly, MARD, other ministries and local governments

(the most important are listed in annex 1). These documents have been amended and gradually improved. The ordinance on seed and seedlings, paramount legal document, has been in effect since 2004.

All perennial industrial plants and fruit trees are categorized together and managed by the Horticulture Division. The regulations and policies developed by the Division apply to all species in this category. This creates further challenges in the field, since the industrial species' sector and fruit-tree sector have different needs.

There is one legal document, Circular 18/2012/TT-BNNPTNT (which replaced Decision 64/2008/QĐ-BNNPTNT) that regulates the business operations and statement management of the production and distribution of industrial and fruit seedlings. The circular consists of five chapters and 15 clauses. The most salient portion appears in Chapter III, relating to the origin, production, and delivery of perennial industrial plants and fruit seedlings. This section stipulates the necessary requirements to ensure the genetic and physical quality of produced seedlings, seedling labelling, criteria for evaluating seedlings, and results of seedling quality assessments.

Chapter IV specifies the roles and responsibilities of individuals and institutions involved in seedling production, sales, other distribution, and governance including seed source owners. Significantly, the document does not specify how to address violations. Thus, the inspection and control agencies responsible for industrial and fruit germplasm have no legal basis to apply punitive measures in case of violations.

Although the document details the role and responsibilities of state agencies at different levels, the operational structure and mechanisms are not specified nor are human and financial resources allocated. As a result, control and inspection work on seedling quality is neglected [28].

The Government's decrees 57/2005/ND-CP and 172/2007/ND-CP prescribe punitive measures against violations in the generic field of seed and seedling business. They do not distinguish between annual and perennial species. The sanctions are relatively low with maximum fines of VND 30 million (USD 1500). This is not a strong deterrent to violators, as profits from operating illegal seedling businesses can easily cover fines. Increasing the fine amount and the development of specific enforcement guidelines are recommended.

As previously mentioned, farmer-producers play a vital role in the fruit tree seedling production but have difficulty meeting regulatory requirements. A primary challenge for farmer-producers is registration of mother trees. The procedures are difficult to follow, time consuming, and require financial investment. Additional challenges also exist although farmer-producers' compliance can be improved. In a survey of farmer-producers conducted by IPSARD in [8], 65% of respondents said they could meet requirements but would need time to do so; 19% said compliance is possible given assistance from relevant government agencies. Five percent (5%) of respondents said the regulations should be changed. Seven percent

(7%) said it would be difficult to fulfil these requirements. But only 4% said they could not meet the requirements. Overall, most IFS producers (84%) feel they could meet government regulations given time and assistance.

As previously mentioned, the issuing decision 35/2008/QĐ-BNN aims to promote the role of the IFS in the production and distribution of seed/seedlings. However, not enough attention has been paid to design and implementation of appropriate measures to strengthen farmers' capacity, and they have not yet been able to benefit from the decision.

B. Law Enforcement

In Vietnam regulations related to germplasm are issued by the central government. The implementation of these regulations is undertaken by the local government, the line agencies of MARD as illustrated in the Figure 2. At the local levels, the regulations may be interpreted and defined slightly differently based on the context of local governance. In general weak law enforcement due to inappropriate resource allocation, lack of clear implementing guidelines and insufficient capacity of local officials have been identified as major issues. Issuing legal documents is the first necessary step however, their implementation at local levels and the determination of implementers is crucial. A strong legal framework should be accompanied by strong law enforcement and support policy as well. Monitoring and inspection of seedling production and supply should be carried out regularly, and in special cases, suddenly and unannounced (Decision 7-CP). In practice, state agencies conduct their monitoring and enforcement roles in a very formal manner mainly focused on germplasm of annual agricultural crops [26].

A large percentage of farmer producers are not registered officially. The low levels of registration may be linked to poor communication. In a survey of IFS producers, 80% of 75 respondent households were unaware of the seedling production requirements stipulated in Circular 18 [8]. Thus, campaigns to disseminate easy-to-understand information to farmer-producers and similar awareness-raising activities may contribute to the registration of producers in the IFS.

C. Policy on Germplasm Development

Along with the legal framework, seed policy is also a vital instrument for an effective germplasm sector. Recognizing this, the Government of Vietnam has developed various policies aimed at promoting research, conservation, breeding, testing, and development of new varieties with higher productivity, genetic quality, and disease resistance.

In 1999, the Prime Minister approved Decision No. 225/1999/QĐ-TTg on plant varieties and germplasm development. Between 2000 and 2005, the Government implemented a series of programs and projects to make the decision operational. This was the first comprehensive national investment by the Government of Vietnam in research, production, and distribution of germplasm. Foreign organizations, such as the Danish International Development Agency, also provided substantial technical and financial support. The main objectives were to: (i) ensure high quality genetic seed resources for production,

prioritizing species of importance for national food security and export; (ii) apply new science, technology, and biotechnology in breeding; (iii) develop a production and distribution system appropriate for existing market mechanisms; and (iv) encourage all individuals and organizations, national or abroad, to participate in research, breeding, and production of high quality seed resources.

To achieve these goals, the Government focused its investment on: (i) strengthening scientific research on seed-source development; (ii) enhancing the material and technical bases for the maintenance of seed origins, superior clones, production of pure and ultra-pure breeds, and hybrids; (iii) importing new varieties and breeding materials; and (iv) building the capacity of farmer-producers through the development of extension networks to encourage their participation in programs.

Subsequent to those initial investments, the Prime Minister issued Decision No. 17 on 20 January 2006 to continue relevant programs through the period of 2006–2010, building on the lessons learned from the first phase.

D. Achievements and Challenges in Policy Implementation

Government policies on germplasm development and international support have resulted in significant research and development impacts. Many new high-yielding plant varieties have been created and applied in practice, especially superior varieties of many fruit species. Despite these achievements, there remain issues to be addressed. Most germplasm policies are comprehensive but resources are insufficient to support good implementation. Some projects are not designed based on practical conditions and as a consequence, the research results cannot be applied in practice. Additionally, activities overlap between programs, resulting in inefficient use of limited resources [29]. Furthermore, many breeding programs, especially those at the national level, focus on high technology systems rather than replicable outputs. Complicated and investment-intensive, high technology systems cannot be applied in practice [30]. Policies need to be adjusted to focus on programs that develop technologies and systems that are appropriate for small-scale and rural seedling producers.

Most policies on germplasm only focus on promoting new plant varieties. The physical and genetic quality of the seedlings actually produced, as well as effective and sustainable distribution systems at local level are neglected [6]. Thus, while new plant varieties are created, the benefits of these efforts are not realized in practice.

Moreover, the institutions benefiting from past programs have been mostly state institutions (research institutes, universities, and seed/seedling centres) in the FS. Preferential policies, like tax and credit programs, were designed to assist the private sector; however, farmer-producers had difficulties accessing these programs because of collateral requirements. In these instances, programs and policies need to be designed to empower smallholders to produce seedlings of high genetic and physical quality. This might include the development of farmer-appropriate technologies, capacity-building

activities designed for farmers' conditions, and suitable investment or credit programs. Experience shows that the sustainability of the tree seedling market is enhanced by strengthening the capacity of grass-root producers and businesses in the IFS, particularly farmer-producers, and includes institutionalizing the distribution of quality germplasm through farmer-to-farmer exchange [31, 32].

V. CONCLUSIONS AND RECOMMENDATIONS

Seedlings of high genetic and physical quality are crucial for effective and sustainable horticulture production. Because fruit trees are perennials, ensuring the quality of seedlings is important to maintaining high productivity and product quality. We found that the largest share of the fruit-seedling market in Vietnam is supplied by small-scale farmer-producers. State-owned institutions and private companies supply a small quantity. However, because the majority of farmer-producers' businesses are unable to comply with regulatory requirements, the seedlings they produce are of uncertain genetic quality. Centrally managed, the germplasm decision-making process in Vietnam, has high transaction costs and time-consuming as it passes through multiple agencies. MARD, its line agencies, and local authorities manage seedling quality control and inspection at different levels, but lack of coordination and resources results in ineffective management and enforcement of policies and rules, leaving the fruit-seedling market vulnerable. Consequently, low or unknown quality seedlings flood the market. There are also gaps in the legal documents and policies related to the production and distribution of seedling sources, and enforcing these policies is a challenge. Based on local context and lessons learned from international practices, recommendations are provided on three major aspects of the fruit germplasm production and supply system, covering management system, legal framework, and support policies.

A. Management system

A decentralized germplasm management system could support an effective and responsive sector. While national agencies control the germplasm of crops that are vital to national food security, local authorities should manage species that are popular or crucial in their local areas.

A uniform management system of seedling sources and distribution should be developed nationwide, including a special unit with well-defined responsibilities to be in charge of seedling management at different levels. Full-time professional staff with adequate technical capacity and inspection skills should be appointed and trained regularly to maintain and enhance their capacity. Special attention and support is needed at the district and commune levels where seedling businesses are conducted... Effective management require that sufficient resources be allocated at each level. In order to mobilize the participation of other relevant organizations in germplasm management, strengthening the role of local mass organizations, such as farmers' unions and germplasm-related associations in germplasm quality monitoring and inspection is also recommended.

B. Legal framework

Promulgating a Seed Law is a crucial step towards improving germplasm management in Vietnam (PANAP & GRAIN, 2010). The Law should include implementing rules and regulations that specify the roles and responsibilities of different, but interrelated agencies, and outlines punitive measures against violations of seed and seedling regulations, as well as incentives that stimulate good practices.

C. Policy structure

Strong germplasm support policies can increase the efficiency of the delivery of quality germplasm and address current gaps in law enforcement. Since IFS plays an important role in fruit-tree germplasm production and distribution, supportive policies that strengthen the role of IFS are required. These efforts should focus on raising awareness of legal and policy issues, technical capacity building on seedling production and distribution, preferential policies for IFS in issuing certification, development of appropriate technology, and investment and credit programs. For seedling customers, raising awareness of the benefits and importance of high-quality seedlings is needed, along with guidelines to help farmers avoid buying poor quality seedlings.

Finally, we see the need for a well-functioning, decentralized, germplasm management system where farmers can easily access quality germplasm, which, in turn, will sustainably ensure high productivity. Such a system must have a clear and responsive structure with accountability mechanisms and adequate human and financial resources. Such a decentralized system requires relevant agencies to work closely and operate within an enabling legal and policy framework.

ANNEX 1

List of legal documents related to the management of germplasm

- The International Union for the Protection of New Varieties of Plants (Adopted on 02.12.1961, amended in Geneva on 10/11/1972, 10/23/1978 and 19/03/1991).
- Ordinance on plant germplasm No. 15/2004/PL-UBTHQH11 issued on 24/3/2004 by the Standing Committee of the National Assembly.
- Law on Intellectual property right No. 50/2005/QH11, passed by the National Assembly on 29/11/ 2005.
- Decree No. 57/2005/ND-CP of the Government on sanctioning administrative violations in the field of plant germplasm.
- Decree No. 104 / 2006/ND-CP: detailed guideline of the implementation of some articles of the law on intellectual property rights related to plant varieties.
- Decision No. 17/2006/QĐ-TTg issued on 20/01/2006 by the Prime Minister on the continuing the implementation of Decision No. 225/1999/QĐ-TTg 10/1999
- Decree No. 105/2006/NĐ-CP: detailed guideline for the implementation of some articles of the law on intellectual property rights protection and state management of intellectual property.

- Decree No. 172/2007/ND-CP amending and supplementing some articles of Decree No. 57/2005/ND-CP, issued on April 27, 2005, on sanctioning administrative violations in the field of plant germplasm.
- Decision No. 64/2008/QĐ-BNN regulating the management of the production and supply of fruit-tree and industrial-plant seedlings.
- Decision no. 11/2008/QĐ-BTC, issued by the Minister of Finance, prescribing the rates of fees and the management of these fees in the field of germplasm.
- Decision no. 69/2008/QĐ-BNN passed by the Minister of MARD on 3 June 2008, promulgating the list of industrial plants and perennial fruit trees that are obligated to be certified according to quality standards.
- Decision No. 35/2008/QĐ-BNN of MARD on smallholder seedling production.
- Circular No. 79/2011/TT-BNNPTNT regulating the recognition and announcement of germplasm quality.
- Circular No. 18/2012/TT-BNNPTNT regulating the management of the production and supply of fruit-tree and industrial-plant seedlings.
- Decree No. 114/2013/ND-CP stipulating the sanctioning administrative violations in the fields of plant germplasm, protection and plant quarantine.

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