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Sustainable Management Analysis of Biodiesel Utilization in Jakarta and it's Surrounding

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ABSTRACT
Analysis of MDS (multi dimensional scaling) is performed to determine the level of sustainability of Biodiesel as Biofuel Utilization in Jakarta and its surrounding area. Sustainability assessment based on scoring by the experts for each attribute in each dimension of sustainability assessment. Dimensions of sustainability are considered consists of the environmental dimension, the economic, social, technological, and policy. The results showed that the five dimensions of sustainability, only environmental and technological dimensions beyond the sustainability index. While the other three dimensions, namely social, economic, and policy do not meet the sustainability index. So that the overall average value of the sustainability of Biodiesel as Biosolar (mixing between automotive diesel engine and biodiesel or FAME) utilization in such area also has not met the required sustainability index. However the counter measures can be applied to leverage these problems is to increase socialization and education, simultaneously the technical regulations that could encourage greater variety of sensitive attributes in each dimension, and make the application of policy incentives and disincentives to support it. The first priority step can be started from the improvement in the social dimension attributes through efforts to raise public awareness of the use of Biodiesel as biofuel. This will indirectly encourage the improvement that will attribute the economic dimension with the increasing value-added agro-industry products. In order to facilitate the operation, the necessary attributes is the improvements in policy dimension, especially at the local level policy. All these efforts can be maximized by encouraging better sensitive attributes, such as environmental and technology attributes. Means Improvement is to increase the utilization ratio of biodiesel in biosolar and increasing the availability of human resources in supporting using Biodiesel as biofuel. The entire steps were expected to raise the level of sustainability of Biodiesel utilization in Jakarta as a whole.
Keywords: utilization, biofuel, biodiesel, sustainability, multidimensional scaling (MDS).

INTRODUCTION

According Sumarwoto (2001) global warming is the earth's surface temperature increases event. Atmospheric temperature is determined by the gas content of the so-called greenhouse gases (GHGs). One effort to do in order to reduce greenhouse gases is to substitute fossil fuel consumption with biofuel. Indonesia is rich in material for vegetable oil, which is an intermediate material for the biofuel. Buiofuel has a great opportunity to contribute to the reduction of GHG. Crude Palm Oil (CPO), has been produced by Indonesia largely, and even since June 2007 Indonesia is the largest CPO producer in the world, and the CPO is a semi-finished materials for biodiesel as substitution of fossil automotive diesel engine (ESDM, 2009). Substitution of Fossil Fuel with Biofuel in its consumption is also expected to reduce the burden of energy demand due to population growth (DJLPE, 2006) and anticipate the decline in oil production of Indonesia (ESDM, 2009), as well as reduce air pollution. Research on biodiesel, is still a further study on the technical and economic aspects, while the ongoing research of integrated policy is still rarely preceded. Therefore it is necessary to do research on the sustainability of biofuel utilization management of palm oil based biodiesel, especially in the area of Jakarta, Bogor, Depok, Tangerang and Bekasi (Jakarta and it's surrounding).

Analysis of MDS (multidimensional scaling) is performed to determine the level of sustainability of management biofuel utilization in Jakarta and its surrounding. Sustainability assessment based on scoring by the experts for each attribute in each dimension of sustainability assessment Biodiesel utilization management in Jakarta and its surrounding. Dimensions of sustainability are considered consists of the environmental dimension, the economic, social, technological, and policy.

METHODS

Object of the study limits the fuel distribution line is administratively located in the Jakarta and its surrounding (here and after called Jakarta), as area of PT.Pertamina (Persero) as State Own Enterprise,West Java

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Region Distribution (Pertamina JBB), section Jakarta Operation Group, assigned as fuel distributor for Public Service Obligation (PSO) for Inland transportation. (Figure 1). This study aims to determine the level of sustainability management Biodiesel utilization in the Jakarta area based on the preferences of experts (knowledge base). Preference was assessed using the MDS experts to determine the level of sustainability of Biodiesel Utilization Management in the Jakarta and it's surrounding.

Scoring the various attributes of the dimensions of the sustainability of biodiesel utilization management in Jakarta is obtained through a survey of experts (expert survey). Expert opinion obtained through a questionnaire with at least selected experts from various parties and disciplines that are very familiar with the complexity of biodiesel utilization management in Jakarta. Expert selection carried out by adopting a boundary analysis using expert search techniques to snow ball sampling (Dunn 2003). Accordingly, the expert survey conducted on experts from government agencies, universities and private parties.

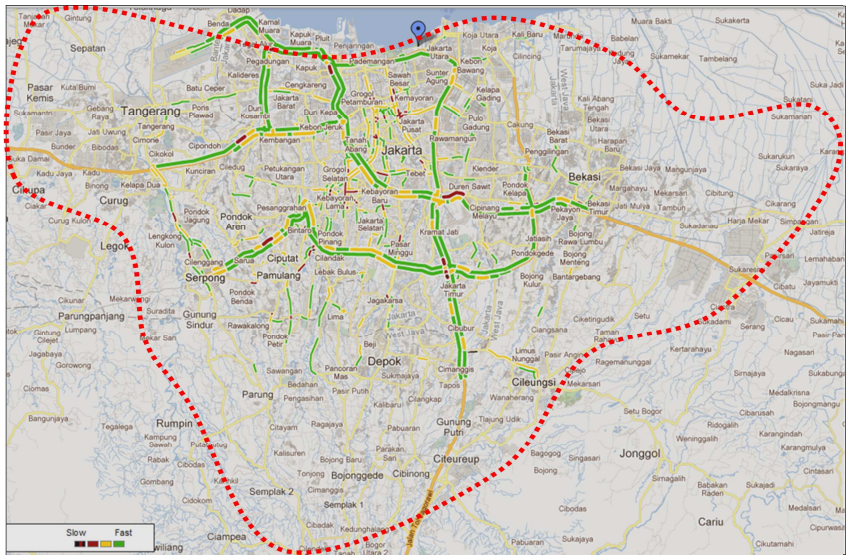

Figure 1 Map of study sites in Greater Jakarta.

The analysis illustrates the sensitivity of various attributes of sustainability Biodiesel biofuel utilization management in the Greater Jakarta area. It is necessary to develop policies to improve the level of sustainability management in Greater Jakarta biodiesel biofuel utilization of various dimensions were analyzed. In addition, sustainability can be generated scores of each dimension that can demonstrate priority policy improvements in various dimensions that have a low level of sustainability.

RESULTS AND DISCUSSION

The analysis assessed the sustainability of the environmental dimensions (7 attributes), economics (8 attributes), social (7 attributes), technology (5 attributes), and policies (8 attributes). The result of ordinate analysis shows the index values of each dimension of the sustainability of Biodiesel utilization management in Jakarta on a scale 0-100. Score and the average value of the various dimensions of sustainability management are presented in Table 1. Scores of each dimension are also depicted in kite diagram, as shown in Figure 2.

Table 1 Score of sustainability management in Jakarta biodiesel utilization

No	Dimension	Score
1	Environment	52.56
2	Economic	43.20
3	Social	46.38
4	Technology	52.95
5	Policy	46.13
	Average	**48.24**

Table 1 and Figure 2 shows that the five dimensions of sustainability, only environmental dimension (52.56) and technology (52.95) that is past the sustainability index. This illustrates that the three dimensions, namely, the social dimension (46.38), economic (43.20), and policy (46.13) do not meet the sustainability index. So that the overall average value of the sustainability of Biodiesel utilization management Jakarta (48.24) also has not met the required sustainability index (50.00). These results indicate that the Biodiesel utilization management in Jakarta is currently fully not managed in a sustainable manner yet, especially from the social, economic, and policy.

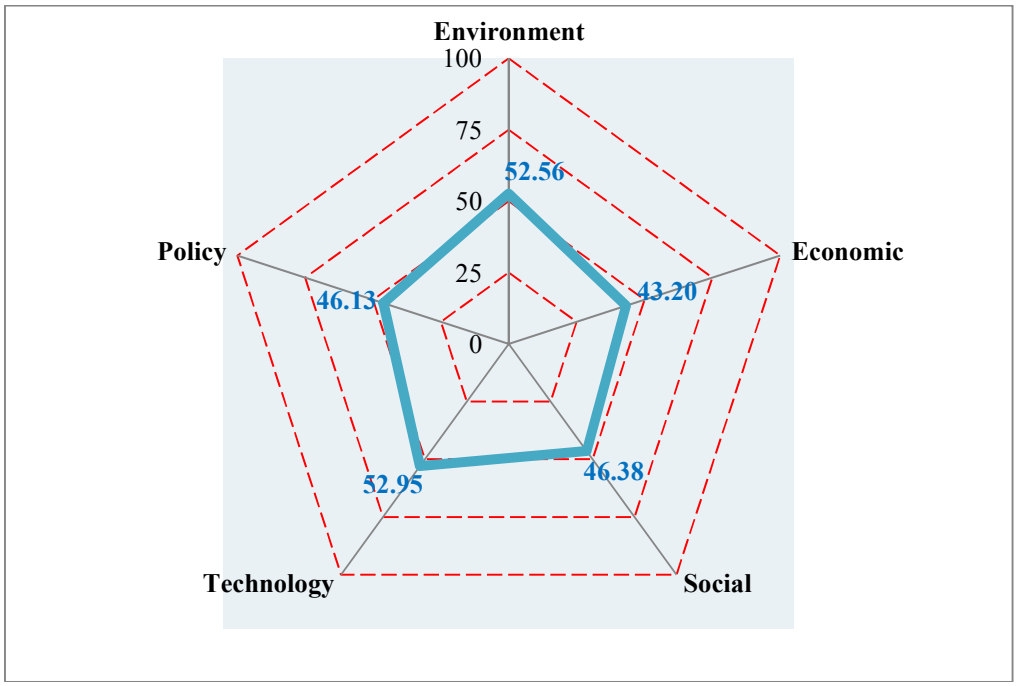

Figure 2. Biodiesel Sustainability management in Jakarta.

In order to improve the sustainability index of each dimension, it is necessary to improve the performance of the various attributes that affect in any dimension. The steps to be considered the most effective way is to improve the attributes that have the highest sensitivity in each dimension. This will hopefully encourage other attributes of performance improvements in every dimension, which in turn will encourage the improvement of all dimensions of sustainability. So that they are expected to encourage the Biodiesel utilization management in Jakarta become sustainable in the future.

Sensitivity analysis performed to determine the attributes that most contribute to the sustainability index. The results of sensitivity analysis on the environmental dimension (Figure 3) shows the attributes of Biodiesel contain ratio of the Automotive Diesel Oil (ADO) under trade named Biosolar BXX (XX indicates the percentage of biodiesel content in biosolar), i.e. value of 3.74, is currently the most sensitive attribute. This indicates that the ratio of the Biodiesel in Biosolar used at this moment will greatly influence the success of Biodiesel utilization management in Jakarta.

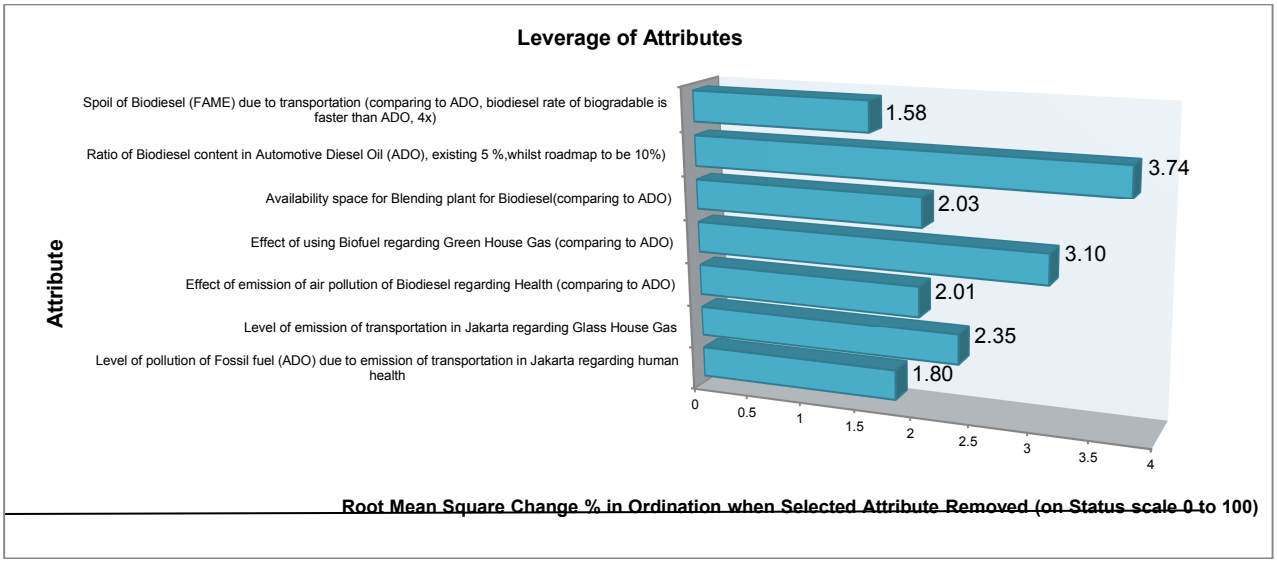

Figure 3. Results of sensitivity analysis on the environmental dimension attributes.

The results of sensitivity analysis on the economic dimension (Figure 4) shows the effect of Utilizing Biodiesel attributes of value added agro-products (2.64) is the most sensitive attribute. This indicates that the increase in value-added agro-products from utilizing Biodiesel greatly affect the success of Biodiesel utilization management in Jakarta.

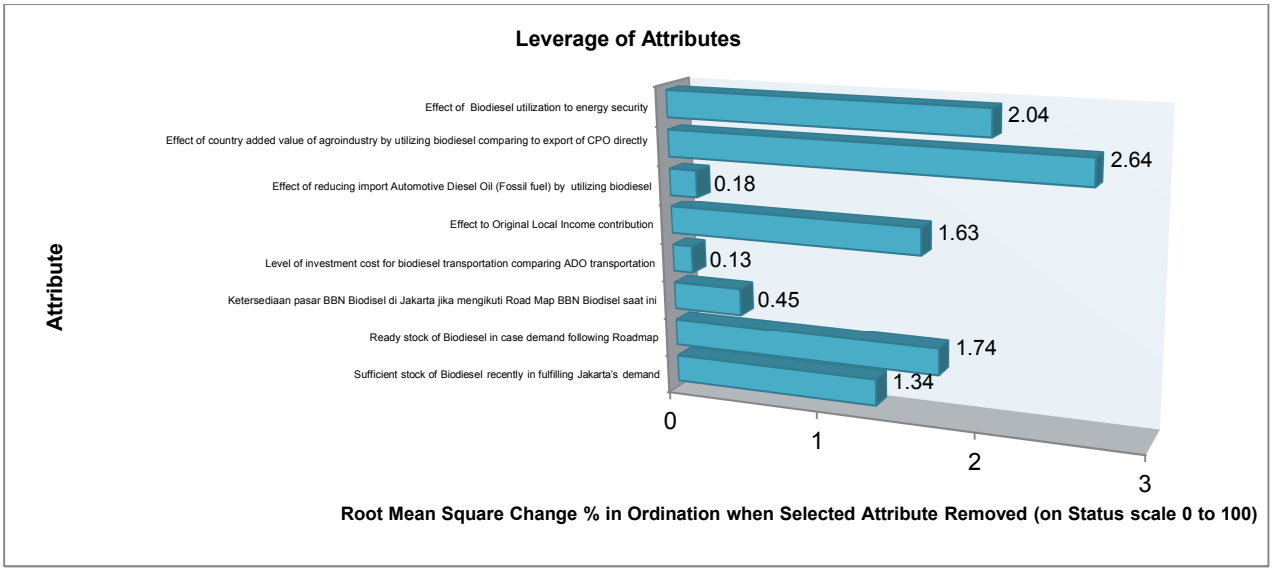

Figure 4 Results of sensitivity analysis on the economic dimension attributes.

The results of sensitivity analysis on the social dimension (Figure 5) shows the attribute level of public awareness towards the use of Biodiesel as fuel for transportation (0.71) is the most sensitive attribute. This indicates that the level of public awareness towards the use of Biodiesel as transportation fuel greatly affect the success of Biodiesel utilization management in Jakarta.

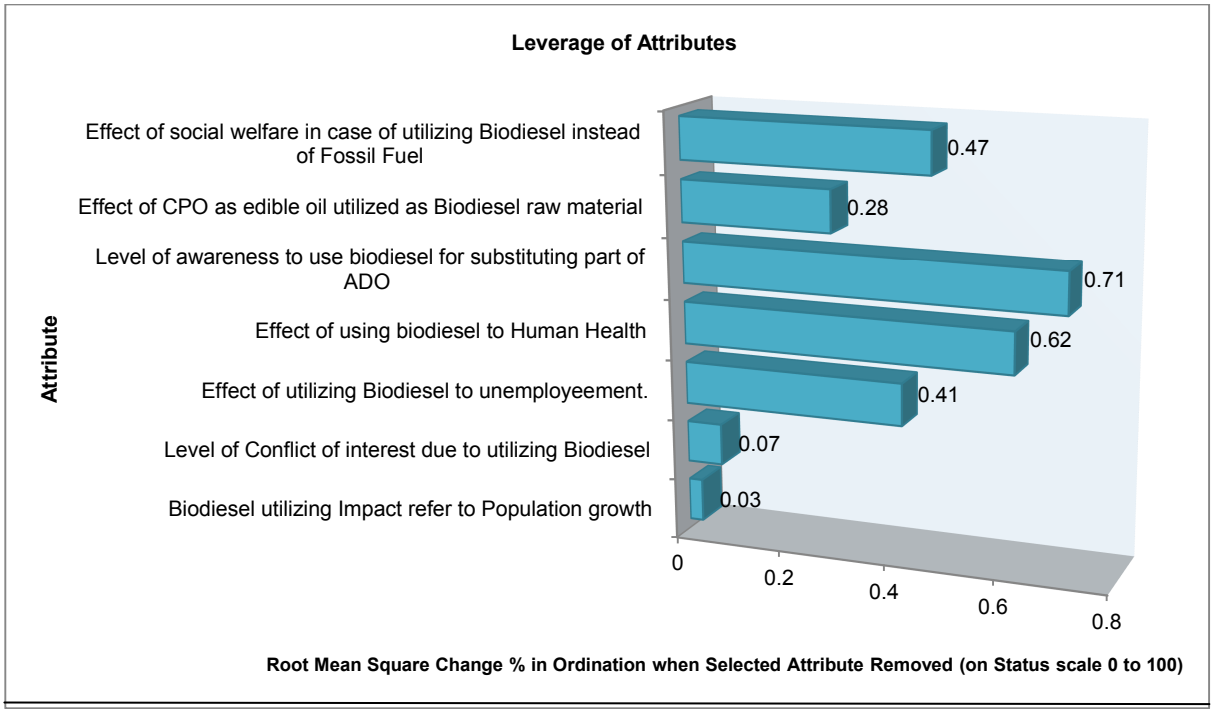

Figure 5. Results of sensitivity analysis on the social dimension attributes.

The results of sensitivity analysis on the technology dimension (Figure 6) shows the attributes of the availability of human resources in support of the use of Biodiesel (1.32) is the most sensitive attribute. This indicates that the availability of human resources in support of use of Biodiesel greatly affect the success of Biodiesel utilization management in Jakarta.

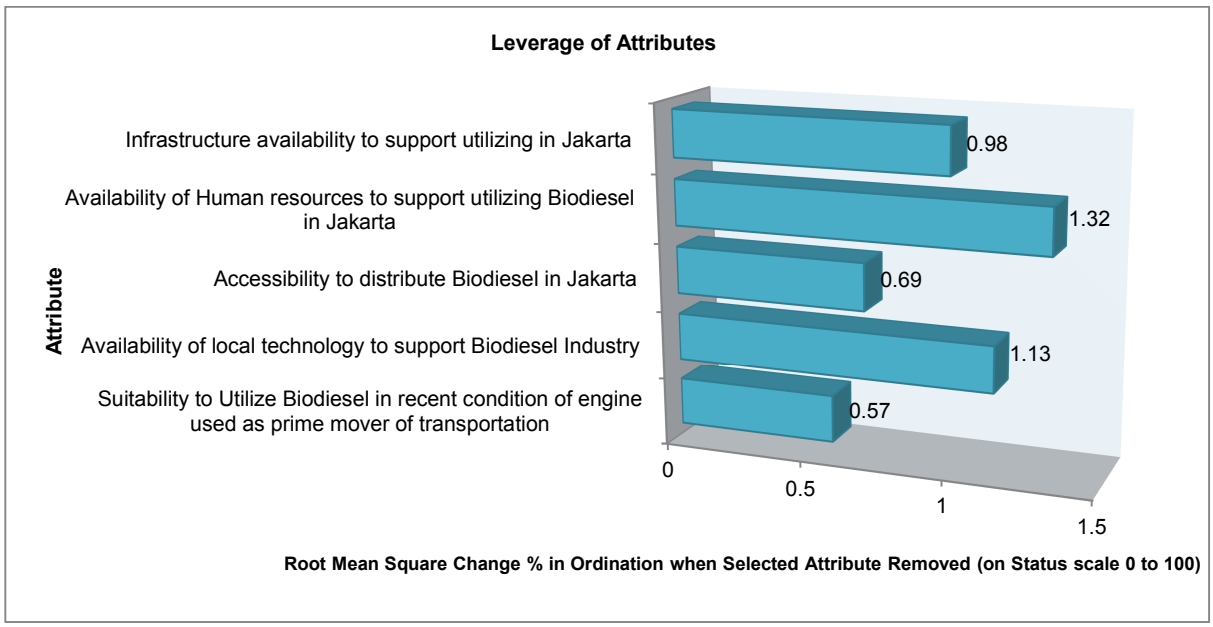

Figure 6. Results of sensitivity analysis on the technological dimension attributes.

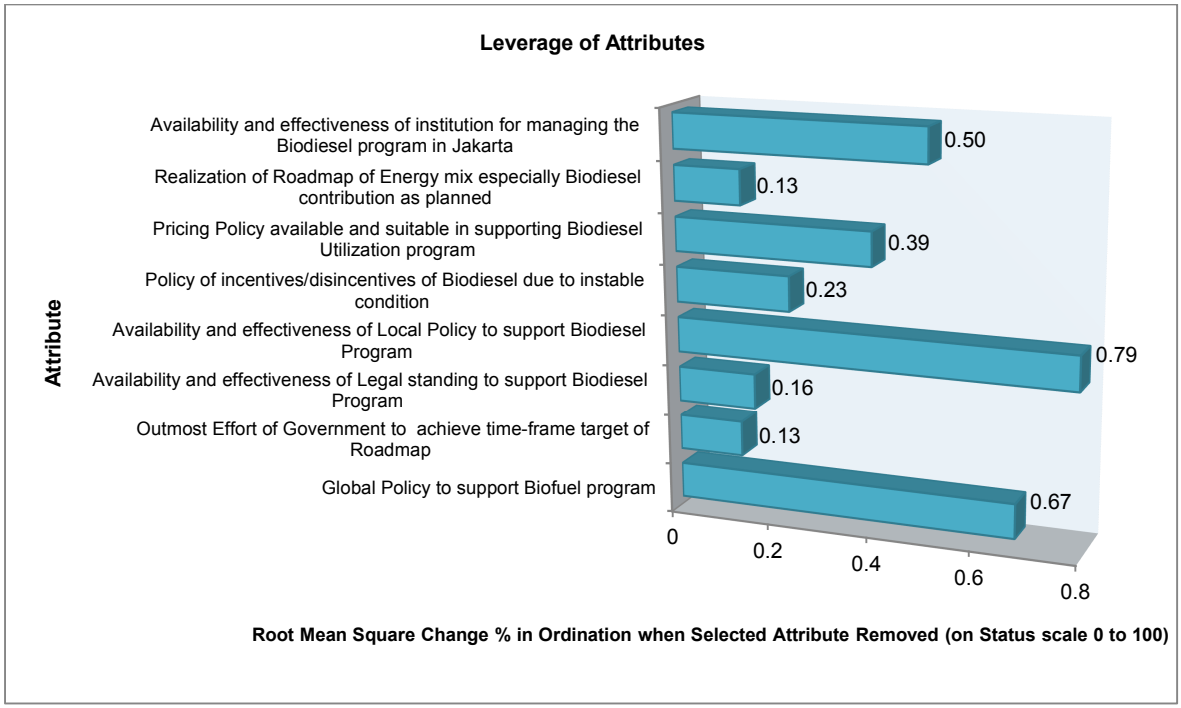

Figure 7 Results of sensitivity analysis on the dimensions of the policy attributes.

The results of sensitivity analysis on the social dimension (Figure 7) shows the attributes of the availability of local-level policy is the most sensitive attribute. This indicates that the availability of local-level policy (0.79) greatly influence the success of Biodiesel utilization management in Jakarta. Corrective action that can be applied to overcome these problems is to deploy or socialization and education, simultaneously establishing the technical regulations that could encourage greater variety of sensitive attributes in each dimension, and policy incentives and disincentives to support it. The first priority step is to encourage greater influence on value added Biodiesel agro products on the economic dimension. This can be done with the socialization and education that could increase public awareness of the use of Biodiesel. This will increase the public understanding of a broad awareness will increase the value of palm oil products if utilized as a biodiesel. This will stimulate the sector (upstream) sector of the economy as well as agro-industries (downstream) fuel economy. In order to facilitate the operation, it necessitate policies, especially at the local level that can provide a clear reference to legislation in both the upstream sector (agro), as well as in downstream (distribution and taxes).

Improvements in a variety of sensitive attributes in the social, economic, and policy on sustainability is expected to push the previous level was inadequate. Support on the dimensions of the environment and technology is expected to increase again the level of sustainability of biofuel biodiesel utilization management in Greater Jakarta.Improvements in the environmental dimension attributes is to increase the utilization ratio of Biodiesel in biosolar. While the dimensions of technology is to increase the availability of human resources in support of use the Biodiesel. The entire was expected to raise the level of sustainability of biodiesel utilization management in Jakarta as a whole.

CONCLUSIONS AND RECOMMENDATIONS

The results showed that of the five dimensions of sustainability, only environmental and technological dimensions beyond the sustainability index. While the other three dimensions, namely social, economic, and policy do not meet the sustainability index. So that the overall average value of the sustainability of Biodiesel utilization management in Jakarta (48.24) also has not met the required sustainability index (50.00). Corrective actions that can be applied to anticipate these problems is to increase socialization and education, at the same time establishing the technical regulations that could encourage greater variety of sensitive attributes in each dimension, and implementing policy of incentives and disincentives to support it.

The first priority step can be started from the improvement in the social dimension attributes through efforts to raise public awareness of the use of Biodiesel. This will indirectly encourage the improvement of economic dimension attributes by increasing the value-added agro-industry products. In order to obtain the achievable manner, it need improvement of attributes policy dimension, i.e. at the local level policy. All these efforts can be maximized by encouraging the sensitive issue, such as environmental and technology dimension. Such Improvement is to increase the ratio of biodiesel content in biosolar and increase the availability of human resources in support use of biodiesel. All above efforts was expected to raise the level of sustainability of biodiesel utilization management in Jakarta as a whole.

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