Model of seedling institution development to improve sustainability of clove farming system in West Java

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Abstract. The characters of spices seed production varied amongst regions as influenced by physical, social-economic, and environmental factors, therefore, seeding institutions are specific to each type of plant and development area. This study aims to analyze the clove seed institutions in West Java and formulate an institutional development model to improve sustainability of clove farming system. The study was conducted in Garut and Tasikmalaya Regencies, West Java in June-November 2018. The surveys were conducted using the snowball sampling method. Research data were qualitatively analysed using the SWOT method. The results showed that the source of clove seeds in West Java mostly originated from the Garut High Producing Block which had been established by the Directorate General of Plantation. The certification and supervision of seed quality were carried out by the Regional Quality Certification and Supervision Board. There were three existing clove seed institutional models, namely Direct Model, Recommendation Model, and Plantation Seed Business Permit Model. The majority of the clove seed growers (100 of 115) in West Java did not have Plantation Seed Business Permits. The study suggests that the institutional model of clove seedling should encourage farmer/grower to partnerships with the seed certification institutions, research institutions, and universities, as well as financial institutions and distributors.

Keywords: high-yield block, certification, supervision, partnership

1. Introduction

Clove (Syzygium aromaticum (L.) Merr & Perr.) is one of the strategic commodities for Indonesian [1] and has an important role in farmers’ income. The role of cloves in the national economy, especially in the form of cigarette excise receipts, is significantly increasing during the 2009-2015 period from IDR 55 trillion in 2009 to become IDR 139.5 trillion in 2015 [2]. Cloves are also used as spices, herbs, beverages, pharmaceuticals, cosmetics, and perfumes [3].

Annual clove plants productivities have fluctuated as affected by the genetic properties of the plants and climate factors, therefore, the plants are not maintained properly especially when the price becomes low. As a result, many clove trees become old, damage, and low productivity [4].

To stabilize clove plant production, the use of certified seeds is important. The use of qualified clove seeds has been regulated by the Government Regulation of the Republic of Indonesia No. 44 of
1995 [5]. Seeds are one of the most important factors for increasing yield and quality of crop production. Ultimately, better crop production increases more farmers' income. It is a common problem that seed availability in both quantity and quality is limited, therefore, the target development area is hampered [6]. Therefore, it is essential to evaluate the current condition of the clove seeding system to ensure the development of clove production areas in the country, especially for rehabilitating areas of the old clove plantations and damage trees due to the stem borer insect [6]. Also, it is necessary to evaluate the readiness of supporting agencies, such as institutions/agencies involved in certifying, supervising, and distributing of clove seeds to guarantee quality superior seeds.

This study aims to analyze the clove seed institutions in West Java and formulate a strategy for developing institutional models to increase clove production, productivity, and distribution control to improve sustainable clove farming.

2. Materials and methods

2.1 Location and Time of Research
The research was conducted in Garut and Tasikmalaya Districts from June to November 2018. In Garut district, there are five locations of the clove High-Yield Block (HYB) been established by the Directorate General of Plantation [7]. Tasikmalaya is one of the center production for clove in West Java [8].

2.2 Data Collection and Analysis
The data collected included primary data through in-depth interviews of the management of high yield block, seed production processes and sales, and assessment of seed quality, as well as secondary data collected through literature studies includes certification mechanisms, quality control and seed distribution, and partnerships among stakeholders. The respondents were determined by snowball sampling method which included farmers managing the high-yield block, seed growers/seed making farmers, and seed quality assessment officers.

The data obtained were analyzed qualitatively by the SWOT method [9], then interpreted descriptively. The analysis was also carried out on the similarities and differences in work patterns in each type of institution found at the study site.

3. Results and discussion

3.1 Institution of Clove Seedlings at the Research Site
In general, seeding institutions are working groups that organized field activities of farmers involved in crop seeding productions. Based on their functions and duties, seeding institutions are classified into five, namely supervisors, research/plant breeding, seed producers, traders/distributors, and seed quality supervisors. In the seeding institution, there is a “coach”, i.e. an institution that establishes seed policy, guiding research activities, productions, and quality control of the seeds. Formal seed institutions at the central level are the Directorate of Plantation Seedling Directorate General of Plantations, and Indonesian Center for Estate Crops Research and Development (ICECRD). In the region, a formal supervisor of seeding is the Provincial Plantation Office.

In West Java, 3 (three) models of institutional development of clove seedlings were identified, namely (1) Direct Model (DM), (2) Model of Seed Growers Business License (SGBL), and (3) Recommendation Model (RM).

3.1.1 Direct Model (DM). In the Direct Model, the “seed growers” are still in the status of seed producers who do not have a Business Permit for Plantations Seed (BPPS) or recommendations from Seed Quality Certification and Supervision Board (SQCSB), unit of West Java Province Plantations Office, whereas the seeds are traded produced not from certified HYB, but farmers’ production
garden or neighbors. These seeds are also known as fake seeds. The fake seeds have no clear origins and is not guaranteed the quality, therefore, it could potentially harm consumers (farmers). Growing fake seeds, especially for clove, is very risked because as an annual crop, the cove started to produce seeds only after 4-5 years old. If farmers do not choose certified seeds or the seeds are not have high quality, the plants may not produce a good yield, therefore, farmers will suffer considerable losses. In the DM clove seedling institution model is shown in Figure 1.

![Figure 1. A Direct Model (DM) of clove seedling institution model in West Java](image)

To prevent the distribution of fake seeds, the government has issued the Minister of Agriculture Regulation number 50 / Permentan / KB.020 / 9/2015 dated 21 September 2015 concerning the production, certification, distribution, and supervision of plantation seeds. But the supervision for fake seed distribution is not obligatory and the punishment is not yet formulated. The majority of farmers or growers do not know yet this Ministry Issue, including sanctions for farmers/growers who sell fake seeds.

3.1.2. Business Permit for Plantations Seed Model (BPPS Model). In the BPPS Model, seed producer has officially become seed growers and already have BPPS, both growers who have HYB or growers who do not have HYB but cultivated seeds come from certified HYB.

3.1.3. Recommendation Model (RM). The flow of the certification process and distribution of certified clove seeds on the MR model is the same as the SIUBP Model, but on MR before the SIUBP is published, the grower is permitted to trade seeds that have been certified by SQCSB.

The RM and BPPS institutions have been running as they should following the Minister of Agriculture Regulation No. 50/Permentan/KB.020/9/2015 dated September 21st 2015, concerning the production, certification, circulation, and supervision of plantation crop seeds. Partnerships have been implemented with both the West Java Province Plantation Office, Research Institute for Spice and Medicinal Crops, Padjadjaran Universities, Private Sector, and Plantation Seed Growers Association. RM and BPPS institution models as shown in Figure 2.

3.2. Development Strategy of Clove Seedling Institutional Models.

The development of an institutional model of clove seedling needs to consider internal factors and external factors that influence the institutional performance itself. Strengths and weaknesses of internal factors and opportunities and threats of external factors were analyzed by SWOT analysis [9]. The results of the SWOT analysis of institutional clove seedlings in West Java can be seen in Table 1.

Based on the results of the SWOT analysis in table 1, the strategy for developing the institutional model of clove seedlings in West Java can be formulated as follows:

1. Utilizing the power of internal factors to seize opportunities that are open to the strategic environment by fostering BPT management and increasing the role of grower associations in supporting “restore the glory of Indonesian spices” policies;
2. Utilizing internal power to overcome threats from external factors by increasing the support of research institutions in the climate change adaptation program and overcoming major clove disease attacks, as well as increasing the role of seed quality control institutions in certification and seed quality control;

3. Overcoming internal weaknesses by taking advantage of strategic environmental opportunities through infrastructure improvements to improve access to BPT locations to facilitate the distribution of source seeds, and to increase the number of seed assessment officers according to optimal needs;

4. Overcoming internal weaknesses to counter external threats by reinforcing regulations requiring bidders to guarantee the purchase and payment of seeds to seed supply guarantor growers (e.g., joint accounts).

Figure 2. BPPS and RM models of clove seedling institution in West Java

Stakeholder support largely determines the effectiveness and efficiency of clove seedling institutions, as reminded by [10] that the achievement of institutional objectives in improving farmers’ welfare is determined by institutional governance. The strength or weakness of farmer institutions is reflected in the ability to explain and fight for their needs with the government, private sector, research institutions, marketing institutions, and other institutions [11]. The steps that can be taken in strengthening institutional farmers according to [12] are: (1) developing the ability of farmers to cooperate in the economic sector in groups; (2) increasing access to capital, bargaining position,
efficiency and effectiveness of farming, facilities and organizational development to farmers; and (3) increasing the capacity of farmers and groups through mentoring and training activities.

Tabel 1. SWOT Analysis for the Development of Clove Seedling Institutional Models

| EXTERNAL | OPPORTUNITY | THREATS |
|----------|-------------|---------|
| 1. Policy to restore the glory of Indonesian spices (K3IS)  
2. Clove demand continues to increase  
3. Clove prices are relatively stable  
4. The market information system is increasingly open  
5. Online transaction system up to the village level  
6. Obligation to "guarantee the supply of seeds from certified breeders" to tender participants for seed procurement in government agencies  
7. National and regional infrastructure development policies | 1. Climate change  
2. Main disease attack  
3. Circulation of seed origin with low prices  
4. Most farmers do not consider to seed certificated holders  
5. "Legal entity" prerequisites for seed procurement  
6. Third party payment commitment (auction winner) is low |

| INTERNAL |
|----------|
| STRENGTH |
| 1. Superior varieties have been released  
2. High-yield Block (HYB) has been established  
3. The Seed Breeder Association has been formed  
4. Accommodative seed regulation  
5. Highly motivated breeders  
6. Certification and quality control institution  
7. Support of research institutions | 1. Development of HYB management  
2. Increasing the role of breeder associations in supporting the K3IS policy | 1. Increasing the support of research institutions for climate change adaptation and overcoming major clove diseases  
2. Increasing the role of seed quality control institutions in the dissemination, certification and quality control of seeds |

| WEAKNESS |
|----------|
| 1. The location of the HYB is far from the location of the breeder  
2. Access to the HYB location is less  
3. Most breeders have not been incorporated  
4. The capital capability of the breeder is limited  
5. The number of seed supervisors is lacking | 1. Increasing access to HYB locations to facilitate the distribution of source seeds  
2. Increasing the number of seed supervisors for optimal | 1. Regulating the obligations of bidders to guarantee the purchase and payment of seeds to seed supply guaractors breeders (example: joint account) |

There were three clove seed institutional development models found, namely the DM model, RM model, and BPPS model. The weaknesses of the DM model, i.e. produced and traded noncertified seed must be addressed immediately to prevent the distribution of fake seeds that will harm the farmers in a long time. In the implementation of DM and BPPS institutional models, it was identified that the role of cooperatives or financing institutions were essential to ease the burden on farmers, especially in the production process, especially in purchasing agricultural production facilities, because in general small farmers lacked the capital to run their farming. Therefore, in the model of institutional development of clove seedlings in West Java, it is necessary to establish partnerships between farmer groups and seed growers with formal Trustees and also partnerships between cooperatives, financial institutions, and distributors of agricultural production facilities. Alsois, the role of the Plantation Crop Seedling Association is very important. The development of the clove seedling institutional model in West Java can be seen in Figure 3.
The role of each element in the development of seed institutional models can be described as follows:

3.3. High-Yield Block (HYB) manager
HYB in Garut, located in Kertamukti Village, Cikelet Subdistrict, Garut Regency has 11 selected parent tree (SPT) with the seed production capacity of more than 350,000 seeds can be distributed in the form of seeds or polybag seeds to growers. In producing polybag seeds, HYB managers collaborated with 4 assisted farmer groups in 2 (two) villages with 144 farmer members.

3.4. Growers
Growers play the most important role in the clove seed institution systems because they provide superior seeds for the community, especially in the form of seeds ready to be released. When the number of growers decreases, the availability of clove seeds in the community also decrease [13]. Seed growers/ producers are institutions that produce scattered seeds through plant propagation from varieties that have been released by the Minister of Agriculture [14] Growers transform the breeding results into commercial seeds, so that in general it is a business institution both micro, small, medium and large businesses. In accordance with Minister of Agriculture Regulation number 50/Permentan/KB.020/9/2015 Article 13, that to become a seed producer or planter seed breeder must have a Seed Production Business License (SIUP) or known as a Seed Business License Plantation (IUBP). In West Java, the majority of seed growers (100 out of 115) did not have the SIUBP license.
West Java Province has planned as a seed province that aims to make West Java Province a reference center for seed technology development as well as a center for the supply of various certified superior seeds for plantation business needs both regionally and nationally. To achieve this desire, the West Java Plantation Service held routine seed breeding technical development activities with the aim of increasing the knowledge and skills of farmers/seed growers in terms of technology, management, and business.

Seed Quality Certification and Supervision Board (SQCSB)

Seed Quality Certification and Supervision Board of Plantations in West Java Province are part of the West Java Province Plantation Office. SQCSB is obliged to support the vision and mission of the Plantation Agency with the objectives and medium-term goals, namely "increasing the feasibility of plantation business with a target indicator of increasing production and productivity of plantation commodities by 2 (two) percent". In addition to carrying out the certification function, SQCSB also carries out the function of supervising the quality and circulation of superior seeds and local superior seeds. Clove seed certification is carried out in two stages, namely certification of seed quality testing in the laboratory and certification of polybag seeds in the field. Seeds that have passed certification before being distributed must be labeled, with the aim of knowing: (1) the place of origin of the seed, (2) plant species and varieties, (3) class of seeds (for seeds that have classes), and (4) data on results laboratory test, field and seed distribution period. Clove seed certification is carried out in two stages, namely certification of seed quality testing in the laboratory and certification of polybag seeds in the field. Clove seed certification procedures in West Java can be seen in Figure 4.

Figure 4. Clove seed certification procedures in West Java

The role of universities and research institutions is very important in the economic empowerment of rural communities. It has three dimensions of strength, namely (i) exploring the potential of human resource areas, natural resources including land suitability, availability of land, as well as regional superior commodities; (ii) knowing the potential of rural communities and business opportunities that are compatible with their socio-culture including the availability of infrastructure and facilities; and (iii) formulate recommendations from a combination of the first and second dimensions to the agribusiness partner group. Besides, as an independent institution, PT is a monitoring agency for rural agribusiness activities [15]

Indonesian Plant Seed Growers Association (IPSGA)

According to the decree of the Minister of Agriculture number: 273 / Kpts / OT.160 / 4/2007. Farmers' associations are one of the types / forms of farmer institutions that are expected to further enhance their role in managing agribusiness-oriented businesses and strengthen their position, even gradually
becoming increasingly involved in various aspects directly or indirectly affecting their farming income. Seed growers after a long time have not been embodied in the organization or association of plantation growers, then based on AHU-0010798.AH.01.07 decree the Ministry of Law and Human Rights established an organization called the Indonesian Plant Seed Association which is based in Jakarta. Legally, the institution is ready to play a role as a provider of plantation seeds.

3.9. Financing institutions / Cooperative

Capital problems have always been a classic problem that afflicts agribusiness actors and become a constraint faced in agricultural development, especially small scale farmers, one of which is the weak capital structure and access to capital sources [16]. Indonesian farmers, in general, are indeed poor, low income, and limited capital [17]. The main source of their income is crop yields. Therefore, the role of financing institutions is very important for clove seed growers, especially in providing capital assistance. They also need a payment guarantee for clove seeds they are producing,

4. Conclusions

Seedling institutions formed in the clove seed business in West Java can be grouped into three models, namely Direct Model (DM), Recommendation Model (RM) and Business Permit for Plantations Seed Model (BPPS). The RM and BPPS models have been running following the Minister of Agriculture Regulation No. 50 / Permentan / KB.020 / 9/2015 concerning the production, certification, circulation, and supervision of plantation seeds, while the ML model has not followed these rules. Clove seed business still faces financial constraints in the process of production, certification and seed distribution. On the one hand, seed growers face limited capital to finance the production process and certification, on the other hand, the sale of seeds through the auction mechanism is often delayed. It is necessary to develop an institutional model for the clove seedling that encourages farmer/grower partnerships not only with seed certification institutions, research institutions, and universities, but also partnerships with the cooperatives/financial institutions and distributors of agricultural production facilities. The development of a more effective clove seedling institutional model is expected to encourage better adoption of cultivation technology in the provision of environmentally friendly clove cultivation.

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