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Analysis of production system in the food plan section at PT. Benih Citra Asia Indonesia

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Abstract – This research focuses on analyzing the production system in the Food Plan section at PT. Benih Citra Asia-Indonesia. A company engaged in the production of superior seeds for food crops and horticulture. This research aims to understand the seed production process, identify constraints in production, and provide recommendations for improvement. The research methodology used is a descriptive approach with direct observation, interviews, and analysis of secondary data from the company. The research sample involved employees in the production division and related sections at PT. Benih Citra Asia. The results showed that the seed production process at PT. Benih Citra Asia includes several main stages, namely (1) seed incoming,; (2) seed processing; (3) seed storage; (4) seed packing, and (4) product storage. The main obstacles found are the mixture of other varieties in : (1) seed sorting; (2) barcode mismatches with harvest receipts, and (3) negligence in seed sorting. The proposed solutions include; (1) increased monitoring of seed quality; (2) improved barcode recording system; and (3) training for employees to improve accuracy in the sorting process. Overall, this study shows that PT. Benih Citra Asia has implemented a good production system, but there are still some aspects that need to be improved to increase efficiency and product quality. This research is expected to provide insights for the seed industry and become a reference for companies in improving the quality of seed production.

Keywords: seed production, production system, seed sorting, agricultural management

1. Introduction

The agricultural sector plays a strategic and vital role in the Indonesian economy, more than just providing food for the people. This sector is also the backbone of a large number of labor absorption,

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especially in rural areas. In the midst of the rapid development of agricultural technology, the availability of high-quality seeds is the main foundation in efforts to increase agricultural productivity in a sustainable manner. Good seeds are characterized by high growth capacity, strong vigor, and resistance to pest and disease attacks, as well as adaptability to increasingly extreme climate change. Therefore, effective and efficient management of the seed production system is crucial to ensure the availability of superior seeds that are able to boost agricultural yields in a sustainable manner, while improving farmers' welfare (Putri, 2022).

In the competitive landscape of the seed industry, PT. Benih Citra Asia has emerged as one of the companies that plays a central role in the provision of superior seeds in Indonesia. Established in 2006, the company has recorded significant growth and transformed into one of the leading seed producers with the widely recognized Bintang Asia trademark. PT. Benih Citra Asia's main focus is on the production of food and horticultural crop seeds, covering strategic commodities such as rice, corn, soybean, as well as various types of vegetables and fruits that have high economic value. With an extensive and integrated distribution network, the company contributes significantly to meeting national seed needs and supporting food security programs in various parts of Indonesia (benihcitraasia.co.id, 2025).

The seed production system at PT. Benih Citra Asia is carefully designed and includes a series of key stages that largely determine the final quality of the marketed seeds. These stages include seed incoming, seed processing, seed storage, seed packing, and product storage. Seed incoming is the initial stage of receiving seeds from partner farmers who then undergo a series of strict quality checks before entering the production process (benihcitraasia.co.id, 2025). Seed processing involves the application of various modern seed purification techniques, including variety separation, cleaning from dirt and weed seeds, and controlled drying, to ensure that only the highest quality and standardized seeds are processed further. Seed storage aims to keep the seeds in optimal environmental conditions to maintain their germination and durability during the storage period before marketing. Furthermore, the seeds are professionally packaged at the seed packing stage, which are then stored in product storage before being distributed to the market network (Interview with Mr. Hermansyah (HRD Surpervisor PT. Benih Citra Asia), 2025).

Although the seed production system at PT. Benih Citra Asia is well-established and structured, its operational dynamics are inseparable from various obstacles and challenges that need to be overcome. Some of the main problems that often arise include the potential mixture of other varieties in the seed sorting stage, mismatches between barcode information and harvest receipts that can cause traceability problems, and negligence in the seed sorting process that can reduce the quality of the final product. These constraints, although seemingly minor, can have a significant impact on overall production efficiency as well as the quality of the seeds produced. Therefore, continuous improvement efforts in the production system are necessary to reduce the risk of errors, improve the quality standards of the seeds produced, and ensure customer satisfaction (Hasani, 2023).

In the context of higher education, especially for students studying agriculture or Islamic economics with a focus on agribusiness, an in-depth understanding of the seed production system and the challenges faced in this industry is a must. Therefore, Field Experience Practices (PPL) is one of the academic programs specifically designed to bridge the gap between the theory obtained in lectures and the complex reality in the world of work. PPL provides a valuable opportunity for students to gain hands-on experience in the field, carefully observe how the seed production system is carried out in practice, and analyze various problems that arise in the field with a scientific approach (Interview with Mr. Hermansyah (HRD Surpervisor PT. Benih Citra Asia), 2025).

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Through the PPL conducted at PT. Benih Citra Asia, students can explore various technical aspects in seed production, from the rigorous seed selection process, seed quality testing using valid methods, to an understanding of the efficient seed distribution system to the market. In addition, students also have the opportunity to develop critical analytical skills in identifying obstacles that occur in the field and designing innovative solutions to improve production efficiency and effectiveness

In an effort to increase agricultural productivity and national food security, the seed industry plays a vital role. Superior seeds are not only the main foundation for quality crops, but also the key to overcoming the challenges of climate change and improving farmers' welfare. PT. Benih Citra Asia, as one of the leading seed companies in Indonesia, is committed to providing high-quality seeds that are accessible to farmers across the country (benihcitraasia.co.id, 2025). Through the Field Experience Practices program, students have the opportunity to contribute directly to efforts to improve the quality of seed production in this company. This research will focus on an in-depth analysis of the production system in the Food Plan section of PT. Citra Asia Seeds, with the aim of identifying the main causes of mixed varieties in the seed sorting process, analyzing the effectiveness of the existing barcode system, designing solutions to reduce negligence in the seed sorting process, and assessing the feasibility of implementing automation technology in improving seed production efficiency (Hasani, 2023).

The results of this study are expected to make a positive contribution to PT. Benih Citra Asia in optimizing the existing seed production system and become a valuable reference for agricultural academics and practitioners in developing better and sustainable seed production management strategies.

In the long run, improving the quality of seed production in Indonesia will have a significant positive impact on the agricultural sector as a whole. With the availability of improved seeds, farmers can substantially increase their yields, reduce the risk of crop failure due to the use of low-quality seeds, and improve the welfare of their families. Furthermore, the competitiveness of Indonesian agricultural products in the global market is also potentially improved, allowing local agricultural products to compete with imported products that often dominate the market (benihcitraasia.co.id, 2025).

Food production systems are increasingly scrutinized for their efficiency, sustainability, and impact on public health. Research on production planning highlights the importance of optimizing scheduling and inventory control, particularly in food processing industries, to reduce waste and increase efficiency (Claassen et al., 2016). The role of spare parts inventory and production quality in Ghana's food and beverage industry further supports the need for structured management practices to ensure smooth operations and cost-effectiveness (Owusu-Mensah et al., 2020). Additionally, lean principles and layout redesign have been identified as crucial elements in enhancing productivity within manufacturing, including the apparel industry, which may have implications for food production as well (Fernandez-Diaz et al., 2024).

The sustainability of food systems remains a pressing concern, with several studies emphasizing the need for transformational changes. The interconnectedness of food security, climate change, and public health is evident in reports that highlight food production as both a victim and a contributor to environmental degradation (Porter et al., 2014). Furthermore, local food systems have gained attention for their role in mitigating the impacts of global crises, as seen in Japan's response to the COVID-19 pandemic, where home food production and food-sharing behaviors contributed to resilience (Kamiyama et al., 2023). These findings align with broader calls for sustainable development through systemic changes in food production and distribution (Caron et al., 2018).

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Economic factors also play a significant role in determining food system performance. Research on Nigeria's food systems indicates that affordability is a key determinant of dietary health and that improving economic accessibility to nutritious food can enhance overall system performance (Mekonnen et al., 2023). Similarly, disparities in food access have been linked to structural weaknesses within public health frameworks, reinforcing the need for equitable food distribution policies (Neff et al., 2009). A global perspective on food systems further reveals a widening gap between policy goals and real-world implementation, emphasizing the urgency of reform before 2030 (Schneider et al., 2023).

The debate between optimization models and rule-based approaches in food production scheduling reflects ongoing discussions about balancing efficiency with adaptability. Comparative studies suggest that while algorithmic optimization can significantly improve scheduling outcomes, rule-based strategies may offer greater flexibility in dynamic environments (Samouilidou et al., 2023). Additionally, indigenous food production systems, often dismissed as primitive, demonstrate sustainable practices that challenge conventional industrial agriculture models (Nietschmann, 1971).

On a practical level, university-led research has explored production planning in food processing, providing insights into operational challenges and potential improvements (Harbers, Year). The study of food industry management through literature further reinforces the necessity of integrating supply chain and operations research for better decision-making (Wedowati et al., 2018). These studies collectively contribute to a growing body of knowledge that informs both policy and practice in food production and sustainability.

This research will focus on an in-depth analysis of the production system in the Food Plan section of PT. Benih Citra Asia, with the main objective of comprehensively identifying existing constraints and providing recommendations for improvements that can be practically implemented to increase production efficiency. With a better understanding of how the seed production system is run in practice, it is hoped that this research can provide significant benefits to various interested parties, including companies, academics, students, as well as the agricultural industry as a whole, in an effort to build a more advanced and sustainable Indonesian agriculture.

2. Method

The types of data used in this research can be classified into two categories: quantitative and qualitative data.

Quantitative data refers to information in the form of numbers or symbols that result from calculations and measurements (Sugiyono, 2018). This type of data is often used to provide statistical evidence and support for research findings by quantifying observations in numerical terms. In this study, the quantitative data collected primarily includes the number of students participating in the activities, as well as the frequency and level of interaction or engagement with the learning media used in the PPL research. By analyzing these numerical values, researchers can determine the effectiveness of different educational approaches, measure student involvement, and identify patterns or trends within the collected data. The use of quantitative data also enables comparisons across different variables, making it easier to draw objective conclusions.

In contrast to quantitative data, qualitative data is expressed in the form of words, sentences, diagrams, schemes, or images (Sugiyono, 2018). This type of data is essential in understanding the underlying reasons, motivations, and perspectives that shape various phenomena. In this study, qualitative data is obtained through a variety of sources, including narratives from information about the organizational structure, interviews with key stakeholders, and direct observations

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conducted at PT. Benih Citra Asia. These qualitative insights provide a deeper understanding of the dynamics within the organization, employee experiences, and the overall operational environment. Through interviews, respondents can express their thoughts and share detailed explanations about their roles, challenges, and experiences, contributing to a richer and more nuanced analysis. Observations, on the other hand, allow researchers to document real-life situations and behaviors, helping to validate findings from other data sources.

The data used in this study comes from two main sources: primary and secondary data. Primary data refers to data collected directly from first-hand sources, where researchers interact with participants or observe events as they happen (Sugiyono, 2018). In this study, primary data collection involved direct interactions with individuals from PT. Benih Citra Asia, including employees, managers, and other relevant stakeholders. To gather in-depth insights, semi-structured interviews were conducted. This interview method follows a flexible approach, where a set of predetermined questions serves as a guideline, but additional questions can be asked depending on the flow of conversation and responses provided by interviewees. This allows researchers to explore topics more thoroughly and gain more comprehensive information based on real-world experiences and perspectives. Observations of work environments, organizational practices, and interactions between employees were also part of the primary data collection process, helping to cross-verify information obtained from interviews.

Secondary data refers to information that has been previously collected and documented by other sources, such as reports, official records, or online databases (Sugiyono, 2018). In this study, secondary data was obtained through various documents and digital resources related to PT. Benih Citra Asia. This includes company management structures, descriptions of available facilities, and records of past research activities. Additionally, social media content, such as Instagram posts, vlogs created during the research period, and photo documentation of various activities within the factory, contributed valuable insights into the company's operations and work culture. Website data, including published reports or updates from PT. Benih Citra Asia, also served as an important source of secondary information.

Once the data was collected, it was systematically organized, examined, and analyzed to identify key themes and patterns. Quantitative data was processed using statistical methods to generate meaningful insights, such as the level of student engagement in different learning activities. Meanwhile, qualitative data underwent thematic analysis, where narratives from interviews and observations were categorized based on recurring themes. By integrating both types of data, a comprehensive understanding of the research subject was achieved, ensuring that findings were both statistically valid and contextually rich. The conclusions drawn from this analysis provide insights into the effectiveness of learning media, organizational practices at PT. Benih Citra Asia, and broader implications for educational and corporate research.

3. Results and Discussion

3.1 Results

Maize belongs to a group of grasses and has a single seed (monocotyledon). This plant has a sturdy, slightly clumpy stem, and a rough texture, with a height ranging from 0.6 to 3 meters. Corn is a seasonal crop with a life cycle of about three months. Corn has many health benefits as it is rich in fiber and essential nutrients for the body (Nuridayanti, 2011).

Maize seeds are generally more resistant to storage compared to legume seeds, due to their relatively lower protein and fat content. The initial stage in seed handling is the process of receiving incoming seeds, which aims to increase production and is part of post- harvest handling. In this process, the quality of maize seeds is highly considered and categorized into two main aspects,

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namely genetic quality and physical quality. Genetic quality relates to the presence of contamination from other varieties or seeds, which can be improved through roughing in the field. Meanwhile, physical quality includes the condition of the maize, whether it is germinated, moldy, or damaged such as bogang.

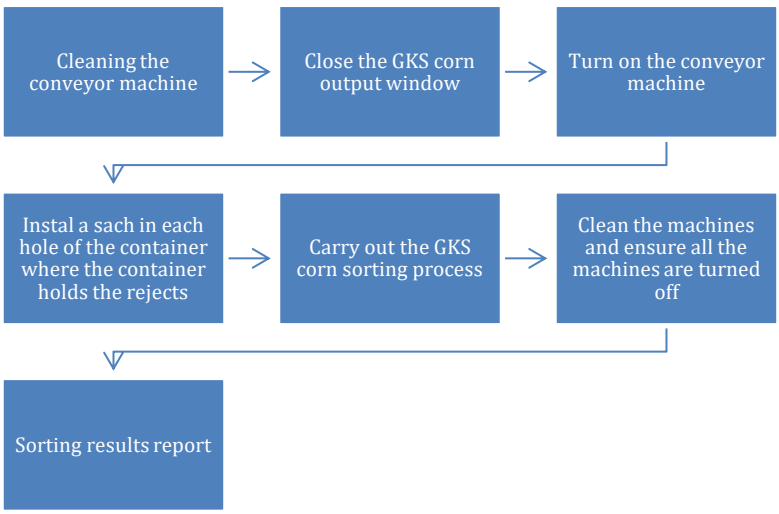
PT Benih Citra Asia applies corn seed acceptance standards through contractual agreements with partner farmers, which set a maximum tolerance limit of 5% for corn that has experienced damage or partial rot, germinated, or moldy. Corn that does not meet quality standards will be categorized as rejected corn and resold as animal feed, while corn cobs are used as fuel for boiler heating furnaces in the seed drying process.

Drying is an important process that aims to reduce the moisture content in corn using heat energy. This process is indispensable, especially to produce superior quality maize seeds. In addition, drying also helps to reduce the volume and weight of the maize compared to its initial condition, thus saving more storage space. In order for the seeds produced to have good quality, drying must be done in accordance with established procedures, especially in terms of temperature and time. This research was conducted at the Seed Incoming stage until the drying process of corn seeds at PT. Benih Citra Asia.

3.1.1 Corn Sorting

Dry field corn in the warehouse of PT. Benih Citra Asia is harvested in the form of dry field corn without klobot, passing field certification by QA, therefore corn sorting is needed in order to produce quality corn seeds. To achieve this, physical quality standards are needed with the following details: (1) Production is not mixed with other varieties, corn cobs are healthy, not infested with pests, and seeds do not germinate. (2) Not the cob of a male plant (3) Not a young cob (4) Not seedless cobs (5) Not off type cob

Based on the physical quality required, sorting is quite good. At PT. Benih Citra Asia. Seeds itself for labor in the sorting process using human labor, given this, workers are expected to be able to distinguish physical quality according to the standard provisions of the company, especially on the type of variety from the company PT. Benih Citra Asia Seeds or not. The flow of the corn seed sorting process can be seen in the picture below.



Source: Interview with Mr. Maulana Syarifudin (food plan coordinator), 2025

3.1.1 Corn Drying

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Drying is a method of reducing or removing most of the moisture content of a material by utilizing heat energy. This process is very important for harvested maize, especially if it is to be processed into high quality seeds. The control of moisture content in the drying process must be well considered, as high moisture content can cause corn to be easily damaged by mold, bacteria, or physical damage. Therefore, proper handling is needed in reducing the moisture content of freshly harvested corn so that it can be used as quality seeds. The process flow in the corn drying bin on broiler media includes: (a) Ensure that the Bin and surrounding area are clean of any remaining maize seeds or other debris. (b) Ensure that the GKS corn to be dried has passed the sorting process. (c) Pour the corn into the bin according to its capacity, and make sure the surface of the corn pile is flat. (d) Controls on the first day included: (i) Ensure that the wind window at the bottom of the Bin is closed. (ii) Ensure that the upper wind window of the Bin is open. (iii) Adjust the position of the blower ducting so that it leads to the bottom path of the Bin. (iv) blower Bin and ensure the temperature indicator is in line with the KM standard for the drying process.

(a) Controls on the second day include activating the Bin heater by turning the heater faucet up, as well as ensuring the temperature indicator starts to change and stabilize according to drying standards.

(b) On the third day, control was carried out by opening the wind window at the bottom of the Bin, closing the window at the top of the Bin, and changing the position of the blower ducting to point to the upper path of the Bin.

(c) On the fourth day onwards, tests were conducted to ensure that the moisture content (KA) had decreased evenly.

(d) After the GKS maize passes the moisture content test, the next process is corn husking.

At PT. Benih citra Asia, the GKS corn drying process is carried out using a Bin dryer with a boiler-based heating system. This tool is in the form of a room that can accommodate up to 20 tons of GKS corn in each room. Each room is equipped with a boiler machine that functions as a heat source as well as an air blowing system to support the drying process.

3.1.2 Corn Flaking

Corn shelling is the process of separating the corn kernels from the corn cob. In the process of shelling maize using a sheller machine, there are several steps that need to be considered, especially the moisture content of the maize. This process begins by ensuring that the GKS maize in the bin has passed the moisture content test and meets the set standard, which is a maximum of 15% moisture content so that the maize kernels remain intact and are not easily crushed.

Next, it is necessary to ensure that the conveyor line, the sheller machine, the elevator to the silo, as well as the area in and around the silo are clear of any remaining maize seeds or other debris. After making sure that the sheller is free from other maize varieties, the machine can be operated by pressing the "ON" button on each section in the following sequence: (1) Main Elevator (2) Bottom Janggel Conveyor (3) Top Cuddle Conveyor (4) Sheller Machine (5) Conveyor Pipil (6) Conveyor Between Tubs (7) North Bottom Conveyor.

Once the shelling process is complete, the results of the activity should be recorded in the GKS corn shelling process monitoring. Finally, ensure that the conveyor lines, sheller machines, elevators, paths to the silos, and surrounding areas remain clean.

3.1.3 Seed Drying on Silo Machine

The second stage of drying is carried out on GKS maize that has passed the shucking process and is already in the form of maize kernels. At this stage, the maize seeds still have a moisture content of around ±13%, so additional drying is required until the moisture content is reduced to ±10.5%. After the drying process, the moisture content of the seeds is tested again using a silo machine.

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This stage of drying uses silo machines with a capacity of 10 tons per unit, with a total of four silo machines used. Mechanically, the process is almost similar to that of the Bin dryer, where the resulting temperature ranges from 40-42°C. However, the difference lies in the duration of the process, where drying with silo machines takes a shorter time, around 8 hours. This is due to the shape of the seeds that are already in the form of corn kernels, in contrast to drying using the Bin which is still in the form of logs.

3.1.4 Gravity Machine Process

The **Gravity Separator** machine is an essential tool in the seed production process at PT. Benih Citra Asia, designed to separate corn seeds based on size. This sorting process ensures that seeds of different sizes are properly classified, allowing for the selection of high-quality seeds that meet industry standards. The machine operates by using a combination of vibration, air pressure, and gravity to separate seeds into categories based on weight and density.

Working Process of the Gravity Separator 1 Machine

The operation of the **Gravity Separator 1** machine follows a structured sequence of steps to ensure efficiency and accuracy in the sorting process. These steps include:

(1) Preparation and Setup: - Before starting the machine, the operator must ensure that the machine and its surrounding area are free from any seed residue, dust, or other debris that could interfere with the sorting process. - The necessary materials, such as seed batches for sorting, collection sacks, and labels, must be prepared in advance. - Proper installation of seed sacks or containers at the machine's output hopper is required to collect both the high-quality seeds and the rejected seeds separately.

(2) Machine Activation: The machine is started by pressing the **"ON"** button in the following sequence: a) **Elevator and Return Feeder:** These components transport the seeds from the input hopper to the sorting area. b) **Blower:** The blower assists in removing lightweight debris and impurities. c) **Vibrator:** The vibration mechanism helps separate seeds based on size and density.

(3) Adjusting Vibration Speed: - The operator must set the vibration speed using the inverter potentiometer located on the control panel. The vibration speed is adjusted based on the type and condition of the seeds being processed to ensure optimal separation.

(4) Seed Sorting Process: - Once the vibration settings are properly configured, the seeds are poured into the elevator input hopper, where they begin the sorting process. - The machine effectively classifies the seeds into different size categories, ensuring that only seeds of the desired size move forward in the production process.

(5) Monitoring and Bagging: - The operator must continuously monitor the sacks or containers collecting the sorted seeds. If a sack becomes full, it should be replaced immediately to prevent overflow and contamination. - After sorting, the seed yield is weighed to ensure compliance with the standard weight per bag.

(6) Labeling and Identification: Before sealing the seed bags, each bag must contain a seed identification (ID) label inside and an identical label attached to the outside. This ensures traceability and proper record-keeping.

(7) Shutting Down the Machine: Once the sorting process is complete, the machine must be turned off in the reverse sequence in which it was turned on: a) **Vibrator** b) **Blower** c) **Elevator and Return Feeder:** The machine and surrounding area must be thoroughly cleaned to remove any remaining seed residue, ensuring that it is ready for the next use.

Post-Sorting Process: Quality Assurance and Storage

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Corn seeds that have passed critical quality tests, including **Germination (DB), Moisture Content (KA),** and **Purity (KM),** are assigned a unique **lot number** and undergo a final mix testing to ensure uniformity.

Following the grading process, seeds that meet the required **quality class standards** are transferred to the **seed storage section** along with a processing report detailing the sorting results. The seed storage team is responsible for verifying the weight and quantity of the seeds to ensure they align with the processing report. This verification step is crucial in maintaining quality control and preventing discrepancies in seed batches.

Once verified, the seeds move to the next phase—**storage in bulky storage (seed in process).** This storage method allows for proper seed conditioning and preservation until they are ready for packaging and distribution.

The **Gravity Separator 1** machine plays a vital role in ensuring that only high-quality corn seeds move forward in the production process. By following a structured operational sequence—ranging from machine preparation and activation to sorting, monitoring, and final verification—PT. Benih Citra Asia upholds high standards of seed purity and quality.

Despite the efficiency of this system, continuous monitoring and periodic maintenance of the machine are necessary to prevent potential sorting errors. Additionally, ensuring that operators are well-trained in machine handling and quality control procedures can further enhance the accuracy and effectiveness of the seed sorting process.

By implementing stringent sorting mechanisms and maintaining rigorous quality assurance protocols, PT. Benih Citra Asia ensures that the seeds supplied to farmers are of the highest quality. This commitment to excellence supports the agricultural industry by providing superior seeds that contribute to better crop yields and sustainable farming practices.

3.2 Obstacles in the Production Process

In every stage of seed production, some of the obstacles that are often faced are:

(1) Variety mix in sorting. Lack of precision in variety separation can lead to a mixture of different seeds, reducing seed authenticity and quality.

(2) Discrepancy between barcode and harvest road letter. Manual or less than optimal recording systems can cause errors in data recording, resulting in inconsistencies in stock management.

(3) Negligence in seed sorting. Lack of supervision in the sorting process can lead to the introduction of low-quality seeds into the production.

(4) Lack of humidity monitoring in storage. Uncontrolled environmental factors can cause seeds to lose their growth capacity due to exposure to high humidity.

(5) Lack of application of automation technology. The use of manual equipment increases the risk of human error in various stages of production, such as packaging and data recording.

3.3 Solutions and Recommendations

To overcome the above obstacles, some solutions and recommendations that can be implemented are: (1) Improved quality control at every stage of production: Provide specialized labor responsible for the seed sorting process to reduce the risk of mixed varieties. (2) Development of a more accurate barcode system: Use a digitalization system in recording production so that information related to barcodes and harvest tickets is more integrated and accurate. (3) Regular employee training: Provide training to employees on seed sorting procedures and the quality standards that must be met. (4) Optimization of seed storage system: Using automatic temperature and humidity sensors to monitor warehouse conditions in real-time to prevent seed damage. (5) Application of automation technology: Adopt automated sorting machines, sensor-based packaging tools, and digital warehouse management systems to improve efficiency and reduce human error.

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By implementing these solutions, it is expected that the seed production process at PT. Benih Citra Asia can be optimized, produce high-quality seeds, and improve overall production efficiency.

4. Conclusion

This research examines the seed production system at PT. Benih Citra Asia, focusing on the Food Plan section. The findings indicate that the production process consists of several key stages, including seed receiving, processing, storage, packaging, and storage of finished products. Each of these stages plays a crucial role in ensuring the quality and effectiveness of the seed production system. However, despite the structured production flow, several obstacles were identified that impact the overall efficiency and quality of the process.

One of the main challenges encountered is the mixture of different seed varieties during sorting. This issue poses a significant risk to seed purity, which is a critical factor in agricultural productivity. If seeds are not sorted accurately and get mixed with different varieties, farmers may experience inconsistencies in crop growth, leading to lower yields and economic losses. Another major issue is barcode mismatches with the harvest road letter, which results in inaccuracies in tracking and inventory management. Proper labelling and identification of seed batches are essential to maintaining an organized production system. Additionally, negligence in the seed sorting process further exacerbates quality control issues, as errors in this stage can lead to suboptimal seed selection and distribution.

To address these challenges, several solutions have been proposed. First, improving quality control measures is essential to ensuring the accuracy and consistency of seed sorting. Strengthening monitoring systems and implementing stricter quality assurance protocols can help reduce the risk of seed contamination and maintain product integrity. Second, enhancing the barcode recording system is necessary to minimize mismatches and improve traceability in production. Upgrading tracking technology and adopting a more standardized labeling system can contribute to more efficient data management. Third, providing employee training is crucial in fostering better accuracy and diligence in the sorting process. Educating workers on best practices in seed handling, classification, and packaging can significantly enhance overall productivity and quality assurance.

Moreover, integrating automation technology into the production process is recommended to improve efficiency and reduce human errors. The use of automated sorting machines, barcode scanning systems, and computerized inventory tracking can streamline operations and minimize risks associated with manual processing. Automation not only enhances precision but also increases the speed of production, allowing PT. Benih Citra Asia to meet growing demands more effectively.

Given the company's role in seed production, it is imperative that PT. Benih Citra Asia adopts more effective and meticulous approaches in its operations. The quality of seeds directly affects agricultural productivity, and any errors in the production process can have significant consequences for farmers and the industry as a whole. If seeds are improperly sorted or mixed with other varieties, the resulting crops may not perform as expected, potentially leading to financial losses for farmers and a decline in trust in the company's products.

Despite these challenges, PT. Benih Citra Asia has already implemented a structured and well-organized production system. The company has demonstrated a commitment to maintaining high-quality standards in seed production. However, continuous improvement and adaptation to advanced technological solutions are necessary to further optimize efficiency and product quality. By addressing the identified issues and implementing the proposed solutions, PT. Benih Citra Asia

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can enhance its operational effectiveness and strengthen its position as a leading seed producer in the agricultural industry.

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