

Quality management system implementation of ISO 90002015 on robusta coffee processing in Jember regency

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Quality management system implementation of ISO 9000:2015 on robusta coffee processing in Jember regency

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Abstract. Indonesia plantation sector is continuing to produce good products including robusta coffee as a good prospect commodity. The problem that is faced is the lowest of product competitiveness comparing with other exporting countries, this has led to a study of the implementation of a quality system in export robusta coffee agribusiness. The study's purpose is to increase the quality of the production process on the processing unit of robusta coffee in Jember regency through continuous quality improvement based on ISO 9001:2015. The research location was selected by purposive sampling, which is Cacao and Coffee Research Center, PTPN XII Renteng, and Ketakasi Multipurpose Cooperative. The used method is self-assessment by pair assessment of the expert using AHP. The result shows the processing unit of robusta coffee Jember has 3 clauses of 7 clauses from strong category. But there is an important part of the quality system that is not standardized yet or has no standard at all. This problem can be fixed by applying the guidance and services of ISO training specialists and consultants. The clauses that became priority in its application in order is Leadership (0,259), Organization Context (0,244), Supporting (0,178), Operation(0,122), Planning (0,095), Increasing(0,053), and Evaluating Performance (0,049). Continual improvement is needed for clauses that have low priority.

1. Introduction

The export of Indonesia robusta coffee in the next 10 years is predicted to have a good prospect [1]. But on the other hand, Indonesia has lower of export competitiveness than Brazil, Columbia, and Vietnam [2], so that the competitiveness shall be increased to keep the good prospect. The low of export competitiveness related with increasing of world trade competition that is caused by over commodity. The increasing competition demand to produce quality commodities of agriculture from quality agribusiness system. Therefore, a study about robusta coffee agribusiness is needed. The development in the period 2015-2016 shows that the growth of Indonesia robustacoffee export fluctuates and tends to decline for -17,4% per year [3]. It indicates that the competitiveness of Indonesia coffee is decreased and the threat to the prediction about the next 10 years possibility. The decreasing number of coffee export is caused by the decreasing quality coffee production, therefore Indonesia shall find the way out of this problem and set a good strategy.

The fluctuating export of Indonesia coffee that fluctuates shows inconsistency in producing quality coffee, it is because the implementation of the quality management system is not consistent. The

quality management system is the exact guarantee to produce quality product consistently. The system that has certainty and is recognized by many countries is the ISO quality management system and the most recent version is ISO 9001:2015

Jember Regency is one of a region that has the potential to join the export of Indonesia robusta coffee to the international market. Jember Regency has a strategic location that surrounds by 3 robusta coffee plantation owned by PT Perkebunan Nusantara XII and coffee field owned by local communities [4], besides Jember has Cacao and Coffee Research Center, PTPN XII Renteng, and Ketakasi Multipurpose Cooperative. Based on this condition, robusta coffee stocks in jember possibly to be increased. The implementation of ISO ensures consistency in quality and standardizes best practice. The previous study shows that the performance in a company with ISO 9001 certification is better than a company without the certification [5]. Likewise, in terms of performance based on statistical analysis, it shows that the implementation of ISO 9000 significantly improves quality performance [6].

Those things make this study, with a specific purpose to prepare researched locations for applying ISO certification to keep the consistency for increasing the quality export product. This study was conducted in Ketakasi Multipurpose Cooperative Sidomulyo, Cacao and Coffee Research Center and PTPN XII Renteng. Coffee robusta processing unit represents Jember Regency of each small, middle and top scale. The three processing units are not only cultivating robusta coffee from their own plantation but also cultivating the coffee plantation from the community around.

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2. Literature Review

2.1 Quality Management System ISO 9001:2015

International Organization for Standardization [7] explains that to produce quality products, the supplier shall apply the quality management principle, such as focus on the customer, optimize the leadership, employee participation, process approach, commit to quality improvement, use factual data in decision making, and build up supplier relationships. Sundari *et al.*[8] stated that to get quality product companies shall apply quality control and quality guarantee concept.

Quality control means each product shall be produced as the demand, by quality management approach that maximalizes employee participation and organization competitiveness through continual improvement.

The adoption of quality management system is a strategic decision for each organization to increase performance and give a base for continuous development. ISO is an exact guarantee because ISO is a standard that addresses the company to a high level of quality control in world level business. ISO document also states the potential benefit for the organization, such as: giving quality products and services consistently, increasing customer satisfaction, knowing risk and chance, and proving that the quality system management is internationally standardized.

As a sign of business activity applied to the quality system continuously, the business activity will give a certificate from a certification agency [9]. The average economic profitability of companies that are ISO certified is greater than companies that are not ISO certified. With certificates, products that are produced in one country are more easily accepted in other countries, so it can be said that ISO is an international language for quality.

The benefit that is obtained from ISO certification is larger access to get in foreign markets and have computability with a foreign supplier. The process that is conducted by the company to reach certification tends to increase quality and uniformity job that is also increasing productivity and resulted in the improvement of competitiveness.

Based on that explanation can be stated that ISO is a system that ensures the increasing quality process of production. The production process that is worked continuously is a control process so that produce quality product. ISO is a document that can be applied to all business activity including the production of coffee. Every process will be worked with a clear quality standard, such as in Table 1.

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 Table 1. Quality Requirements for Wet Processing Robusta Coffee

Size	Criteria	Unit	Requirement
Big	Do not pass the sieve diameter 7,5 mm	% mass fraction	Max pass 5
Medium	Pass the sieve diameter 7,5 mm, Do not pass the sieve 6,5 mm	% mass fraction	Max pass 5
Small	Pass the sieve diameter 6,5 mm, Do not pass the sieve diameter 5,5 mm	% mass fraction	Max pass 5

Resources: National Standardization Agency [10]

Based on table 1 can be ensured that the size of coffee seed production has high quality and ISO ensures the standard is used properly. ISO consists of 7 clauses and 20 subclauses [7].

2.2 Analytic Hierarchy Process (AHP)

The decision involves many things (intangibles) that need to be compared. For doing that, the intangible shall measure throughout the tangibles side that the measurement shall be evaluated, how good in making the decision. AHP is a measurement theory through pairwise assessment and depends on the expert measurement to get the scale priority. This comparison measures the intangible in the relative term. The comparison is made uses absolute scale scoring that shows how many an element dominates others related to the attribute given. The scoring may be inconsistent, and how to measure the inconsistency and increase scoring, if to get better consistency is the AHP concern. The scale priority is lowered level and synthesized by multiplying with the priority and adding all the priority itself. It shows that is needed the organizing way to make a decision and submit information which is relevant while deciding something with estimating important factors and negotiates the understanding, believed, and value of the decision-maker [11].

3. Research Method

The study was conducted at Robusta coffee processing units in 3 places, namely the Indonesian Coffee and Cocoa Research Center, PTPN XII Renteng, and Ketakasi Multipurpose Cooperative Sidomulyo. Site selection is done by purposive sampling. The sample in this study is called a resource that provides reliable and reliable information about existing elements. Key informants are determined with certain considerations. The consideration is that the person is considered the most knowledgeable about the expected information or influential person making it easier for researchers to explore and explore information from the objects needed. Key informants in this study are the decision-making officials, staff, related employees, and other related parties.

3.1 Research Stage

- Assesing how far the clauses of ISO 9001:2015 has been applied through pre-assessment
- Improvement of ISO Clauses that is weak in its implementation based on *self-assessment* by the owner so that quality system management can be fully applied on robusta coffee agribusiness
- Determination the priority of applying ISO 9001: 2015 clauses through *pairwise assessment*.

3.2 Methods of Measurement and Development of a Quality Management System

- Identification ISO clauses by describing clauses for conditions of robusta coffee processing.
- Initial assessment by answering yes / no or already / not yet regarding the application of ISO. Respondent: owner/manager of agribusiness processing.
- Assessing the readiness to implement ISO using a checklist [8]. Answer choices: complete / written / documented score = 10, incomplete / unwritten / undocumented score = 5, and none = 0. The assessment of 100 statements was carried out in 4 classes, namely: a score of 751-1000 strong (strong), 501-750 moderate (fair), 251-500 weak (weak), and 0-250 bad (poor).

- d. Improvement of ISO clauses that are still weak in their application based on self-assessment by the owner/manager, so that the quality management system can be fully implemented in Robusta coffee processing.
- e. Comparison of the interests of the 7 clauses with the expert system tools so that the priority order of implementation is obtained.
- f. Determination the priority of applying ISO 9001: 2015 clauses through pairwise assessment.

3.3 Data Collection

Data collection was carried out by interviewing, observing and filling out questionnaires by respondents, namely managers of Robusta coffee processing units in Jember Regency. They are the managers of the Coffee and Cocoa Research Center, PTPN XII Renteng, KSU Buah Ketakasi Sidomulyo. The data that is obtained from the respondents managing the Robusta coffee processing unit is finalized by experts to determine the final answer.

4. Result and Discussion

4.1 Data Processing

The results of data processing show the frequency distribution of 7 clauses that can be seen in Table 2.

Tabel 2. Assessment Score of Clauses based on expert

No.	Clause	Complete (x10)	Incomplete (x5)	None (0)	Total Value	Average
1	Context of the Organisation	13	7	0	165	8,25
2	Leadership	9	8	0	130	7,65
3	Planning	3	8	1	80	6,67
4	Support	14	9	0	185	8,04
5	Operation	11	11	1	165	7,17
6	Performance Evaluation	3	7	3	65	5,00
7	Improvement	2	4	0	40	6,67
Total		55	54	5	820	7,06

Based on the data in the above table, it can be seen that some clauses still contain the value of "None", namely clause 3, clause 5, and clause 6. Clause 6 is a clause with the highest value "None" that is 3, so the level of application of Clause 6 including in low category.

4.2 Data Analysis

Analysis of the data from the assessment of 114 statements was divided into interval scores 4, namely strong for scores of 858-1140, moderate for 572-857, weak for 286-571, and poor for scores of 0-285. The score for "complete / written / documented" answers is 10, "incomplete / unwritten / undocumented" is 5, and "none" = 0. The Overall Self-Assessment Score, Category, and Description can be seen in Table 3.

The final assessment results based on Table 4 are obtained a total score of robusta coffee processing unit readiness in the application of ISO 9001: 2015 of 820 with the details such as:

- 55 components that are assessed as complete x 10 = 550
- 54 components that are assessed as incomplete x 5 = 270
- 14 components that are assessed as none x 0 = 0

Total score has been fulfilled in fair category, in some elements of the company's system it is in accordance with ISO 9001: 2015 quality management system standards [13], but there are still some important parts that are not in accordance with the quality management system standard and even none at all, so it is advised to implement a quality management system under the guidance of ISO 9001: 2015 training specialists and consultants.

Table 3. The score, category, and overall self assessment description

Score	Category	Detail
858-1140	(Strong)	Most of the elements of the company are in accordance with ISO 9000 standards. Examine areas where the score is weak and apply improvements; connect with ISO 9004 as additional instructions. It is also recommended to hold preassessment from the ISO 9000 registration Agency.
572-857	(Fair)	Some elements of the company system are in accordance with ISO 9000 quality management system standards. But there are still important parts of the company's quality system that do not fulfill these standards or even none at all. Find the exact field and apply the system mentioned; as an additional guide, the company can link it with the official guidelines in ISO 9004 or obtain services from ISO 9000 training specialists and consultants
286-571	(Weak)	There are still many quality management systems that are not in accordance with ISO 9000 standards. Companies shall conduct a lot of orientation and training specifically regarding these standards. If the company is serious about ISO 9000 certification, arrange an implementation and control team and get service from ISO 9000 training specialists and consultants.
0-285	(Poor)	The company quality system is practically is not exist. In this connection, it is very important for the company to carry out the review. Careful rules regarding training in Total Quality Management (TQM) tools and techniques are needed, as likewise ISO 9000 training and consulting, before companies invest their time and effort in ISO 9000 certification.

Source: Johnson [12]

The next analysis is to determine the performance value of each clause to determine the category of each clause in the overall quality management system. The results of the calculation of the performance value can be seen in Table 4.

Table 4. Performance Value of Each Clause

Clause	Assessment Score	Maximum Value	Value Scale	Category
Context of the Organisation	165	200	82,50	Strong
Leadership	130	170	76,47	Strong
Planning	80	120	66,67	Fair
Support	185	230	80,43	Strong
Operation	165	230	71,74	Fair
Performance Evaluation	75	130	50,00	Weak
Improvement	40	60	66,67	Fair
TOTAL	820	1140	70,64	Fair

Clauses that are included in the Strong category are Context of Organization, Leadership, and Support. These clauses are in accordance with ISO 9001: 2015 standards. Robusta coffee processing unit has SNI quality standards up to ISO 9001-2008. The existing organizational structure in the Robusta coffee processing unit has been formed and competent experts included. Robusta coffee processing unit manager and staff have conducted training activities related to the development of the Robusta coffee production process. As for the Clauses which fall into Fair category are Planning, Operations, and Improvement. Some components of these clauses are in accordance with the 9001: 2015 quality management system standard, but there are still other important components of these clauses that are still not in accordance with the ISO 9001: 2015 quality management system, so it is necessary to make continual improvements. and conducted training under the guidance of consultant 9001: 2015. The Performance Evaluation Clause is in the weak category. There are still many components of the clause that are not in accordance with the 9001: 2015 standard. All components of this clause have been partially implemented but there are no written documents regarding the responsibility and authority for the performance evaluation process. The management shall do a lot of

orientation and training, especially regarding performance evaluation. The performance value of each clause becomes the parameter to set the clause. The ISO 9001: 2015 classification according to the level of readiness for its implementation is presented in Table 5.

Table 5. Classification of ISO 9001: 2015 Clauses According to Their Application Readiness Level

Category	Clause	Value
(Weak)	Performance Evaluation	50,00
	Planning	66,67
(Fair)	Improvement	66,67
	Overall Performance	70,64
	Operation	71,74
(Strong)	Leadership	76,47
	Support	80,43
	Context Of the Organization	82,50

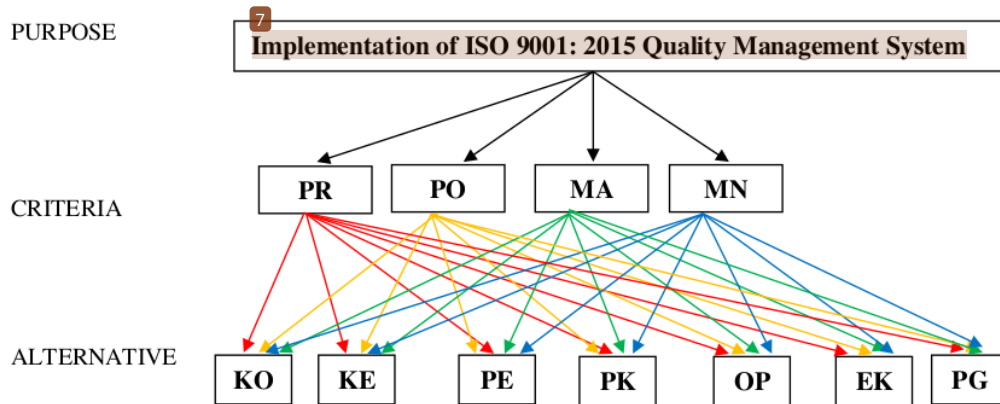


Figure 1. Hierarchical Structure of Implementing ISO 9001: 2015

Jember Robusta Coffee Processing Unit has 23 clauses in the Strong category. There need to be improvement efforts in the other 4 clauses to implement an ISO 9001: 2015 quality management system. The four clauses that are classified as fair and weak still need to be improved. The priority of applying ISO 9001: 2015 in Robusta coffee processing unit is determined based on four tasks of an effective agribusiness manager as agribusiness manager, such as 1) Planning (PR); 2) Organizing (PO); 3) Directing (MA); 4) Control (MN). While the alternative formulation uses 7 ISO 9001: 2015 clauses, such as: 1) Context of organization (KO); 2) Leadership (KE); 3) Planning (PE); 4) Support (PK); 5) Operations (OP); 6) Performance Evaluation (EK); and 7) Improvement (PG). Based on the criteria and alternatives, the hierarchy is arranged in Figure 1.

After compiling the hierarchical structure, a pairwise comparison test is conducted to obtain priority weight values. Based on the results of the Analytical Hierarchy Process (AHP) on the comparison of the four tasks of an effective agribusiness manager, it can be seen that the highest priority in the selection of the application of ISO 9001: 2015 is PO (Organizing) with a weight value of 0.544. Organizing is the main key because in organizing there is a structure that allows people to work effectively to achieve goals. The better the organization in an agribusiness, it allows employees to be able to complete their work properly. Organizing is considered to be a top priority that shall be considered in the application of ISO 9001: 2015 because organizing is the first step in running a business. Whereas the MA (Directing) criteria have the lowest principle priority because the managers of Robusta coffee processing units feel that efforts to guide existing human resources.

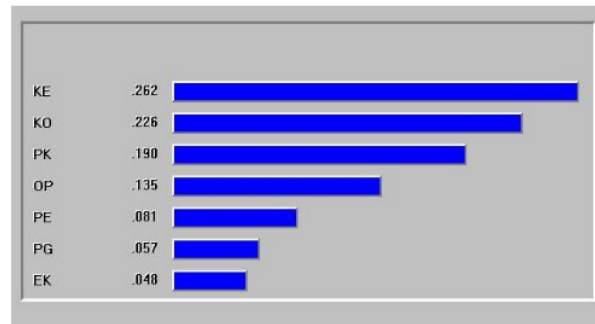


Figure 2. Priority for Implementing ISO 9001: 2015 Clauses Based on Organizing Tasks

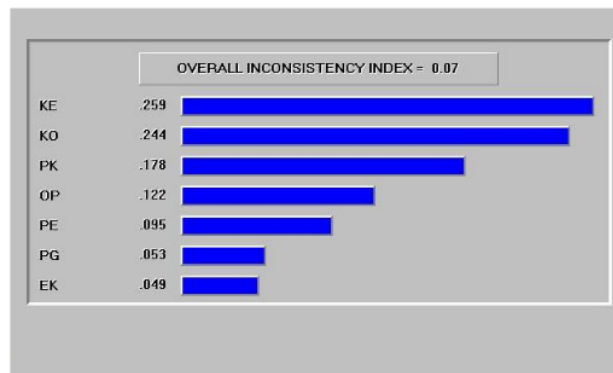


Figure 3. Priority for the Implementation of ISO 9001: 2015 Clause Based on the Purpose of Quality System Implementation

After knowing the priorities of the Agribusiness Managers' Four Criteria, the criteria for the ISO 9001: 2015 alternative clauses were analyzed, which are the priorities in Figure 2. The priority of applying ISO 9001: 2015 clauses based on Organizing tasks, the one that has the highest priority is the Leadership clause with a weighting value of 0.262. The head of the Robusta coffee processing unit has been able to influence the attitudes and behavior of his employees and is able to motivate them to do their best work. Leadership provides instructions on how to complete tasks and provide information about the outcomes. The aim is to explore the potential of each individual to contribute to the goals and success of the organization. The Leadership Clause occupies the first priority in developing an ISO 9001: 2015 quality management system. The organization in the Robusta coffee processing unit has effective leadership as indicated by taking actions to continuously improve the quality management system so that the quality standards of Robusta coffee processing units continue to increase so that they can compete in both the national and international markets. While the evaluation clause ranks last with a weight value of 0.048. The expert considers that this performance evaluation will be carried out if an error occurs during the production process. Managers of Robusta coffee processing units regularly review the quality management system at the organization to ensure sustainable suitability, feasibility and effectiveness so that production activities can be well controlled.

Meanwhile, the main priority of implementing ISO 9001: 2015 quality management system clauses based on the Planning task (PR) is the Planning (PE) clause, based on the Directing task (MA)

is the Leadership clause (KE), and based on the Control task (MN) is also Leadership clause (KE). From 7 clauses of ISO 9001: 2015, which ones will be prioritized can be seen in Figure 3.

Clauses of ISO 9001: 2015 that are prioritized are Leadership clauses with a weight value of 0.259, followed by Organization Context (0.244), Supporting (0.178), Operations (0.122), Planning (0.095), Improvement (0.053) and Performance Evaluation (0.049). The leadership role will be able to determine the Robusta coffee quality standards, it is conducted as an effort to improve the quality of Robusta coffee products so that, it can open and expand market access.

Leadership must interpret programs, plans, policies, procedures, and practices within the organization. Every department, division, or organization must have a balance. Leadership needs to provide more formal training in courses, workshops, seminars, educational meetings, and similar activities because it can give benefits to the organization and employees. The performance of each employee must be regularly assessed and evaluated as a form of employee contribution to the processing unit. Leadership will direct the processing unit to the process of improvement in various matters related to the improvement of the quality processes. Good leadership of the Robusta coffee processing unit has taken actions and decisions on the ongoing performance evaluation process and is able to create a productive work environment. One of the keys to a productive work environment is the flow of good communication that will allow good ideas to emerge as a form of a contribution to improve product quality. The values of all ISO 9001: 2015 clauses are the same, prioritizing only to show that one clause shall first be implemented to catch up with other clauses that are already well implemented.

5. Conclusion

The Robusta Coffee Processing Unit in Jember Regency already has many clauses in the Strong category, which are 3 clauses of 7 existing clauses. The Robusta coffee processing unit has implemented almost half of the ISO 9001: 2015 quality management system. The other half is still a clause that needs to be improved. In implementing the ISO 9001: 2015 quality management system, the level of readiness of the Robusta Coffee Processing Unit in Jember Regency is included in the Fair category. But there is still an important part of the agribusiness quality system that is not in accordance with these standards or even does not exist at all. This can be overcome by applying improvements to the elements as referred to under the guidance and services of training specialists and ISO 9001: 2015 consultants. The clauses of ISO 9001: 2015 that are prioritized in the implementation are Leadership clauses with a weight value of 0.259, followed by Organization Context (0.244), Support (0.178), Operations (0.122), Planning (0.095), Improvement (0.053) and Performance Evaluation (0.049).

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