STRENGTHENING THE HORTICULTURAL SEED SYSTEM: CHALLENGES AND POLICY STRATEGIES

Miftahul Azis, Joko Mulyono, Abdul Aziz,
Kartika Sari Septanti, Annisa Rika Rachmita

Email: miftahul_azis@yahoo.com

INTRODUCTION

Seeds are genetic material and one of the essential components of horticultural agribusiness. The demand for horticultural seeds continues to increase along with the growth of agribusiness. Regulations govern various stages in the seed system, from variety development, production, to distribution. However, the national seed industry, particularly Domestic Investment (PMDN) seed producers, faces challenges such as limited human resources, technology, and market access, making it difficult to compete with Foreign Investment (PMA) seed companies.

This study aims to formulate policy recommendations to enhance the performance of the horticultural seed system to be more competitive in the domestic market. Specifically, this study will analyze seed regulations and institutions, the performance of seed supply systems, and formulate alternative policies to support the national seed industry.

METHODOLOGY

This study uses a case study approach on seed producers and interviews with horticultural farmers, particularly vegetable farmers. Literature studies are conducted to strengthen the analysis of regulations and seed systems that have been implemented. Respondents consist of stakeholders at both central and regional levels, including the Directorate General of Horticulture, the Center for Plant Variety Protection and Agricultural Licensing, the Indonesian Quarantine Agency, and Provincial and District Agriculture Offices. The study was conducted in West Java Province, one of the top five vegetable-producing regions in Indonesia.

The analysis is conducted qualitatively and descriptively, focusing on: (1) Seed supply from and to foreign countries, (2) Variety breeding and seed technology innovation, (3) Seed production, partnerships, distribution, and markets, (4) Seed system monitoring, including certification and registration, and (5) The dynamics of seed use among horticultural farmers. Furthermore, a synthesis of previous research findings is conducted to formulate alternative policies. This approach generates best practices (lesson learned) and potential innovations to improve the existing seed system.

RESULTS AND DISCUSSION

Regulation of the Horticultural Seed System

Regulations regarding the importation of seeds are governed by Minister of Agriculture Regulation (Permentan) No. 15/2017 and No. 17/2018 concerning the import and export of horticultural seeds. These regulations aim to: (1) Ensure the availability of quality seeds in sufficient and sustainable quantities, (2) Develop the domestic seed industry, (3) Increase national foreign exchange, (4) Enhance genetic diversity, and (5) Ensure biosecurity.

However, field findings and information from seed industry players indicate inconsistencies in tax policies. Imported horticultural seeds are not subject to import duties, whereas domestic seed production is taxed, making businesses prefer importing seeds rather than producing them domestically.

Moreover, according to Permentan No. 15/2017 and No. 17/2018, one of the primary objectives of seed imports is to provide quality seeds for commercial purposes. Discussions with stakeholders reveal that vegetable seed imports are generally carried out for economically inefficient types to be produced domestically but are essential for farmers. These include spinach, broccoli, cauliflower, cabbage, kailan, Chinese cabbage, bitter mustard, pak choi, shallots, scallions, onions, Japanese cucumbers, paprika, celery, parsley, radish, beet, and zucchini.

In practice, inconsistencies arise between Permentan No. 15/2017 and No. 17/2018 when compared to Permentan No. 37/2016 regarding horticultural facilities that cannot yet be produced domestically. As a result, imported seeds continue to circulate in the domestic market, justified by farmers' needs. These inconsistencies also lead to seed imports extending beyond cabbage, radish, broccoli, and Chinese cabbage, covering other types as well.

Institutional Framework for Seed Production and Distribution

Horticultural seeds are classified into four categories: Breeder Seed (BS), Foundation Seed (FS), Stock Seed (SS), and Extension Seed (ES). These seed classes can be produced by formal or informal institutions. Formal institutions include government entities such as the Horticultural Seed Center (BBH), Seed Supervision and Certification Center (BPSB), Seed Quality System Certification Agency (LSSM), as well as private seed companies and seed import-export businesses. Informal institutions consist of independent seed growers at the farmer level.

Currently, the development of horticultural seeds, particularly for vegetable crops, is heavily driven by the private sector. The private sector provides BS, FS, SS, and ES seeds through two primary channels: self-development and importation. Seed breeding and production are carried out by private companies for types of seeds that can be produced domestically.

Apart from the government and private producers, independent seed growers also play a role in seed development. They primarily produce SS and ES seeds, although some also handle FS seeds, known as class A seed growers.

Performance of the Horticultural Seed Supply System

Variety Development

Variety development includes research and development, testing, registration, variety release, and Intellectual Property Rights (IPR) protection for breeders. Seed companies, both large and small-scale, generally have research teams that tailor seed specifications to market needs. The evaluation of released varieties serves as the foundation for developing new varieties, focusing on resistance to pests and diseases, high productivity, and adaptability to climate change. In addition to information from farmers, seed producers also gather insights from vegetable traders in traditional and modern markets. Traders tend to seek vegetables with bright colors, uniform shapes, long shelf life, and resistance to damage. Meanwhile, consumers consider factors such as taste, color, size, and price.

In developing varieties, the mechanism for obtaining genetic seed resources is regulated by the Food and Agriculture Organization (FAO) through an international agreement in effect since 2001. The agreement covers genetic resource exchange for food and agriculture, conservation, sustainable utilization, farmers' rights—including environmentally friendly

cultivation practices—and mechanisms for access, funding, benefit-sharing of market-released seeds, and IPR protection.

Field findings reveal that vegetable seed research in a large-scale private seed producer is divided into groups based on seed types. For instance, Group A specializes in developing tomato seeds (for highland and lowland varieties), eggplant, water spinach, celery, and spinach. Group B focuses on chili peppers (large chili, bird's eye chili, curly chili), and bell peppers. Group C specializes in watermelon, melon, pumpkin, bitter melon, ridge gourd, and cucumber (climbing type). Group D focuses on brassica vegetables, cabbage, legumes, shallots, while Group E specializes in sweet corn seed development.

The time required from market survey to variety release ranges from 4 to 10 years. Several factors influence the duration of variety development, including the crop's lifecycle and the process/stages involved in breeding, as each commodity has a different growth cycle. Additionally, small-scale private seed companies face challenges in accessing parent seeds from abroad.

Production and Distribution

Horticultural seed production is dominated by private companies, while the government's role through the Seed Source Management Unit (UPBS), Horticultural Seed Centers (BBH), and seed-producing farmers remains relatively small. Out of 1,600 registered seed producers, only about 30 companies actively report their production.

Data indicate that vegetable seed production in 2021 increased by 23% compared to 2020. However, in 2022, production declined by 19% compared to 2021. Meanwhile, the volume of imported vegetable seeds fluctuates and does not always align with national production trends. Generally, imported seeds can only be marketed after being repackaged with Indonesian-language labeling and meeting the Indonesian National Standard (SNI). Imported horticultural seeds may come in the form of seeds, bulbs, tissue culture, or other plant parts.

Foreign direct investment (FDI) seed producers are more dominant than domestic direct investment (DDI) seed producers. FDI companies are more active in seed imports and have even started exporting, whereas DDI companies still have limited market access. Additionally, FDI companies have greater human resources and research budgets and have implemented Quality Management System Certification Institutions (LSSM) for quality certification, while DDI companies lag in this aspect.

Supervision of the Horticultural Seed System

The Seed Supervision and Certification Agency (BPSB) or the Horticultural Seed Supervision and Certification Agency (BPSBTH) serves as the supervisory body in each province. Seed certification must follow the scheme issued by the OECD for the Varietal Certification of Seed. Currently, seed certification can also be carried out by LSSM, which is expected to strengthen the supervision of market-available seeds. Certification is the process of granting a certificate to a batch of seeds that has undergone inspection and/or testing and meets quality standards or minimum requirements. This certification ensures that horticultural seeds, including fruits, vegetables, and perennial medicinal plants, meet the standards set in Ministerial Decree Kepmentan 380/2023 on horticultural seed certification techniques.

As of 2024, 26 seed producers, both CVs and PTs, have obtained LSSM or independent seed certification institutions. However, field practices show that LSSM is still dominated by large-scale seed producers, while small producers face various certification challenges. The main concerns among small-scale seed producers include: (1) Lengthy certification processes through BPSB/BPSBTH, particularly for testing and certificate issuance; (2) Highly detailed and complex technical regulations, which are considered burdensome and impede certification

processes; (3) High maintenance costs for certification; (4) Short validity periods, leading to seed expiration before being fully sold.

In field supervision, BPSB/BPSBTH relies on Plant Seed Inspectors (PBT). Besides overseeing seed distribution in the market, PBTs also monitor seed imports and exports. However, the number of PBTs is declining as many inspectors reach retirement age, posing a major challenge to seed system supervision.

Additionally, the proliferation of counterfeit seeds threatens large producers, as irresponsible parties use their trademarks to sell fake seeds. To address this issue, producers have begun implementing hologram labels and advanced sticker printing techniques on seed packaging. This allows farmers to distinguish genuine seeds from counterfeit ones more easily.

Dynamics of Horticultural Farmers' Seed Utilization

Horticultural farmers who are part of farmer groups are generally more advanced and coordinated in planting planning, which aligns with market demand. They do not focus on a single crop type but cultivate a variety of horticultural commodities. For example, within a farmer group consisting of 240 members, the cultivated commodities include various leafy vegetables, chili peppers, tomatoes, carrots, green onions, and more. Most farmers trust certified seeds that have been on the market for a long time. They perceive seeds from new producers as unproven in quality and carrying a higher risk of crop failure. The choice of seeds depends on the crop type. For seed-based crops like tomatoes and chili peppers, farmers tend to prefer high-quality and certified seeds. Meanwhile, for tuber or stem-based crops like carrots and green onions, farmers often use local seeds or seeds from previous harvests.

In addition to using high-quality and certified seeds, more advanced farmer groups have also adopted production management strategies, such as selecting crop types based on the season. The availability of vegetable seeds, especially those produced by national seed producers, is generally found in agricultural stores in production centers. However, farmers frequently experience seed shortages during planting seasons, which is suspected to be a deliberate move by producers to increase seed prices. As demand for horticultural seeds rises, farmers have started seedling businesses, particularly for crops like chili and lettuce. Seedlings are then sold to other farmers for cultivation. This method is considered more practical as it saves time and labor while reducing the risk of failed germination.

Lesson Learned and Policy Recommendations for the Horticultural Seed System

The horticultural seed system in Indonesia plays a strategic role in supporting food security and the competitiveness of the agricultural sector. However, various challenges, such as overlapping regulations, limited research and innovation, and uneven market access, continue to hinder its development. Additionally, the dominance of multinational companies (PMA), market access disparities for domestic producers (PMDN), and suboptimal certification and supervision processes remain major obstacles in the national seed industry. To address these challenges, the following policy recommendations are proposed:

1. **Regulatory Harmonization**
   The government needs to harmonize Permentan 15/2017, Permentan 17/2018, and Permentan 37/2016 to ensure consistency in seed import and production policies.
2. **Support for Research and Innovation**
   Increased investment in research and development (R&D) is essential to produce superior local seed varieties that can compete globally.
3. **Simplification of Registration and Certification Processes**
   The government should streamline the variety registration, accreditation, and

certification processes, particularly for small seed companies, to facilitate market access.

4. **Strengthening Domestic Seed Companies**
   Policies should support domestic seed producers, including easier access to breeder seeds from abroad, capacity-building for human resources, and better access to genetic resources.
5. **Utilization of Digital Technology in Distribution**
   Digital platforms should be leveraged to improve seed distribution, allowing real-time access to seed availability, distributor locations, and ordering systems.
6. **Enhanced Supervision Mechanisms**
   Monitoring seed circulation must be strengthened using digital technology for real-time reporting and tracking. Stricter enforcement of quality standards and penalties for illegal seed distribution should also be prioritized.
7. **Facilitation of Collaboration Among Industry Players**
   The government should promote cooperation between public institutions, private companies, and farmers within the seed distribution network to enhance the resilience and independence of the national seed industry.