Bioaccumulation Pattern of Heavy Metals in *Solanumlycopersicum* Co-Inoculated with Red Worm *Eisenia fetida*

Zahra Putri Fauziyah*, Sudharto P.Hadi, Widiartanto

Department of Business Administration, Diponegoro University

Email: zahrazapufaa@gmail.com, sprawatahadi@gmail.com, widi.fisip@gmail.com

*Corresponding author’s E-mail: zahrazapufaa@gmail.com

**Article History**

Received: 06 June 2023
Revised: 05 Sept 2023
Accepted: 07 Dec 2023

**Abstract**

Kitchen Pertaharjo is one of the community developments under the guidance of PT Pertamina Patra Niaga DPPU Ahmad Yani CSR which has a business incubator facility. In its implementation, the business incubator is considered to be still less than optimal and there are several obstacles. Therefore, it is necessary to evaluate in order to formulate a new strategy for the development of the Pertaharjo Kitchen as part of Ahmad Yani's Pertamina DPPU CSR. In this study, the authors evaluate the Pertaharjo Kitchen business assistance using the Compass Sustainability analysis method. The author uses a mix method to analyze and describe the implementation of Dapur Pertaharjo for Compass Sustainability in 4 aspects, namely nature, economy, society, and well-being which can be taken into consideration for further development steps.

**Keywords:** Compass Sustainability; Community Development; Business Incubator

---

1. **Introduction**

Corporate social responsibility is an effort to integrate economic, environmental and social aspects in the cultural values of decision-making, strategy and company operations (Business & CSR, Reference for Decision Makers in Hadi, 2020). Corporate Social Responsibility (CSR) becomes one of the important elements for business operations in order to maintain a good image of the company in the eyes of stakeholders, especially those affected by the company's business operations. How companies manage the social and environmental impacts of their value chains will likely be a key driver of competitiveness (Padilla-Lozano & Collazzo, 2022). CSR performance is directly proportional to corporate social performance, so that if CSR performance is good, then social performance will be good too and have a positive impact on corporate image to consumer stakeholders and investors (Prayogo, 2011).

The highest level of CSR implementation is community empowerment or community development. In this case, the company is trying to build self-reliance for the community through various training activities as well as optimizing its regional resources. The selection of community development programs in CSR is able to increase the responsibility and quality of the company and is able to have an impact on the quality of the economy and help the community face the dynamics of the economy, social and culture in the future (Rahmah & Salahudin, 2021).

CSR in the form of community development can be carried out through various activities, such as aquaponics cultivation, waste banks, as well as business assistance to local communities. One of the choices for local community business assistance is when the area has human resources that have the potential to make something that can be traded or generate economic value. The business assistance of the local community is able to contribute to the rotation of the regional economy, especially when the independence of the citizens has been created from the assistance. Especially if business or business assistance is given to Micro, Small and Medium Enterprises (MSMEs).

This is because MSMEs have an important role in Indonesia's economic growth (Pakpahan, 2020). MSMEs have a significant role in encouraging national economic development, in terms of the number of actors, labor absorption, and contribution to Gross Domestic Product (GDP). % of the number of business actors in Indonesia. The workforce absorbed in the MSME sector reached 116 million.
Therefore, it is important to have collaboration from various sectors simultaneously for the empowerment of MSMEs so that they can continue to grow big. One of them is from the business sector in the form of a CSR community development program in the form of mentoring MSMEs.

The Public Disclosure Program for Environmental Compliance or commonly known as PROPER is an instrument that includes an assessment of the company's compliance with some of the principles of good governance, one of which is environmental social responsibility. One of the companies that managed to get the best rating or gold in PROPER is PT Pertamina. Based on data from the Ministry of Environment and Forestry, for three years, PT Pertamina's Gold PROPER achievement obtained 50% of the National Gold PROPER achievement. PT Pertamina is committed to ensuring that no subsidiary gets a red PROPER.

One of the subsidiaries of PT Pertamina under the auspices of PT Pertamina Petra Niaga is PT Pertamina Petra Niaga DPPU Ahmad Yani. The implementation of CSR at Pertamina DPPU Ahmad Yani can also be said to be good. This is because in the implementation of community development based on PROPER organized by the Ministry of Environment and Forestry (KLHK), PT Pertamina DPPU Ahmad Yani in 2020 managed to get PROPER with GREEN predicate and in 2021 managed to get a GOLD PROPER candidate.

One of the community developments carried out by PT Pertamina, especially DPPU Ahmad Yani, is in the form of a business incubator. The business incubator is carried out through the provision of business assistance to women for Family Welfare Empowerment (PKK) in Tambakharjo Village, Semarang City in the form of a healthy food catering business under the name Kitchen Pertaharjo which is located in the Tambakharjo area, ring-1 Pertamina DPPU Ahmad Yani operational area.

Kitchen Pertaharjo was established by Pertamina DPPU Ahmad Yani together with local women. According to Susanto (Rahman, 2009) community development can be done with a community development cycle that starts with the principle of development, namely the development of concepts, goals, and program targets based on community needs analysis or community needs analysis, which in this case is a community that leads to a catering business. The establishment of the Pertaharjo Kitchen based on the initial study was due to the potential of the local community who had a talent for cooking, such as the Vaila Snack cake business and the Ginger business made by local housewives. The selection of business or entrepreneurship assistance programs, as the implementation of community development is in line with research Kamil, at all (2019), where entrepreneurship training focuses more on the local potential of an area, the community can empower optimally.

Kitchen Pertaharjo consists of 15 members, most of whom are housewives. The establishment of the Pertaharjo Kitchen was also accompanied by periodic assistance which was carried out for 6 months by providing various trainings to funding assistance on a rotating basis. The presence of business assistance in the Pertaharjo Kitchen business aims to foster the independence of local residents so that they are able to manage their own business properly which will have a positive impact, namely the local economic turnover.

In carrying out the business incubator program, the business assistants have felt optimal in providing training and from Pertamina DPPU Ahmad Yani's CSR in providing funds and facilities. However, there has been no measurable progress that can be seen from this assistance. Moreover, during the mentoring process there were several obstacles such as the members of Dapur Pertaharjo who still had difficulty in dividing their time between their activities and the Pertaharjo Kitchen training activities. This can be proven from the number of non-permanent members when participating in mentoring. Besides that, there is still a lack of sense of belonging to the Pertaharjo Kitchen, in which the members of the Kitchen more often rely on the chairman of the Pertaharjo Kitchen in several activities that can be done together.
Seeing this, of course, it is necessary to have an overall evaluation related to the implementation of mentoring in order to achieve the effectiveness and sustainability of the group being assisted, in this case the MSME Kitchen Pertaharjo. The author offers an evaluation with the analysis of the sustainability compass tool. The Sustainability Compass is useful for assessing the extent of the sustainability of a program and measuring the success of community empowerment programs.

Besides this, in knowing the success of a mentoring program, it is necessary to measure the level of satisfaction received (Eko Widodo et al., 2019). In this case, the author uses a satisfaction index to measure the extent to which the benefits of business assistance are received by members UMKM Kitchen Pertaharjo.

**Literature Review**

*Community Development*

Community Development defined as is a strategy to help the community to identify problems and find solutions for themselves (Hadi, 2020). An important aspect in a community empowerment program is a program that is prepared by the community itself in responding to the basic needs of the community, supports the involvement of the poor, women, illiterates and other neglected groups, is built from local resources, is sensitive to local cultural values, pays attention to environmental impacts, , does not create dependence, various related parties are involved, and is sustainable.

The community development program has three main characters, namely community based, local resource based, and sustainable, while the targets to be achieved are community capacity and welfare. Community capacity can be achieved through empowerment efforts so that community members can participate in the production process or supporting institutions in the production process, equity without distinguishing status and expertise, security, sustainability and cooperation, all running simultaneously. Implementing a community empowerment approach at the policy-making level will increase the effectiveness and efficiency of the use of increasingly limited development resources.

**2. Materials And Methods**

This study uses a mix method in data collection. Data obtained quantitatively using a questionnaire and analysis data on compass sustainability will be obtained qualitatively using in-depth interviews. In collecting information data, the author involved various sectors of informants such as Mr. Catur as Operation Head and Mr. Renaldi as Community Development Officer of PT Pertamina Petra Niaga DPPU Ahmad Yani, business incubator assistant, and members of MSME Kitchen Pertaharjo as beneficiaries of business assistance.

**3. Results and Discussion**

**Business Incubator Process**

The purpose of the incubator according to Allen and Rahman (1985) in Hackett & Dilts, (2004) is to increase the chances of companies [n incubates] surviving the formative year. In this case, the focus is on the Pertaharjo Kitchen.

The implementation of the business incubator given to Dapur Pertaharjo involves various parties, as is the case in the penta helix theory. Among them are involving the private sector as the owner of CSR, namely PT Pertamina Petra Niaga DPPU Ahmad Yani, the government from representatives of the Tambakharjo Village, the university as academic representatives from PT Undip Maju, and the community from representatives of Tambakharjo women and the media.

In the implementation of community development community empowerment through the Pertaharjo business incubator, the first step taken was the existence of a Group Discussion Forum (FGD) from the
parties involved. The FGD aims to discuss how the program is planned by PT Pertamina Petra Niaga DPPU Ahmad Yani for assistance for the next one year. So in this case the business incubator does not only provide more than basic services (Games et al., 2020a). Equalization of perceptions and goals, as well as providing input from the Tambakharjo sub-district and the beneficiary mothers as well as from the academics, namely PT Undip Maju.

After the FGD, it was started to communicate the business incubator program. Kitchen Pertaharjo began to be given some training, such as training to cook healthy food. The healthy food menu was chosen considering the COVID-19 pandemic that is endemic, so that the healthy food menu can be used as an advantage for Pertaharjo Kitchen products to compete in the business world. Cooking training was conducted four times in the period from August 2021 to November 2021. To optimize the training, the business incubator companion team brought in chefs to provide training. In cooking training, members of Dapur Pertaharjo are taught to cook healthy food with special chefs. Mrs. Nafiq as the head of the Pertaharjo Kitchen felt that she had increased knowledge about the basics of cooking and cutting.

Furthermore, Dapur Pertaharjo was also given financial training during the business incubator period. Financial training taught related to how to book cash in and cash out, as well as the use of smartphone applications to record financial accounting reports to be more integrated with technology. The business incubator team also provides marketing training in the form of photos of food products and the use of social media as a means of optimizing advertising, from Facebook to Instagram. This is done so that the business incubator also helps formulate a commercialization strategy and direct practice for its tenants to improve their performance (Games et al., 2020b)

The business incubator companion team also facilitates in assisting the registration of Home Industry Food Permit Certificates (PIRT) and MSMEs. As well as the registration of Pertaharjo Kitchen into the online motorcycle taxi application, namely Go-Food. In addition, the CSR of PT Pertamina Petra Niaga DPPU Ahmad Yani also provided several cooking utensils facilities to the Pertaharjo Kitchen to assist the operations of business activities.

Operationally, Hackett & Dilts, (2004) write five mutually exclusive incubation statuses at the completion of the incubation process, including
1) Incubatee survive and make profit
2) Incubatee survive and grow and are on the path to profitability
3) Incubatee survive but do not grow and are not profitable or only marginally profitable.
4) The incubation operation is stopped while it is still in the incubator, but losses are minimized.
5) The incubation operation is stopped while it is still in the incubator, and the loss is large.

It can be categorized that after the business incubator from CSR PT Pertamina Petra Niaga DPPU Ahmad Yani, Dapur Pertaharjo entered status number 3, which is able to survive but not grow and not profitable or slightly profitable. This assessment is still in the early stages after the incubator ends. Kitchen Pertaharjo is still registered with Go-Jek and has received several orders, although not in large quantities. There is a possibility that after a few months, judging from the spirit and condition of the members, Dapur Pertaharjo can continue to progress and be productive.

Mapping of Sustainability Programs through the Sustainability Compass

The Sustainability Compass is an idea put forward by AtKisson., (1997) inspired by the compass compass in general. Atkisson, (2009) changing words or terms used from north to nature, east to economy, south to society and west to wellbeing. The existence of the sustainability compass tool helps to identify sustainability points more effectively, which will encourage sustainable value creation and help integrate various aspects of the decision-making process and performance evaluation at all levels.(García-Sánchez et al., 2020)

The sustainability compass analysis in this study was obtained from documents and the results of interviews (in-depth interviews) with the business assistant of Dapur Pertaharjo and the beneficiaries of the assistance. The following is a summary of the sustainability compass at the Pertaharjo Kitchen Business Incubator.

<table>
<thead>
<tr>
<th>Table 3 Compass Sustainability Analysis of the Pertaharjo Kitchen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Data Processing Author 2022</td>
</tr>
</tbody>
</table>
The use of places to eat as an effort to reduce plastic is an added value for Dapur Pertaharjo. This includes green innovation investment efforts that will help develop opportunities for new markets and create competitive advantages by positioning themselves as environmentally friendly businesses (Chen et al., 2006; Kam-Sing Wong, 2012) in (Padilla-Lozano & Collazzo, 2022). Successful green innovation benefits the company by achieving greater efficiency and strengthening the green image, which ultimately contributes to higher profitability (Chen, 2008).

With the implementation of sustainability aspects at Dapur Pertaharjo which is a CSR of PT Pertamina Petra Niaga DPPU Ahmad Yani, it will help increase sales. This is in line with research García-Sánchez et al., (2020) which discusses that companies that adopt SDG Compass in that year or the following year will become the object of more sales recommendations.

Kitchen Pertaharjo has several problems related to group members. Therefore, it is necessary to strengthen the capacity of community working groups. This needs to be done because the level of participation from the members of Dapur Pertaharjo is still minimal. To facilitate the development needed, the author details some of the problems found in Dapur Pertaharjo to describe a clear development strategy by comparing the problems and advantages of Dapur Pertaharjo.

### Table 4 Problems and Constraints of Pertaharjo Kitchen

<table>
<thead>
<tr>
<th>Pertaharjo Kitchen Problems</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. There is no production kitchen to share</td>
<td>Implemented</td>
</tr>
<tr>
<td>2. Member activities outside of the Pertaharjo Kitchen</td>
<td>Implemented</td>
</tr>
<tr>
<td>3. Marketing that is still not wide reach</td>
<td>Implemented</td>
</tr>
</tbody>
</table>

From these problems, the authors also try to describe some of the potentials of the Pertaharjo Kitchen so that it can help solve problems and find solutions for the development of Pertaharjo Kitchen. Here are some of the potentials of the Pertaharjo Kitchen, namely:

### Table 5 Potential Kitchen Pertaharjo

<table>
<thead>
<tr>
<th>Pertaharjo Kitchen Potential</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Talent for cooking from the members of Dapur Pertaharjo</td>
<td></td>
</tr>
<tr>
<td>2. Catering facilities and infrastructure provided by CSR PT Pertamina Petra Niaga DPPU Ahmad Yani</td>
<td></td>
</tr>
<tr>
<td>3. Tambakharjo strategic location with housing and schools for consumer reach</td>
<td></td>
</tr>
<tr>
<td>4. Business incubator training provided by CSR PT Pertamina Petra Niaga DPPU Ahmad Yani</td>
<td></td>
</tr>
<tr>
<td>5. Already registered through the online messaging service Go-Jek</td>
<td></td>
</tr>
<tr>
<td>6. Already have a Home Industry Food Permit (PIRT)</td>
<td></td>
</tr>
</tbody>
</table>

Overall, the business incubator process from Dapur Pertaharjo has been carried out very well and according to plan, from the beginning of the FGD before the program implementation to the FGD evaluation of the results of the mentoring. With all the facilities that have been obtained by Dapur Pertaharjo, this business can run and the remaining tasks are for marketing development so that its reach is wider.

Based on the results of an interview with Mrs. Nafiq, the head of Dapur Pertaharjo, Dapur Pertaharjo was once offered a hotel to become one of the hotel food subsidizers. However, due to financial constraints, which must first spend large amounts of funds for initial capital and a long time, namely one week for a return on capital, Pertaharjo Kitchen is still not able to. The partnership that is deemed suitable for the Pertaharjo Kitchen which contains housewives is more of a partnership with offices for catering service providers for lunch and snacks at meetings.
If you compare the problem with the existing potential, the third problem is that marketing has not yet been able to be overcome with its potential, so that encouragement is needed for this aspect. Social media can be used as an option to market products from Dapur Pertaharjo.

Meanwhile, the marketing aspect can be optimized by expanding the reach of consumers by conducting organized partnerships. This is in line with research Suyatna & Yuda, (2021) that the network is one of the ideal assets for MSMEs to continue to grow. By maximizing marketing with a partnership model with agencies, Dapur Pertaharjo is able to grow faster and increase the economic value of IKM as well as compass sustainability analysis.

4. Conclusion
The Compass Sustainability analysis which explains four categories (nature, economy, society, and wellbeing), states that the progress of the Pertaharjo Kitchen is very good and has an impact on the surrounding community. In the nature category, this program uses a reusable dining area to serve food. In the economy category, Dapur Pertaharjo was able to get more than 50 orders. In the society category, there is a closer relationship between residents in Tambakharjo Village, Semarang so that it indirectly expands the reach of consumers. In the wellbeing category, Dapur Pertaharjo has been registered in the online ordering service at Go-Jek and has carried out knowledge sharing with one of the coffee shops related to cuisine from Dapur Pertaharjo. This is what continues to be maintained and cultivated for the better in order to become a strategy for the advancement of the Pertaharjo Kitchen in the future.

Research Limitations
This study refers to a business incubator with a small number of members, namely 15 people, so it must be careful if the reader interprets a business incubator with quite a lot of members because the results of the approach will be different. This business and research incubator is also carried out during the COVID-19 pandemic, so there are limitations in space for movement and meetings. The suggestion from the author is that a business incubator can be started by building strong motivation at the beginning to have enthusiasm in participating in training and developing a catering business.

References:

Available online at: https://jazindia.com
Bioaccumulation Pattern of Heavy Metals in Solanumlycopersicum Co-Inoculated with Red Worm Eisenia fetida


Wawancara bersama narasumber Head Operational PT Pertamina Patra Niaga DPPU Ahmad Yani (2022)
Wawancara bersama narasumber tim inkubator bisnis Undip (2021)
Wawancara bersama narasumber anggota Dapur Pertaharjo (2022)
Wawancara bersama narasumber Community Development Officer PT Pertamina Patra Niaga DPPU Ahmad Yani (2022)