Implementation of Good Warehouse Practices (GWP) and Good Distribution Practices (GDP) on Rice Product Case Study of PT. Agrobisnis Banten Mandiri

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Abstract. Rice is the important food crop in the world and has become a staple food for more than half of the world's population. PT Agrobisnis Banten Mandiri (PT ABM) is a food distribution center in Banten Province that especially handles rice products. It is a must that a warehousing and distribution system be designed for quality assurance and food safety. This system is known as Good Warehouse Practices (GWP) dan Good Distribution Practices (GDP). This research aimed to study the implementation of the system, GWP and GDP, on rice products at PT ABM. Data collection was carried out by observation, in-depth interview, documentation, and literature review, and data analysis carried out using a descriptive method. The implementation of GWP and GDP at the agro-hub includes 20 clauses. This implementation is affected by several factors, namely organizational management, warehouse facilities and equipment, and warehousing activities. It is imperative to establish standard operational procedures for the warehousing activities to ensure food safety and quality.

Keywords: Good Distribution Practices · Good Warehouse Practices · Rice

1 Introduction

To date, rice remains a staple food consumed by most of Indonesians. Rice thus becomes a development priority in the national food security. The high level of rice consumption in Indonesia has driven the government to guard the rice availability as food availability

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can affect the economic stability. An intervention on rice is made by publishing a food policy [1].

The rice supply chain in Banten Province includes several links, starting from seeding, planting, and harvesting by farmers. The rice harvest is then sent to rice mills in Banten or sold to middlemen from outside Banten who will later send it to rice mills external to Banten. Milled rice is then distributed to wholesalers and retailers. The dry-milled grain (GKG) produced by Banten farmers is not entirely absorbable to the rice milling units in Banten due to some obstacles, including limitations in the milling capital needed in absorbing farmers' grain, rice milling unit (RMU) capacity and warehouse capacity, as well as technology in post-harvest handling [4].

Food quality and food safety are central issues in the food industry. Food quality and food safety are realized through good practices implementation. Good practices in the food chain start from post-harvest handling, followed by production, warehousing, distribution, and selling, and end up when the products reach to the consumers. They depart from good agricultural practices (GAP) that aim to ensure that raw materials fulfill food quality and food safety requirements. Food processing is carried out based on good hygiene practices (GHP), good manufacturing practices (GMP), and hazard analysis and critical control point (HACCP) [5]. Food quality and food safety assurance in warehousing and distribution are good warehouse practices (GWP) and good distribution practices (GDP). Inappropriate implementation of GWP and GDP results in decreased quality and safety of food products [5].

PT. Agrobinis Banten Mandiri (PT.ABM) with its business development strategy will build an agro-hub that contributes to the increase of farmers' income through distribution center, warehouse, and packing house entities. This Banten agro-hub is one of the options for a food distribution center in Banten that is integrated with logistics entities, warehouses, packaging houses, and digital markets. The Banten agro-hub has a core activity consisting of three pillars of a business ecosystem, namely farm, food, and mart. It also helps distribute and supply all farmers' crops directly to businesses and households. With regard to warehouse and distribution facilities, it is necessary for the agro-hub to pay attention to the implementation of good warehouse practices (GWP) and good distribution practices (GDP). This paper aimed to analyze the good warehouse practices and good distribution practices implemented in the rice packing at the agro-hub and to recommend some more good warehouse practices and good distribution practices for the agro-hub.

2 Methodology

A. *Research Design*

This research was conducted in September–October 2021 at PT. Agrobisnis Banten Mandiri (PT. ABM) as a warehouse and distribution center located on Jl. Raya Cilegon, Drangong, Taktakan, Serang City, Banten Province. The research method used is a descriptive method with a qualitative approach. This qualitative research describes and explains clearly and in detail the answer to the researcher's problem [4].

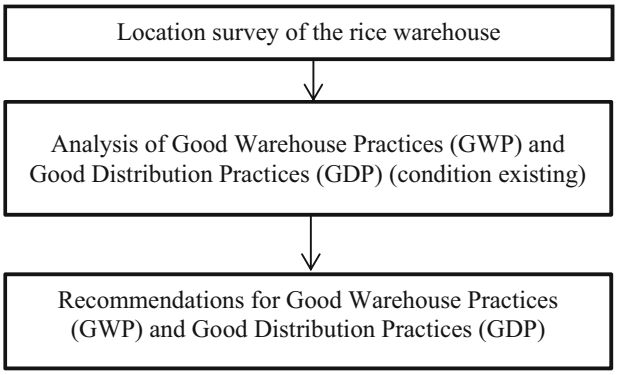

Fig.1. Research stage

The implementation of good warehouse practices (GWP) and good distribution practices (GDP) at the agro-hub must include 20 clauses, 17 of which are the most important. The clauses are about organization and management, personnel, quality management, warehouse and storage, vehicles and equipment, containers and container labelling, dispatch, transportation and products in transit, documentation, repackaging and relabeling, complaints, recalls, rejected and returned products, counterfeit products, importation, contract activities, and self-inspection.

B. *Research Stage*

The research stages are illustrated in Fig. 1. This research was started by location survey all the way to analysis of the implementation of good warehouse practices (GWP) dan good distribution practices (GDP) at the agro-hub warehouse. Recommendations were made through a literature study of some similar research works about GDP and GWP.

C. *Data Collection Methods*

Data collection was carried out through observation, in-depth interview, documentation, and literature review. The data were collected in the form of interview transcript, photos, videos, notes, and field documentation. Survey and direct observation were performed by visitation to the agro-hub warehouse location in Serang City. Direct observation was an observation for the purpose of data collection by looking directly at the object studied [5]. In-depth interview was conducted to derive information regarding the agro-hub warehousing and distribution systems and activities. It was a conversation with a specific intention. In the interview, the interviewer asked questions and the interviewee would answer the question posed to him/her [6]. Meanwhile, documentation concerned the conditions and activities carried out in warehousing and distribution [7]. It was a complement in the data collection to observation, in-depth interview and literature review.

3 Results and Discussion

Warehouse is a building in which goods such as raw materials or products are stored to be processed, packaged, and made ready for shipment. A warehousing system consists of various activities, including not only goods storage [8], but also goods receipt, packing, sorting, documentation, and shipping. These activities are also carried out at the Banten agro-hub. The agro-hub's implementation of good warehouse practices and good distribution practices was therefore studied in this research.

Nowadays, the agro-hub carries out warehousing activities to distribute food packages (especially of rice) that are to be sent to the government office of Banten Province and eventually be distributed to the community. The rice that is stored in the agro-hub is supplied from the rice milling units in Karawang and Indramayu. The rice milling units have been supplying premium rice under the brand Si Menak at 72 t. Rice is packed in polyethylene terephthalate plastic bags each at 5 kg. The packaging has been labelled with the product type, trademark, production date, expiration date, marketing authorization from the Ministry of Agriculture, supplier, and procedure processing.

In the future, the agro-hub is set to become a food distribution center in Banten that is integrated with logistics entities, warehouses, packaging houses, and digital markets. Therefore, the agro-hub requires good warehousing and distribution methods to ensure the food quality and safety. The clauses on warehousing and distribution activities include the following themes: organization and management; personnel; quality management; warehouse and storage; vehicles and equipment; containers and container labelling; dispatch; transportation and products in transit; documentation; repackaging and relabelling; complaints; recalls; rejected and returned products; counterfeit products; importation; contract activities; and inspection.

A. *Organization and Management, Personnel, and Quality Management*

The agro-hub organizational structure consists of 2 staff members, namely the person in charge (PIC) of the warehouse and the driver. There are also freelancers. The agro-hub recruits freelancers to load/unload certain goods in particular projects following an uncertain schedule. These freelancers are untrained to work in the warehouse. They just follow the order given by the PIC to finish the packing activity. The warehouse PIC manages the ongoing warehousing and distribution activities as well as documents regarding receipt, storage, stock, and delivery. The warehouse PIC arranges daily schedule and daily packing target for the freelancers. Freelancers are recruited for a certain job when the agro-hub has a project. All the warehousing activities are managed by the PIC. An addition of workers/warehouse staff members is needed. Besides, the organizational management should also be well-arranged.

Based on the fact above, there needs to be an adequate organizational structure along with job description and description of responsibilities at the warehouse. Duties and responsibilities must be clearly defined and understood by the individual concerned and be recorded as a written job description. The authority of each personnel must be clearly demonstrated. The organizational structure for each entity must be defined with the aid of an organizational chart [9]. The responsibilities, authorities, and interrelationship of

all the personnel should be clearly indicated and included in an organizational chart. Usually, an organizational chart is mounted on the wall of a warehouse office.

Risks of warehousing management may happen, including non-conformity of PO (purchase order) and expired date. The personnel at the warehouse must at least consist of a PIC, a checker, a quality control person, an administrative officer, and a processing staff member to ensure that warehousing activities such as storage, receipt, packing, sorting, documentation, and shipping are carried out properly.

Based on the observation, there has been no mechanism of freelancer recruitment and worker training designed. In addition, there have been risks of reduced rice quality that may occur during the warehousing and distribution process due to causes such as damaged packaging and rice loss (impurities, firm and dry texture, rough texture, poor cooking quality, and small broken grains) because of the handling by untrained worker. No standard operating procedures (SOPs) for workers, warehouse storage, and distribution have been designed yet either. It thus necessitates the creation of standard operating procedures for warehousing activities. The quality system should include appropriate procedures, processes, and resources. SOPs for warehousing should be created in consideration of the following: all risks are identified; effective controls are required; the management of outsourced activities is ensured; there are self-inspection and/or quality audits and quality risk management (QRM) systems; and there are management of returns, complaints, and recalls as well as management of changes, deviations, and corrective and preventive actions [9].

B. *Warehouse and Storage*

The agro-hub warehouse is shown in Fig. 2. The agro-hub warehouse stores not only rice but also several other products such as cooking oil, flour, eggs, and mineral water, to name a few. The warehouse storage temperature is around 25–29 °C, with no temperature setting at hand. Storage areas should be designed or adjusted to ensure appropriate and good storage conditions. In particular, they should be clean, dry, and maintained within acceptable temperature limits [9]. In the existing warehouse, air conditioning is not installed. Rice must be stored at ambient temperature and humidity of $<60\%$ in a dedicated area. Rice can be stored safely with 14% moisture content. A moist, humid, and open condition will damage the quality of the rice. In addition, records of temperature monitoring data should be available for review, and the monitoring data should be kept for at least the shelf-life of the stored products [9].

Adequate warehouse management including inventory management will prevent quality deterioration. It is necessary to control the inventory system in the scheme of the "first in, first out" (FIFO) method. This inventory method is determined by the warehouse layout although, in fact, the inventory layout management does not support the FIFO method. Products are placed in pallets and grouped by type of products. There are lot labels for grouped products that are written including the date of the products' storage. The pallets are placed very close to each other. This may cause goods movement with hand pallets to be difficult and insufficient for regular cleaning. There are 2 lines for goods movement in the warehouse (Fig. 3). There should be a sufficient distance between the pallets and the wall to facilitate regular cleaning. The minimum distance between pallets should be approximately 1 m.

Fig. 2. Agro-hub Warehouse

Fig. 3. Inventory Layout

Fig. 4. Rice stored

Significant losses in quantity and quality of the stored rice occur as a result of the activities of microorganisms, insects, mites, and rodents [10]. Warehouse cleaning must be carried out routinely, including all area of the building, so as not to leave behind traces of garbage and stains. Cleaning should be performed, checked, and recorded [9]. The quality control of the warehouse must ensure that the storage area is cleaned regularly. A pest control program should be set out in the warehouse SOPs, and it must be scheduled regularly [11]. Precautions must be taken to prevent unauthorized persons from entering the storage area [9]. The floor must always be clean and dry. Periodic cleaning is performed every 2 weeks.

The rice stored can be seen in Fig. 4. With limited storage space, companies are required to use space effectively and efficiently so that storage activities are not hampered; they are also required to find the best layout for higher effectiveness. Products that have the most shipping frequency and the ones that frequently go in and out are brought close to the entrance to minimize the distance of material handling movement.

In the application of GDP, warehouses and storage areas become zones that receive important attention. Therefore, it is necessary to repair the warehouse facilities. Warehouses must have sufficient capacity to allow the storage of various products. The storage

Fig. 5. Tools and transportation facilities in the Banten agro-hub warehouse

area must be provided with adequate lighting to allow all operations to be carried out accurately and safely.

C. *Vehicles and Equipment, Shipment Containers and Container Labelling, Dispatch, and Transportation*

Vehicles and equipment are used to distribute, store, or handle the rice. The warehousing equipment used at the agro-hub include a scale for weighing products and hand pallets for distributing products in the warehouse. Meanwhile, the transportation facility used for product distribution is a pick-up truck. The agro-hub only has one pickup truck that is equipped with a cover so that the products transported are well-protected from direct sunlight. The facilities and equipment should be kept clean and dry. Therefore, appropriate cleaning should be performed, checked, and recorded periodically after the usage of the facilities and equipment in accordance with the sanitation procedure for facilities and equipment (Fig. 5).

A recommendation concerning vehicles and equipment is that a procedure should be in place for the operations and maintenance of all vehicles and equipment involved in the distribution process, including for cleaning and maintenance. Equipment and transportation means must have sufficient capacity [9]. The design and use of vehicles and equipment must aim to minimize risk of errors and permit effective cleaning and maintenance to avoid contamination, build-up of dust or dirt, and any adverse effect on the quality of the packed rice being distributed [9]. Procedures should be in place to ensure that the integrity of the products is not compromised during transportation [9]. Defective vehicles and equipment should not be used [9].

D. *Documentation*

The agro-hub's documentation includes all procedures and records: SOPs and records of receipts, shipments, and stocks. Documents, in particular instructions and procedures, relating to any activity that may have an impact on product quality should be designed, equipped, reviewed, and distributed [9]. The title, nature, and purpose of each document should be clearly stated. Therefore, work instructions and work procedures for storage and warehousing in the form of standard operating procedures (SOPs) are needed. These SOPs must include the duties and responsibilities of the person in charge.

Documents should be organized regularly and checked. All documents must be completed, approved, signed (as required), and dated by an authorized person and shall not be amended without the necessary permission. A document of product identity must

contain date, name of product, quantity, and supplier identity. A record of facility checking and monitoring must contain person in charge, schedule, and analysis parameter. Comprehensive records should be maintained for all receipts, materials and products stored, and issues or distribution [12].

E. *Complaints, Recalls, Returned Product, and Contract Activities, and Repacking and Relabelling*

There are no complaints, recalls, and returned products, especially in the case of rice products, at the agro-hub. Contracts/agreements between the agro-hub and suppliers are signed only on particular occasions. The agro-hub's activities are re-labelling the rice with the brands Si Menak and Si Ratu, storage, and distribution. Rice production is carried out at the rice milling units in Karawang and Indramayu. In the future, agreements must be made periodically and clearly documented.

The agro-hub needs to design the complaint procedure clearly. Consumer voice should be listed in the product label. All complaints should be recorded and appropriately investigated. The actions to be taken should be described, including the need to consider a recall where appropriate [9, 12].

The agro-hub also needs to establish procedures regarding risk management in rice warehousing and distribution to avoid product recalls. Traceability procedure and document must be designed. Besides, a written procedure about a system for the recall of products known or suspected to be defective or counterfeit needs to be designed involving the person in charge. This procedure should be checked regularly and updated as necessary. The original manufacturer and/or marketing authorization holder should be informed in the event of a recall [9].

Customers' product returns may be caused by deterioration of quality, such as small grain, impurities, etc. The agro-hub must have a procedure to handle rice packs that are returned, rejected, and destroyed. Records of all returned, rejected, and/or destroyed rice packs should be kept for a predetermined period. Meanwhile, in the case of impurities, the rice may undergo reprocessing by cleaning up the impurities. Rice of deteriorated quality can be processed into a valuable product. A recommendation from the author is to reprocess rice into compost fertilizer or reprocess broken rice into flour.

F. *Self-inspection*

The agro-hub's self-inspection includes checking the equipment every time it is used, and for self-inspection the personnel must be in a clean and healthy condition. A quality system that includes self-inspection is carried out in the processing and receipt of goods (whether they are in a good condition and whether the water content is $<14\%$).

Based on WHO the equipment used for activity performance should be inspected for cleanliness and maintained periodically. Transportation means inspection include care such as service. Inspection of products may be performed by first checking the products' packaging and quality before sending them. All inspections must be recorded and include date, duties of the executor, and corrective actions [9].

4 Conclusion

The implementation of good distribution practices (GDP) and good warehouse practices (GWP) at the agro-hub needs to be improved with the design of duties and responsibilities on warehousing and distribution. It is necessary to pay attention to routine hygiene procedures, room layout settings, and storage conditions on a regular basis. In regard to tools and transportation means, it is necessary to schedule maintenance, maintain cleanliness, and maintain usage schedules so as not to interfere with the warehousing and distribution process. Documentation must be performed in complete. Product receipt, delivery, and stock must be recorded. Self-inspection of processes, tools, transportation, and products is required.

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