

# Development Strategy for a Quality Management System of Gayo Coffee Agro-Industry Using Soft Systems Methodology

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## Abstract

The potential of Gayo coffee production in Aceh Province, Indonesia, has not been thoroughly well optimized, especially the low quality of coffee products and an inadequate quality management. Resulting in a demand of a holistic mapping problem system to elaborate the problem and discover the root and the most suitable solution. This article explains the development strategy for quality management system of Gayo coffee agro-industry using Soft Systems Methodology (SSM) approach. The SSM approach is able to provide solutions for unstructured problems. In this case, it is recommended to initiate an improvement from the farmers and exporters regarding the planning, controlling, and improving the quality under a control of local government, research institutions, and universities. Building a union and tools for the quality observation, control, and improvement is highly needed with a continuous process to achieve a sustainable improvement.

## Keywords

Aceh, CATWOE, conceptual model, human activity system, root definition

## 1 Introduction

One of the coffee production center in Aceh, Indonesia, is in Gayo highland which located in Central Aceh and Bener Meriah Regency. Almost 85% of the area is planted with the Arabica coffee, and the rest are Robusta. Both regencies consist of suitable lands for coffee growth with an elevation more than 800 m above the sea level and are excellent for the Arabica coffee (Pusat Penelitian Kopi dan Kakao and BPTP NAD, 2010). The total of coffee areas in both regencies is 45,900 ha, where 3,900 ha lays on Bener Meriah Regency and 42,000 ha is located in Central Aceh. The production of Arabica coffee beans in this area is 41.895 tons in 2007 with an export value up to US\$18,890, which reached US\$21.55 million in 2008 (AEKI, 2009) in spite of the fact that the productivity average was only 0.6 ton per ha.

The high potential of coffee production in Aceh has not been entirely well-optimized yet. It can be seen from two main problems; firstly, the produced coffee quality is still low (especially because of physical contaminations, cultivation techniques, and standardizations in the

middle level); secondly, the quality management is still inadequate (Fadhil et al., 2017a; Silitonga, 2008; Jaya et al., 2011). In fact, Quality Management is a very important issue nowadays (Háry and Klujber, 2001), because the global business environment becomes more competitive that it demands the company (including agroindustry) to keep improving and developing new ideas that are differences from other competitor (Milichovsky, 2015), including in innovation terms (Ehrenberger et al., 2015). Therefore, a holistic mapping problem system is highly needed to elaborate the problem in order to discover the root and its best solution.

Quality Management System is a potential mean to improve the trading condition and agricultural product quality (Raharja et al., 2012). This system includes quality (product and overall service characteristics), quality policy (overall purpose and objectives of the organization), quality management (all aspects of management function which stipulate and implement the quality policy), quality control (technique and operational activity to meet

the quality requirement), and quality assurance (planning and systematic activity required to give conviction) (Kadarisman, 1994). Quality system is purposed to identify all tasks which are related to quality, allocates responsibility, and establish cooperative relationships in the company (Insani et al., 2011). Quality system was also intended to build mechanism in order to integrate all functions into a comprehensive system.

The Soft Systems Methodology (SSM) is a holistic approach in assessing realistic and conceptual aspects within the society (Fadhil et al., 2018). SSM is seen as one of the strategy towards a number of management problems developed from a human activity system (Bjerke, 2008; Martin, 2008). A series of human activities is recognized as a system because each activity relates one to another and forms certain links. The Soft Systems approach is considered as a very productive methodology to study each human activity which is organized to reach certain goals (Patel, 1995). SSM is very appropriate to be implemented as a framework of problem solving that is especially designed for conditions where the problem is hardly defined (Sinn, 1998; Fadhil et al., 2018; Martin, 2008). SSM is also commonly used to develop a model concept, correct pragmatic acts, find compromises, and develop a participative learning such as developing organizations, communities, and business (Fadhil et al., 2017b).

Similar to other approaches, the main point of SSM is comparing between the reality and several models representing it. The SSM is intended to provide a better understanding about the reality (research) and ideas of improvement (action) (Sonatha and Prayama, 2011; Brocklesby, 1995). It is capable of providing a framework to understand even a complicated problem (Daellenbach and McNickle, 2005). The SSM is commonly implemented in a variety of field studies by experts, researchers, and academia; starting from human resources (Fadhil et al., 2017b), supply chain (Mello et al., 2017), organisation (Wang et al., 2015), health (Holm et al., 2013), social (Hardjosoekarto, 2012), etc.

In this study, the SSM approach is implemented to improve the quality management system of Gayo coffee agro-industry in Aceh according to the fact that many quality problems are found from the farmers to the exporters level which need to be solved. The problems are elaborated to find a development strategy for the quality management system of Gayo coffee agro-industry by taking many involved stakeholders into a consideration. The result of this study, which is in a form of conceptual

modeling using the SSM, is a simulation that served as a reference for the restoration and improvement of the quality management system of Gayo coffee agro-industry.

## 2 Methodology

This study used the SSM with the steps developed by Checkland and Poulter (2010); Checkland and Scholes (1990). The SSM consists of seven steps as illustrated in Fig. 1. The seven steps in SSM according to Checkland and Scholes are:

1. To review unstructured problems. This phase gathers essential information related to the quality management system of coffee agro-industry, including perspectives and assumptions of involved sides. The information can be received from documents of governmental and non-governmental institutions that include results of researches, interviews, or focus group discussions. The chosen experts are seven people, some of them are coffee shop owners in Takengon, Gayo coffee farmer, collecting trader, Gayo coffee cooperative, Department of Agricultural of Central Aceh Regency, one is a lecturer from Gajah Putih University in Takengon, and one is the owner of Gayo coffee Micro, Small and Medium Enterprises (MSMEs). This phase is not intended to define problems, yet to receive a number of developing perspectives to figure out possible decisions.
2. To express problem situation. The result of the first phase is then utilized to build a rich picture (sketching a reality map) or namely a representation of current condition. The sketch illustrates the process of activities from each institutions and actors involved within the situation as an indication of element structures, communication flows, and environment of individual interpretations (Sonatha and Prayama, 2011; Eriyatno and Larasati, 2013).
3. To define the problem that is related to the problem situation. This phase formulates the root definition, which is a short sentence stating "a particular system does *P* using *Q* to reach *R*". The root definition is then applied to the mnemonic CATWOE (Table 1).
4. To build a conceptual model. According to the aforementioned root definition of each element, an essential conceptual model is then built to reach an ideal goal. The model identifies human activities system which is an expression result of the problem situation. The model is an adaptive process as it plays a feedback role between a modeling process and an expression

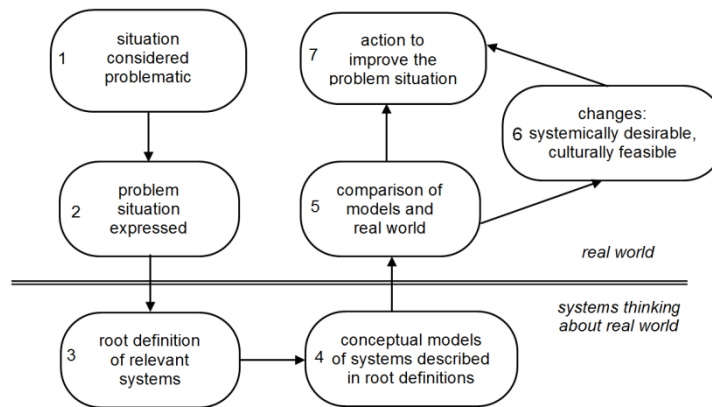


Fig. 1 The steps of soft system methodology (Checkland and Poulter, 2010; Checkland, 1981)

Table 1 The element and description of CATWOE

Elements of CATWOE	Description
Customer	Who receives the benefit of intended activities?
Actor	Who implements the activities?
Transformation	What should be changed to convert inputs into outputs?
World-view	Which way of views able to stop the activities?
Owner	Who is able to stop the activities?
Environment	What obstacles found within the system environment?

Adopted from Checkland and Scholes (1990).

result of the problem situation. All elements applied to the CATWOE are included in the conceptual model.

- To compare the model above with the problem situation. The model is compared with the reality to find a possibility of changes. All stakeholder express perceptions and assessments of the modeled activity to find a decision. The decided model is then recommended for changes. A logic analysis upon a transformation shows that a conversion of an input into an output is seemed as a success or not according to five criteria arranged in the formulation of 5E that includes an efficacy (does the decided approach work well to produce an output?), an efficiency (is the utilization of resources during the transformation process minimized?), an effectiveness (does a *T* (transformation) fulfill the long-term goal?), an ethicality (does the process against ethics?), and an elegance (sustainability).
- To decide an appropriate and desired change. This phase is intended to identify and find a desired change systematically and appropriately based on cultures. The changes may occur on the structure, procedure, or people's behavior.

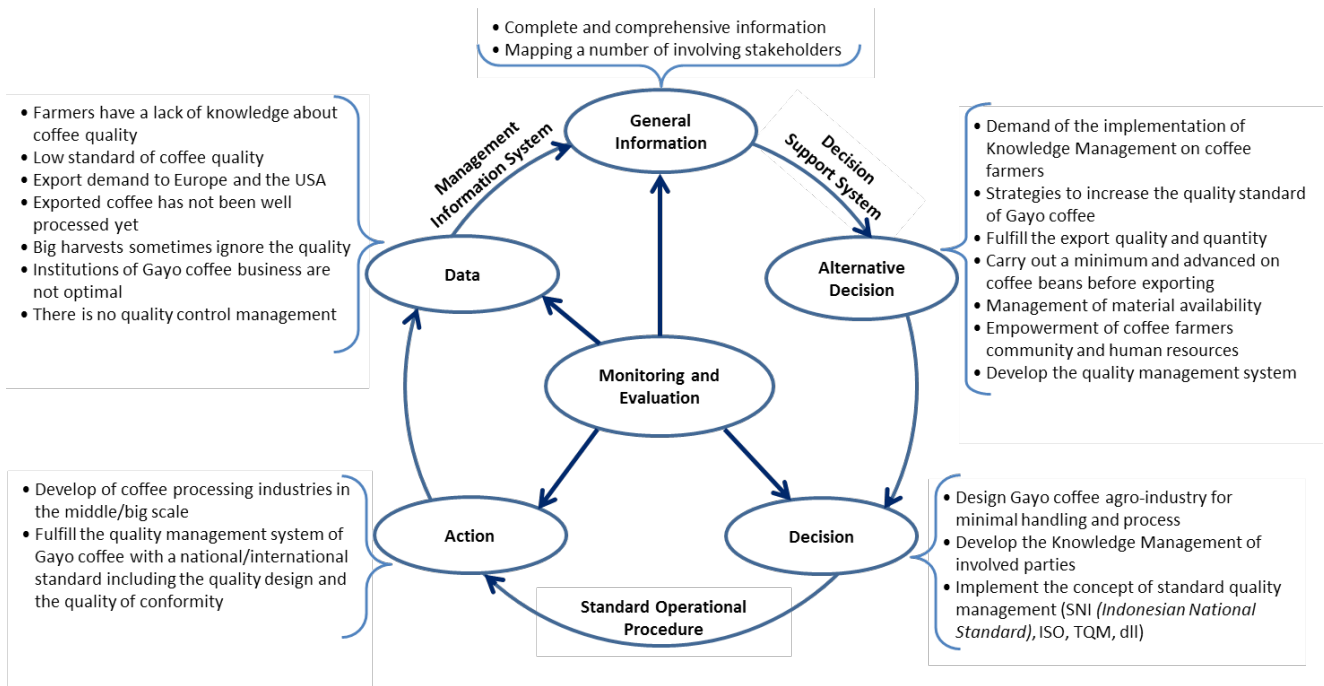
- To implement improvement actions on the problem. This phase results in an implementation of recommended changes. It shows a right system to make a change where activities will be a "reality".

The key point of SSM is building a model from systems related to the problem situation. The model is utilized as a deep discussion media to lead to an improvement in the reality. The discussion allows participants to argue and question in such a way to reveal varied perspectives (Martin, 2008).

### 3 Results and Discussions

#### 3.1 Identifying unstructured problems

The notable problems of Gayo coffee agro-industry in Aceh is that small and medium industries have been producing coffee beans from farmers where high physical contaminations are still found. It leads to a decrease of the competitiveness. Silitonga (2008) reported that contaminated coffee reached 80% of the total supply from farmers which ranked at grade 3-6 (the National Standard of Indonesia (SNI) 01-2907-2008). The high physical contamination is caused by traditional drying techniques where coffee beans are placed on the floor or soil, resulting in contaminations with rocks, gravels, dirt, and branches (Jaya et al., 2011). Moreover, problems found within a significant difference of prices between coffee beans supplied from farmers and exporters, a disinformation among executors was also found (Ibrahim and Zailani, 2010). The detailed problem is explained using an information cycle (Fig. 2). An institutional role of stakeholders is very important in the development strategy for the agro-industry quality management system especially as a media to spread the innovation of agriculture products (Budi et al., 2009). Institution is an organization



**Fig. 2** The information cycle of the development strategy of quality management system of Gayo coffee agro-industry (Adopted from Marimin and Maghfiroh (2010))

system and control the resources. It also regulates the relations (Nasution, 2002).

### 3.2 Problems mapping

Rich picture showed the problematic situation from several perspectives and emphasizes the structure, process, relation, conflict, and uncertainty. In addition, it also reveals problems and values which are believed and visualized using symbols (Fig. 3).

Farmers, exporters (agro-industry), and government are facing various problems within the coffee production in Aceh, such as non-optimal production quantity, the physical quality, and the taste. Non-optimal control of pre- and post-harvest handling and various coffee varieties plantation by farmers produced a low quality coffee. This condition is also not supported by a strong farmer organization that leads to the lack of planning, control, and improvement of coffee production quality. Therefore, this situation results low prices and demands of coffee by industries and consumers that has an impact to the low income.

During this time, quality and price of coffee are determined by exporters, which sometimes do not have an official standard reference. The exporter evaluation in assessing the coffee production were very subjective depends on personal judgment which often results in a low range. This situation will cause farmer incomes become unstable. The low quality of coffee is caused by a

lack of knowledge within farmers regarding the planting and processing of coffee according to an export standard. Generally, coffee farmers were learned hereditary about coffee plantation (Fadhil et al., 2018).

The role of farmer institutions, traders and coffee agri-business companies are still not optimal in developing and providing counseling to farmers. As a result, farmers are seemed to be working by themselves in producing coffee without getting any supports from other relevant institutions.

Farmer financial institutions such as cooperatives or other associations should facilitate an access to capitals, including cooperation with banks and support of various agencies. Government supports are not only in term of capital or finance but also include supporting the development of human resources through training in order to obtain the science and technology.

### 3.3 Root definition

The unstable quality of coffee from farmers does not reach the existing standard demanded by exporters because most of farmers do not fully understood the quality control. The problems related to the situation of Quality Management System of Gayo Coffee Agro-Industry in Aceh Province is outlined in the root definition, which is a system to conduct the planning, control, and improvement of the coffee quality (*P*) by implementing a planning, control, and improvement practice of coffee quality

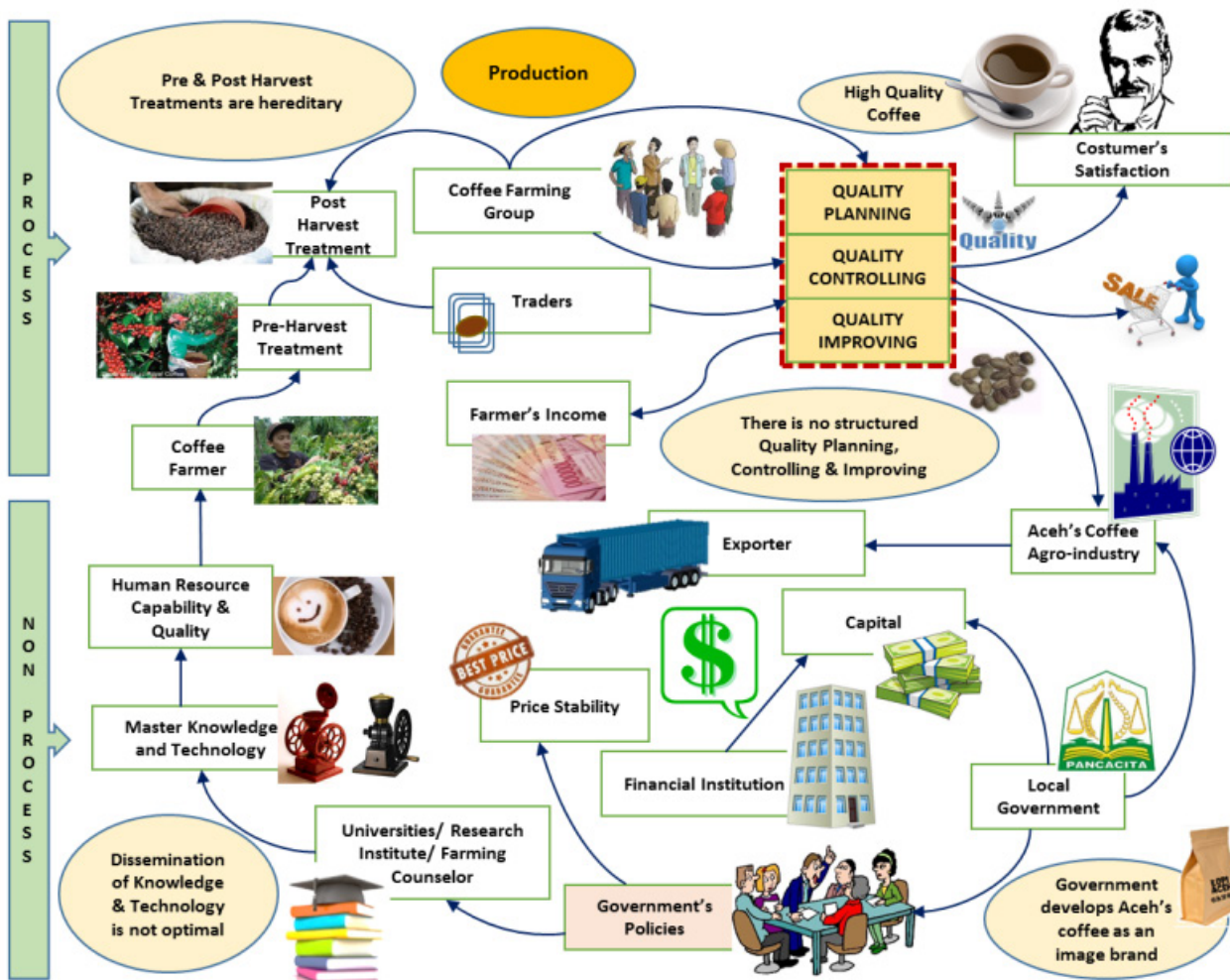


Fig. 3 Rich picture of quality management system problem of coffee agro-industry

by all involved sides ( $Q$ ) to be able to produce coffee with an export quality and become a regional brand image ( $R$ ) ("a system performs  $P$  by way of  $Q$  to achieve  $R$ "). The next root definition is explained into the mnemonic CATWOE as shown in Table 2.

### 3.4 Conceptual model

Based on the root definition, a conceptual model is then obtained which identifies required activities needed in the activity system of Gayo coffee agro-industry in Aceh province (Fig. 4). This conceptual model is an adaptive process, in which activities of executors occur and there are feedbacks between the process and the executors in the system.

A logical analysis to the transformation demonstrates that success and failure in each conversion from inputs to outputs can be evaluated based on five criterias listed in 5E formulation as shown in Table 3.

### 3.5 The comparison of model and real world

The comparison of a conceptual model (human activity system) with the reality produces several recommendation formulas that are utilized to prevent the problems that have been happening recently. Recommendations are grouped into three parts, namely planning, control, and improvement department. Recommendations for the planning emphasize the need of concrete actions that can strengthen the role of institutions (agro-industry / non-governmental organization (NGO) / universities / research institution) in quality planning, dissemination of knowledge, as well as optimizing the communication between the executors.

Recommendations for control is to optimize the role of farmers in handling coffee quality within the start point by strengthening the knowledge of farmers, forming an appropriate union, and harmonizing the role of parties involved in controlling the coffee quality. The recommendations for improvement section emphasize the need of measuring

**Table 2** Analysis of CATWOE

	Description	Result Definition
C	Costumer: the person who is influencing / influenced by the system	Exporter, Agro-industry, Traders
A	Actor: person and role of system in the activity	<ul style="list-style-type: none"> <li>Farmer: the person who handle planting, harvesting and post-harvest handling traditionally</li> <li>Trader: executing post-harvest handling and selling to agro-industry (exporter)</li> <li>Agro-industry and Exporter: the person who sell the products to national and international consumers (buyers)</li> <li>University: an institution that provide the science and technology</li> <li>BPTP (Agricultural Technology Research Center): technology provider and as an institution conducting dissemination of research result to farmers and traders and an executor for the policy maker</li> <li>Counselor: the person who disseminate the result of research and technology</li> </ul>
T	Transformation: process and transformation	The establishment of the development strategy of quality management system of Gayo coffee agro-industry through research, training, counseling, community empowerment and policy formulation
W	World-view: impact of system implementation	The formation of government policies and the establishment of good knowledge for all involved elements to have a responsibility in sustainable planning, controlling, and improving the quality management system of Gayo coffee agro-industry in Aceh province
E	Owner: the owner	Farmers, Entrepreneurs (agro-industry) and regional government
C	Environment: environment problems including its system and implication	<ul style="list-style-type: none"> <li>Lack of information and quality management of Gayo coffee agro-industry</li> <li>Cultures and behaviors of farmers in the handling of pre and post-harvest based on predecessor knowledge</li> </ul>

ROOT DEFINITION:

The system performs activity of planning, control and improvement of coffee quality (P) by implementing practical planning, control and improvement of coffee quality by all the parties involved (Q) to be able produce a high-quality coffee and become a regional brand image (R)

**Table 3** Formulation of 5E

No	Aspect	Formulation
1	Efficacy	Transparency and collaboration in the whole process of quality management system of coffee agro-industry
2	Efficiency	Resources are used in accordance with the principle of quality management of coffee agro-industry
3	Effectiveness	Preparation of planning and improvement of coffee quality occurs optimally to guarantee the fulfillment of coffee quality standard
4	Ethicality	Quality control does not decrease the right of farmers to develop coffee productions
5	Elegance	The whole process considers the sustainability principle

instruments as the success indicators of the improvement processes. A complete explanation can be seen in Table 4.

**3.6 Expected changes**

The main purpose of Gayo coffee farming management is to increase the production in order to increase the income of coffee farmers. Therefore, the farmers as business managers have to understand how to allocate their resources or production factors to achieve goals. The produced coffee must meet certain quality requirements to be accepted by the market. One of the efforts is improving the human resources of farmers and mastering knowledge and technology about agro-industry and coffee quality. Coffee from Aceh province is one of the best of the existing coffee and this is a fundamental capital of farmers as competitiveness

to fulfill the coffee need of the world. Farmers should master technology of pre- and post-harvest handling to obtain coffee that meet the quality standard that has been established and agreed among farmers, traders and entrepreneurs (agro-industry). This must be managed in a good concept and management, includes achieving the export quality standard.

Maintaining the quality of coffee should become the concern of government so that the leading regional product in Aceh as an export commodity of the world can be maintained continuously and sustainably, through a collaboration with research institutions and the existing universities (Fadhil et al., 2017c).

The fluctuation of coffee price is very detrimental to farmers. The government could help to overcome the

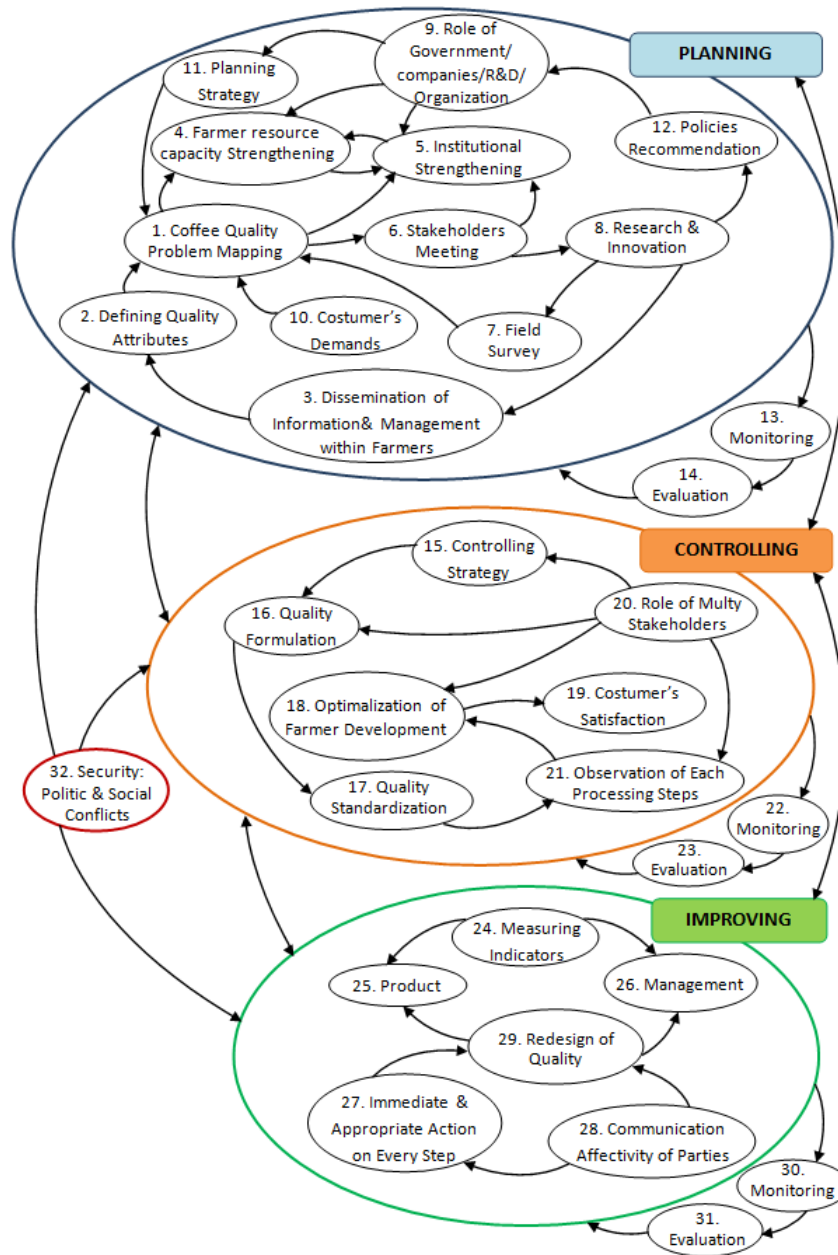


Fig. 4 Conceptual model of development strategy of quality management system of Gayo coffee agro-industry

problem by issuing policies that supports coffee farmers such as utilizing the locally-generated revenue as a bailout of policies implementation on the market price of coffee, followed by an access to a financial institution. This will decrease the dependence of farmers on coffee mafias who give detrimental binding bailouts. The local government is expected to issue strategic policies to increase the welfare of farmers, such as:

- Promoting a coffee agribusiness management based on cooperatives in order to increase the welfare of coffee farmers by reducing the social gap between poor farmers and capital owners.

- Increasing the coffee promotion in the national and international levels as one of the approaches to attract new coffee investors and buyers that will result in the increase of competitiveness.
- Developing and restoring the nearest road and port infrastructures, such as Krueng Geukueh port, North Aceh as a departure location to export coffees.
- Developing a marketing strategy.

Other than that, an efficiency increase of selling chain is needed through:

1. A fair benefit sharing between traders and farmers.

**Table 4** The comparison of model and reality

Activity	Real Condition	Recommendation
Planning	At the phase before the production of coffee, the farmer is very less aware of information that relates to planning strategy	Optimizing the role of agricultural counseling and participation of non-governmental organizations in the dissemination of knowledge management activities for farmers
	Quality of coffee has no strategy in the planning process, it only follows inherited traditions	Dissemination of knowledge about quality management to farmers through non-governmental organization and counseling agencies
Controlling	Involvement of stakeholders tends to be on their own action without good coordination from farmers to the exporters	Optimization of predictive meetings between the stakeholders
	Gayo coffee production does not have a comprehensive control strategy, either in the production quantity, or in the quality and handling of pre and post-harvest	Optimizing the participation of non-governmental organization / counselors to educate farmers so they are aware of "the quality and technology" within the pre and post-harvest activities in order to control the coffee quality from the "head" level
	There are no clear list of stakeholders who has responsibility on the agro-industry quality management standard, either for the pre or post-harvest phases, so the quality definition has different references	Collaboration among agro-industry (exporters), Agricultural Technology Research Center, non-governmental organization, local government and farmers to form an union of "Determinants and Supervisors of Coffee Quality"
Improving	Poor quality of production and management, there is no grand design clearly in efforting improvement	Determining the measurable real indicators as a reference of improvement process
	Improvement effort on each levels should be done immediately at every level where quality problems are found, yet it is sometimes neglected in practices, because improvement efforts are expected to be performed by the higher management level	The effectiveness of communication among farmers, farmer groups, agro-industry, Agricultural Technology Research Center, non-governmental organization, local government and regional government for each of quality improvement process

2. Facilitating a development of new competitive traders / exporters.
3. Facilitating farmers / exporters with a capital help.

To develop an agribusiness in rural areas, banks play an important role as a funding institution. The existence of funding from banks determines the progress of agribusiness. What has been happening is that credits allocation for rural agribusiness is very low, especially on farm agribusiness.

### 3.7 Upgrading action

The development strategies of Gayo coffee agro-industry is started by controlling and supervising the quality within farmers (pre- and post-harvest). An intensive and sustainable role of related institutions (agro-industry, research institution, universities, Food Crops Research Center, agricultural counselors, and local government) is needed to increase the capability of farmers in order to produce coffees with an export quality standard.

A formation of a union is needed to bridge communication among the agro-industry people, farmer / group of farmers, research institution, universities and local government to create an understanding and agreement that need to be implemented together within the implementation of a

quality guarantee system in Gayo coffee agro-industry in Aceh. Moreover, tools are also needed as factual and measurable indicators which are used as reference of improvement processes.

An improvement recommendation can be implemented. This is important as an appreciation that after the implementation of changes, the problem situation will be modified. In the other word, the process is a cycle which is done with a sustainable improvement as illustrated in Fig. 5.

### 4 Conclusion

SSM approach on development of quality management system of Gayo coffee agro-industry in Aceh Province, Indonesia, can provide solutions for the unstructured problems. For the aforementioned case, the recommended solution is to carry out an improvement from the farmer until the exporter levels (agro-industry) in planning, control and improvement of Gayo coffee quality under the supervision and guidance of local government, research institutions and universities. The establishment of a union and tools in supervision, control and improvement of the quality is needed so that the process of sustainable improvement can be carried out continuously.



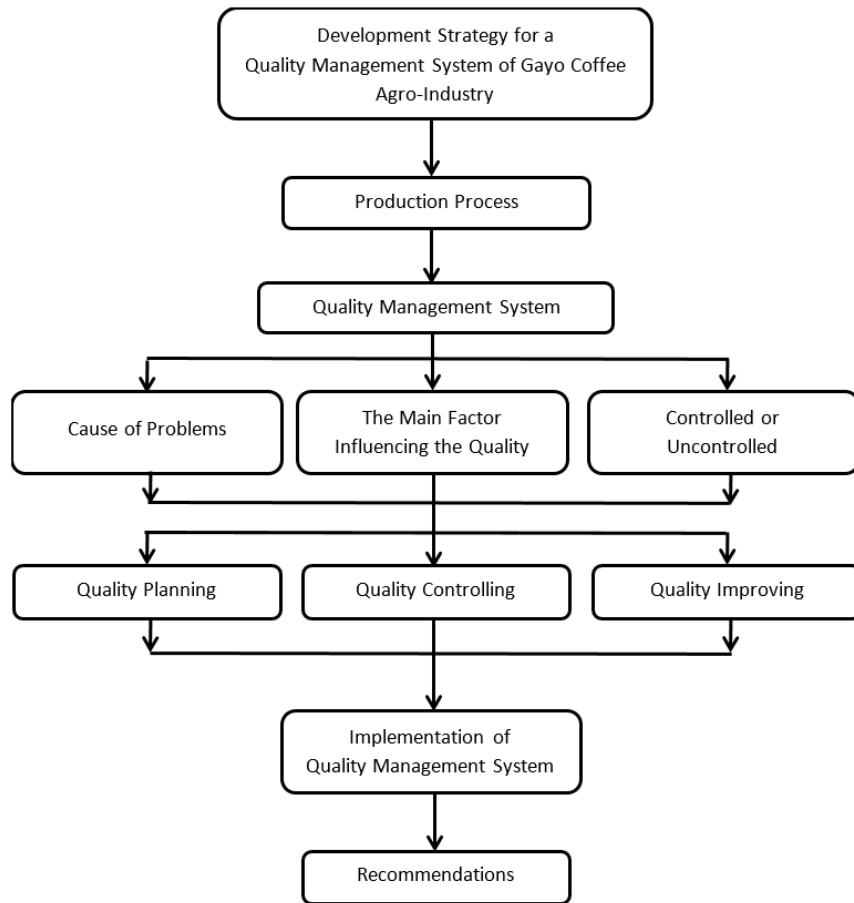


Fig. 5 A flowchart of development strategy of quality management system of Gayo coffee agro-industry

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**References**

AEKI Asosiasi Eksportir dan Industri Kopi Indonesia (Association of Indonesian Coffee Exporters and Industries (AICE)) (2009) "Peluang Pengembangan Komoditi Kopi Arabika di Dataran Tinggi Gayo", (The Development Opportunities of Arabica Coffee Commodity in Gayo Highland) AEKI, Jakarta, Indonesia. (in Indonesian).

Bjerke, O. L. (2008) "Soft Systems Methodology in action: A case study at a purchasing department", MSc Thesis, Chalmers University of Technology and University of Gothenburg Göteborg. [online] Available at: [https://gupea.ub.gu.se/bitstream/2077/10551/1/gupea\\_2077\\_10551\\_1.pdf](https://gupea.ub.gu.se/bitstream/2077/10551/1/gupea_2077_10551_1.pdf) [Accessed: 23 April 2017]

Brocklesby, J. (1995) "Using Soft Systems Methodology to Identify Competence Requirements in HRM", *International Journal of Manpower*, 16(5-6), pp. 70–84. <https://doi.org/10.1108/01437729510095962>

Budi, L. S., Ma'arif, M. S., Sailah, I., Raharja, S. (2009) "Strategi Pemilihan Model Kelembagaan dan Kelayakan Finansial Agroindustri Wijen", (The Strategy for Selecting Institutional Model and Financial Analysis of Sesame Agroindustry) *Jurnal Teknologi Industri Pertanian*, 19(2), pp. 56–63. (in Indonesian). [online] Available at: <http://journal.ipb.ac.id/index.php/jurnaltin/article/viewFile/1061/170> [Accessed: 24 April 2017]

Checkland, P. (1981) "Systems thinking, systems practice", 1st ed., John Wiley & Sons Ltd., Chichester, United Kingdom.

Checkland, P., Poulter, J. (2010) "Learning for Action: A Short Definitive Account of Soft Systems Methodology, and its use for Practitioners, Teachers and Students", Wiley, New York, USA.

Checkland, P., Scholes, J. (1990) "Soft System Methodology in Action", John Wiley & Sons Ltd., Chichester, England, United Kingdom.

- Daellenbach, H., McNickle, D. (2005) "Management Science: Decision-Making through Systems Thinking", 2nd ed., Palgrave Macmillan, Hampsire, United Kingdom.
- Ehrenberger, M., Koudelková, P., Strielkowski, W. (2015) "Factors Influencing Innovation in Small and Medium Enterprises in the Czech Republic", *Periodica Polytechnica Social and Management Sciences*, 23(2), pp. 73–83.  
<https://doi.org/10.3311/PPso.7737>
- Eriyatno, Larasati, L. (2013) "Ilmu Sistem, Meningkatkan Integrasi dan Koordinasi Manajemen", (System Science, Enhance Integration and Management Coordination) Guna Widya, Surabaya, Indonesia. (in Indonesian).
- Fadhil, R., Maarif, M. S., Bantacut, T., Hermawan, A. (2017a) "Alternative Assessment of Development in the Quality Management System of Gayo Coffee Agroindustry Using Non-Numeric Multi Experts-Multi Criteria Decision Making Approach", *Proceedings of Aceh Development International Conference 2017*, Kuala Lumpur, Malaysia, Mar. 24-26, 2017.
- Fadhil, R., Maarif, M. S., Bantacut, T., Hermawan, A. (2017b) "Model Strategi Pengembangan Sumber Daya Manusia Agroindustri Kopi Gayo dalam Menghadapi Masyarakat Ekonomi ASEAN", (Strategy Model of Human Resources Development of Gayo Coffee Agroindustry in Dealing with ASEAN Economic Community) *Jurnal Manajemen Teknologi*, (Indonesian Journal for the Science of Management), 16(2), pp. 141–155. (in Indonesian).  
<https://doi.org/10.12695/jmt.2017.16.2.3>
- Fadhil, R., Maarif, M. S., Bantacut, T., Hermawan, A. (2017c) "Assessment of Innovation Potential of Gayo Coffee Agroindustry", *Quality Innovation Prosperity*, 21(3), pp. 114–126.  
<https://doi.org/10.12776/qip.v21i3.888>
- Fadhil, R., Maarif, M. S., Bantacut, T., Hermawan, A. (2018) "Situational Analysis and Intervention Strategy for Gayo Coffee Agroindustry Institution in Indonesia", *Journal of Food, Agriculture and Environment*, 16(1), pp. 31–40.  
<https://doi.org/10.1234/4.2018.5479>
- Hardjosoekarto, S. (2012) "Construction of Social Development Index as a Theoretical Research Practice in Action Research by Using Soft Systems Methodology", *Systemic Practice and Action Research*, 25(6), pp. 493–509.  
<https://doi.org/10.1007/s11213-012-9237-9>
- Háry, A., Klujber, D. (2001) "Assessment Approaches and Strategies for the Quality System Improvement", *Periodica Polytechnica Social and Management Sciences*, 9(2), pp. 127–139. [online] Available at: <https://pp.bme.hu/so/article/view/1729> [Accessed: 12 June 2017]
- Holm, L. B., Dahl, F. A., Barra, M. (2013) "Towards a multimethodology in health care – synergies between Soft Systems Methodology and Discrete Event Simulation", *Health Systems*, 2(1), pp. 11–23.  
<https://doi.org/10.1057/hs.2012.21>
- Ibrahim, H. W., Zailani, S. (2010) "A Review on the Competitiveness of Global Supply Chain in a Coffee Industry in Indonesia", *International Business Management*, 4(3), pp. 105–115.  
<https://doi.org/10.3923/ibm.2010.105.115>
- Insani, D. D., Septiani, L., Saputra, M. Y., Saifatah, L. (2011) "Sistem Jaminan Mutu Pada 3Q (Quality Qontrol, Quality Assurance, Quality Manajement)", (Quality Assurance System at 3Q) *Manajemen Mutu dan Industri Pangan*, 12(1), pp. 118–122. (in Indonesian). [online] Available at: <https://cyberpustaka.wordpress.com/nomor-dan-volume/118-2/> [Accessed: 10 June 2017]
- Jaya, R., Machfud, Ismail, M. (2011) "Aplikasi Teknik ISM dan ME-MCDM untuk Identifikasi Posisi Pemangku Kepentingan dan Alternatif Kegiatan Perbaikan Kualitas Kopi Gayo", (Application of ISM and ME-MCDM Techniques for the Identification of Stakeholders Position and Activity Alternatives to Improve Quality of Gayo Coffee) *Jurnal Teknologi Industri Pertanian*, 21(1), pp. 1–8. (in Indonesian). [online] Available at: <http://journal.ipb.ac.id/index.php/jurnaltin/article/view/3661/2511> [Accessed: 24 April 2017]
- Kadarisman, D. (1994) "Sistem Jaminan Mutu Pangan", (Food Quality Management Systems) *Pelatihan Singkat Dalam Bidang Teknologi Pangan*, Angkatan II. Kerjasama FATETA IPB – PAU Pangan & GIZI IPB dengan Kantor Meneteri Negara Urusan Pangan / BULOG Sistem Jaminan Mutu Pangan, Bogor, Indonesia. (in Indonesian).
- Marimin, Maghfiroh, N. (2010) "Aplikasi Teknik Pengambilan Keputusan Dalam Manajemen Rantai Pasok", (Technic and Application of Decision Making in Supply Chain Management) 1st ed., IPB Press, Bogor, Indonesia. (in Indonesian).
- Martin, E. (2008) "Aplikasi Metodologi Sistem Lunak untuk Pengelolaan Kawasan Hutan Rawan Konflik: Kasus Hutan Penelitian Benakat, Sumatera Selatan", (Application of Soft Systems Methodology for Close-to-Conflict State Forestland Management: The Case of Benakat Research Forest, South Sumatra) Ph.D. Dissertation, Sekolah Pascasarjana Institut Pertanian Bogor. (in Indonesian).
- Mello, M. H., Gosling, J., Naim, M. M., Strandhagen, J. O., Brett, P. O. (2017) "Improving coordination in an engineer-to-order supply chain using a soft systems approach", *Production Planning & Control*, 28(2), pp. 89–107.  
<https://doi.org/10.1080/09537287.2016.1233471>
- Milichovský, F. (2015) "Financial Key Performance Indicators in Engineering Companies", *Periodica Polytechnica Social and Management Sciences*, 23(1), pp. 60–67.  
<https://doi.org/10.3311/PPso.7810>
- Nasution, M. (2002) "Pengembangan Kelembagaan Koperasi Pedesaan untuk Agroindustri", (Institutional Development for the Cooperative Rural Agroindustry) IPB Press, Bogor, Indonesia. (in Indonesian).
- Patel, N. V. (1995) "Application of Soft Systems Methodology to the Real-World Process of Teaching and Learning", *International Journal of Educational Management*, 9(1), pp. 13–23.  
<https://doi.org/10.1108/09513549510075998>
- Pusat Penelitian Kopi dan Kakao, BPTP NAD (2010) "Usulan Pelepasan Kopi Arabika Gayo Bor-Bor dan Tim-Tim, Takengon", (The Proposed Release of Arabica Gayo Coffee Bor-bor and Tim-tim, Takengon) Pusat Penelitian Kopi dan Kakao (PPKK) and Balai Pengkajian Teknologi Pertanian Aceh (BPTP NAD), Banda Aceh, Indonesia. (in Indonesian).

- Raharja, S., Munarso, S. J., Puspitasari, D. (2012) "Perbaikan dan Evaluasi Penerapan Sistem Manajemen Mutu pada Industri Pengolahan Tahu (Studi Kasus di UD. Cinta Sari, DIY)", (Improvement and Evaluation of Implementating Quality Managemet System in Tofu Industry (Case Study at UD. Cinta Sari, DIY)) MANAJEMEN IKM: Jurnal Manajemen Pengembangan Industri Kecil Menengah, 7(1), pp. 28–36. (in Indonesian).  
<https://doi.org/10.29244/28-36>
- Silitonga, C. M. T. M. (2008) "Analisis Keunggulan Bersaing Kopi Arabika Gayo Organik di Indonesia", (Competitive Advantage Analysis of Arabica Gayo Coffee Organic in Indonesia) Masters Thesis, Program Pascasarjana Universitas Terbuka, UPBJJ Medan, Medan, Indonesia. (in Indonesian).
- Sinn, J. S. (1998) "A Comparison of Interactive Planning and Soft Systems Methodology: Enhancing the Complementarist Position", Systemic Practice and Action Research, 11(4), pp. 435–453.  
<https://doi.org/10.1023/A:1023098025076>
- Sonatha, Y., Prayama, D. (2011) "Penerapan Soft System Methodology Dalam Mengatasi Permasalahan Home Monitoring", (The Implementation of Soft Systems Methodology to Solve Home Monitoring's Problem) Poli Rekayasa, 6(2), pp. 154–160. (in Indonesian). [online] Available at: <http://repo.polinpdg.ac.id/422/> [Accessed: 24 April 2017]
- Wang, W., Liu, W., Mingers, J. (2015) "A systemic method for organisational stakeholder identification and analysis using Soft Systems Methodology (SSM)", European Journal of Operational Research, 246(2), pp. 562–574.  
<https://doi.org/10.1016/j.ejor.2015.05.014>