

# Environmental Assets System Design: Looking at System of Environmental-Economic Accounting (SEEA) PT. Bakrie Sumatera Plantation

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**Abstract---** *System of Environmental-Economic Accounting (SEEA) is an accounting information system that contains a framework for integrating economic and environmental information from all resources so that can be used in the decision making the process for corporation and government. Accounting information itself contains information about financial accounts and data from the corporation, that information could be used as consideration in the decision-making the process. SEEA divided into eight thematic areas; they are Agriculture, Forestry and Fisheries, Air Emissions Accounts, Energy, Environmental Activity Accounts, Ecosystem Accounts, Land Accounts, Material Flow Accounts, and Water. This research used qualitative with analysis system approach. This research's purpose is to design a new system using SEEA to trace supply and use environmental asset of the corporation, especially Pt. Bakrie Sumatera Plantations using only its annual report and financial report. The result is that the supply and use of ecological asset information could be well integrated and more accessible to use in the decision-making the process.*

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*Keywords: Environmental Assets System Design, Environmental-Economic Accounting (SEEA), Bakrie Sumatera Plantation*

## I. Introduction

Accounting information system (AIS) is a set of resources designed to transform financial data into information that might be used to help the user in the decision making the process [1]. Information and system quality has been shown as a proxy that affects service quality [2]. System of Environmental-Economic Accounting (SEEA) is a statistical system that combines economic and environmental information into one framework to assess the condition of the environment, the environmental contributes to the economy, and the impact that is caused by the economic activities to the environment [3]. SEEA contains standard concepts, definitions, classifications, accounting rules, and tables to produce an internationally approved statistic. SEEA could make the decision-making process more productive, more accurate, and well informed by integrating the environmental and economic accounts by financial and physical data.

This research is showing the new design of the flow of the environmental assets in PT. Bakrie Sumatera Plantation based on the SEEA – Central Framework (CF) and accounts from SEEA – Agriculture, Forestry, and Fisheries (AFF). Before this research, there is other research conduct by another researcher from various countries, but all of the research using the country as their case study. As an example, there is a research conducted by Jani M. Salmine, Pekka J. Veiste, Jari T. Koskiahio, and Sariannekkanen in 2017 titled “Improving Data Quality, Applicability and Transparency of Nation Water Accounts – A Case Study for Finland.” That research, try to figure out about the combining of the information about the supply and use account for water to the economy and the use of water that is on the economic activity itself — that research using SEEA – Water as the water account data measurement method [4].

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Meanwhile, in Indonesia, the research and application of SEEA are held by *Badan Pusat Statistik* (BPS) Indonesia. BPS uses SEEA to count the timber, energy, and water resource. In the early of 1990, BPS applying SISNERLING (*Sistem Neraca Ekonomi dan Lingkungan*), and the SEEA is used to improve that system in 2014, BPS using SEEA – AFF[5]. In 2016, BPS started to applying SEEA – CF in the SISNERLING. BPS succeeded to arrange the land accounts for Sumatera. Now SISNERLING covers assets accounts for land, energy and mineral resources, and timber[6]. Based on their research, the researcher wants to try to applying SEEA in the corporation, but the SEEA is too complicated for the average corporation in Indonesia, therefore, the researcher suggesting a new system design to keep track on the flow of the environmental assets in the corporation.

In this research, the researcher used PT. Bakrie Sumatera Plantation (BSP) as the case study because they are the first rubber-producing corporation in Indonesia based on [www.bakriesumatera.com](http://www.bakriesumatera.com) which is accessed on 19 May 2019 stated that, “BSP is the first corporation in Indonesia that moved in the rubber industry, BSP first exist in 1911 located in Kisaran, North Sumatera.” The primary production of BSP is high-quality latex. But, since the year 1993, BSP started to plant a palm on the 6,200 ha land. Beside this is the first corporation that produces rubber as the primary production, we choose BSP because they have 73,329 ha of an environmental asset in 2018 that contain rubber plant and palm (see table 1).

**Table 1.** Environmental Asset of PT. Bakrie Sumatera Plantation.

Assets	2018	
	Amount (ha)	Percentage (%)
Rubber Plant	16,421	22.4
Palm	56,908	77.6
TOTAL	73,329	100

Source : Annual Report PT. Bakrie Sumatera Plantation 2018

Based on table 1.1, the BSP’s asset is dominated by palm in 2018, which is 77.6 % of the total environmental assets. But, based on the statement from [www.bakriesumatera.com](http://www.bakriesumatera.com), the BSP corporation will still committed to the rubber business segment even though the palm asset is bigger than the rubber asset.

**System of Environmental-Economic Accounting (SEEA)**

Based on the official website of SEEA <https://seea.un.org>, SEEA is a framework that integrating between economic and environmental data to provide a more comprehensive and multifunction view about the interrelation link between the economy and environment and environment stocks and the changes of the environmental inventories, as giving benefit to the humanity. SEEA first suggested and compiled in 1987 as a way to promote sustainable development growth and any policy changes that needed to accomplish it.

SEEA is composed of eight different thematic areas, and every area have guidance in the form of book about the thematic area itself, the application and the classification of accounts[3]. The eight thematic areas is :

- 1) SEEA – Water
- 2) SEEA – Environmental Activity Account
- 3) SEEA – Energy
- 4) SEEA – Material Flow Accounts

- 5) SEEA – Air Emission Accounts
- 6) SEEA – Land Accounts
- 7) SEEA – Agriculture, Forestry, and Fisheries
- 8) SEEA – Ecosystem Accounting

The application of decision-centered design to environmental accounting using SEEA should enable integrated economic and environmental information to be brought into the mainstream decision-making processes of government and in particular to annual planning and budgetary cycles[7]. SEEA produces data and indicators for policy, analysis, and research.[8]

## II. Research Method

This research uses the qualitative method with the system analysis approach; this method was used because this research focused on the in-depth and detailed explanation to the object study and the result of that explanation might be applied[1]. There are four steps in the system analysis method, which are :

- 1) Survey of the current system
- 2) Identifying the information need
- 3) Recognizing the system need
- 4) Developing system analysis report

### *Data's type and the source*

This research used two kinds of data; they are :

- 1) Primary data

Primary data in this research obtained from the webinar (web seminar) and the guide book of the System of Environmental-Economic Accounting (SEEA) provided by SEEA official website.

- 2) Secondary data

Secondary data in this research obtained from the prior researches and books about the system and SEEA application. Another resource is from application report and research report from BPS Indonesia about SEEA application in the SISNERLING.

### *The scope*

The scope is the study limitation that explains the focus of a study so that the study is not getting out of topic and discussing another topic. The scope of this research is limited in the application of SEEA in the flow of the environmental assets of PT. Bakrie Sumatera Plantation. This scope uses two aspects of assessment, which are :

- 1) The understanding of SEEA – CF, and SEEA – AFF about the flow of environmental asset in monetary and physical terms.
- 2) The application of SEEA in the PT. Bakrie Sumatera Plantation especially for the rubber plant and palm assets.

### The data collection procedure

This research used two procedures; first procedure is from the webinar, the SEEA research team conducts the webinar here as the part of SEEA e-learning program. The second procedure is the study of literature; in this procedure, the researchers read and understanding books, researches, and articles about the system, accounting, SEEA, and environmental assets. This procedure took so that the researchers could understand the SEEA and how to apply the SEEA in the corporation.

### III. The result

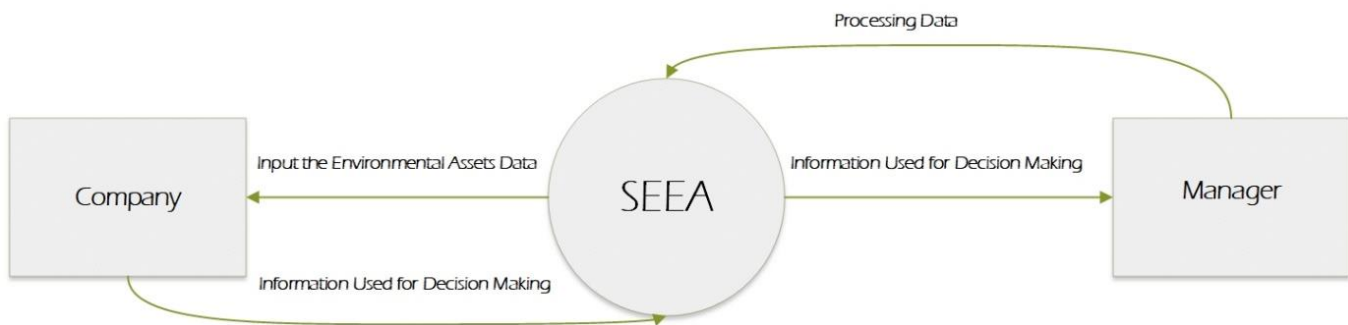
#### *Conceptual framework of SEEA – AFF*

SEEA – AFF is based on the SEEA – CF that provide a foundation for integrating economic and environmental data in the monetary and physical terms[9]. There is four main components, which are basic data and statistics, basic accounts, combined presentations, and related indicators.

#### System design

System design is the system recommendation that compiled by the researchers to simplify the SEEA application for the corporation and to produce more effective and well-informed information about the flow of the environmental assets.

#### *Context Diagram*



**Figure 1.** Context diagram of the system

The figure 1 shows that there is two sides of that connected by SEEA, manager side, and corporation side. The first process is corporation give the environmental asset data to the manager. The second process is manager to compile the integrated presentation table that contains the integrated use and supply of environmental asset data in the monetary and physical terms. And the last is to the manager handing the table back to the corporation and be used as the information in the decision-making process.

#### *The system of integrated use and supply environmental assets data*

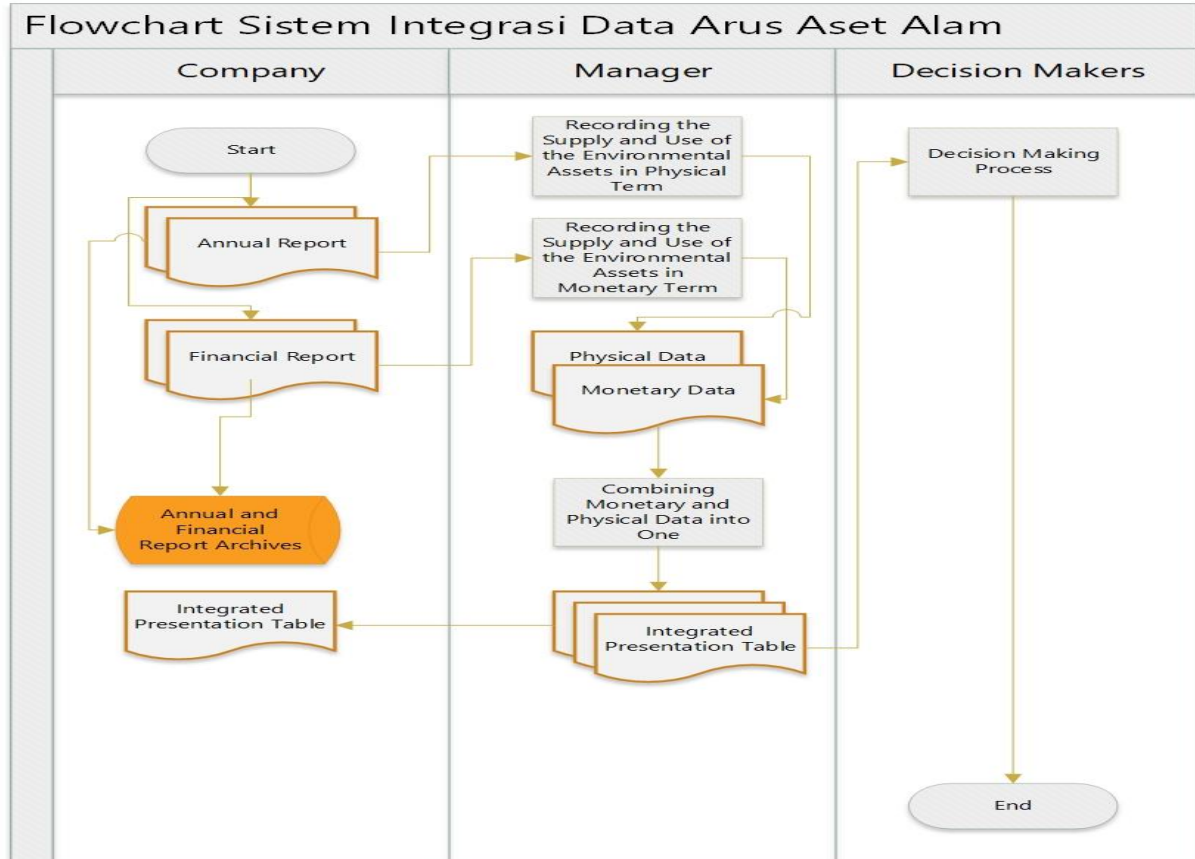
To describe more detail about the recommended system, the researchers compiled a flowchart about how the system works. System flowcharts have been used in accounting and auditing since the 1960s to model the flow of documents in accounting information systems (AIS)[10]. The flowchart would explain the main process of the system (see figure 2). These are the processes :

- 1) Read the annual and financial report from PT. Bakrie Sumatera Plantation
- 2) Find all data about the flow of the environmental assets
- 3) Write down data obtained about the use of the environmental assets in monetary and physical terms
- 4) Write down data obtained about the supply of the environmental assets in monetary and physical terms

- 5) Integrating the data obtained to form the integrated presentation table that integrated the supply and use of environmental assets data into one.
- 6) Hand it over to the decision-makers so that they can use it in the decision-making process.

The application of this system in the PT. Bakrie Sumatera Plantation would give a positive impact to the decision-making process because it could provide information about the supply and use of environmental assets in one integrated table. The table is called “the integrated presentation table” that contains information about the flow of the environmental assets in monetary and physical terms about the supply and use of the environmental assets of the PT. Bakrie Sumatera Plantation.

**Figure 2.** Flowchart Integrated System of Asset Data



*Entity-relationship diagram (ERD)*

ERD is a diagram that described the relationship between the entity and the attribute that could describe the entity itself. In this research, the researchers used notation from Chen. Chen’s notation in ERD only takes effect in the use of the symbols and connectors and the notation on the connector line to connect that relationship[11]. Here are the notation lists :

- 1) One-to-one (1: 1)

Used when there is only one entity connected with another one entity

- 2) One-to-many (1: N)

Used when there is one entity connected with more than one entity

- 3) Many-to-one (N: 1)

Used when there is more than one entity connected with one entity

4) Many-to-many (M: N)

Used when there is more than one entity connected with more than one entity

Enterprise Relationship Diagram

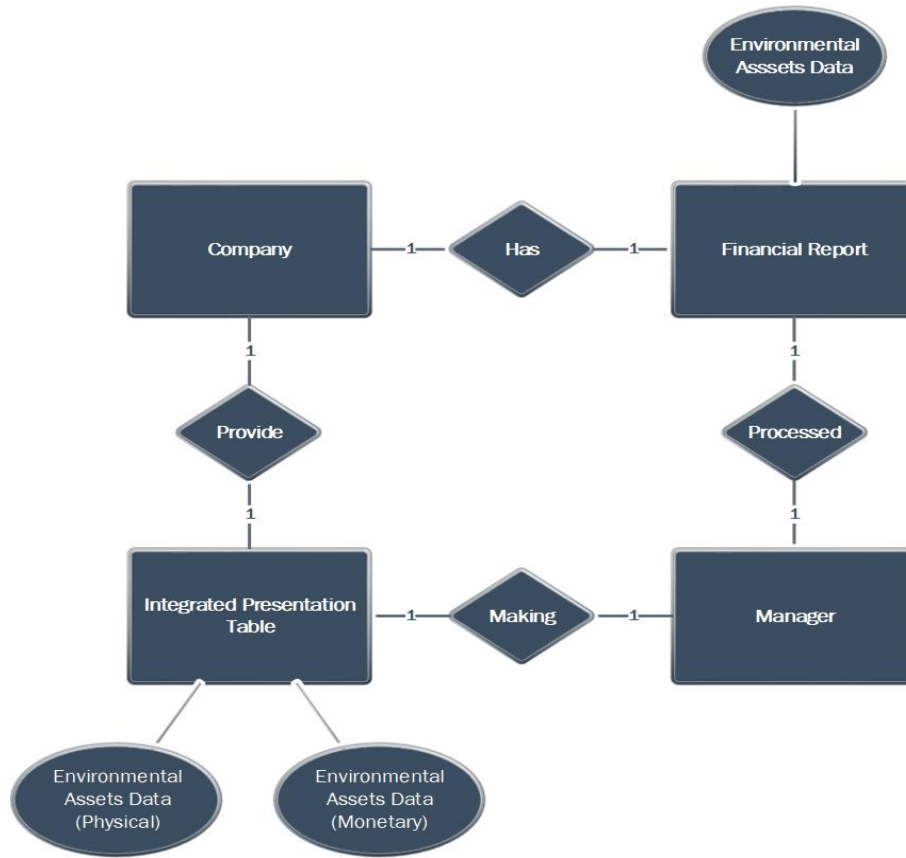


Figure 4. Entity Relationship Diagram

The first relationship is between the corporation with the financial report, where the corporation has one financial report per one year accounting period, then the attribute from the financial report is the environmental assets data which then give it to the manager. The second entity is a financial report that has data which will be processed by the third entity, which is the manager. The fourth entity relationship is the manager with the integrated presentation table, where the manager is the one who made the integrated presentation table. Integrated presentation table contains the environmental assets both in the monetary and physical terms. That information then, being used as the consideration material in the decision-making process.

The integrated presentation of environmental assets

Table 2. The integrated presentation table of environmental assets supply and use

No	Information	Industry			Total
		CPO	PK	Latex	
	Supply				
1	The Supply of the Palm and Rubber Plant Assets in Physical Term (Ton)	129.000	27.718	67.279	223.997

2	The Supply of the Palm and Rubber Plant Assets in Monetary Term (Rupiah)	988.365. 825.600	212.171. 034.340	365.932. 000.000	1.566.468. 859.940
	Use				
1	The Use of the Palm and Rubber Plant Assets in Physical Term (Ton)	90.270	20.123	12.595	122.988
2	The Use of the Palm and Rubber Plant Assets in Monetary Term (Rupiah)	905.980. 275.500	152.894. 760.000	365.932. 000.000	1.424.807. 035.500
	Assets				
1	The Remaining of the Palm and Rubber Plant Assets in Physical Term (Ton)	38.730	7.595	54.684	101.009
2	The Remaining of the Palm and Rubber Plant Assets in Monetary Term (Rupiah)	82.385.5 50.100	59.276.2 74.340	0	141.661.8 24.440

Table 2 shows the supply and use of environmental assets data especially for palm with the crude palm oil (CPO) and palm kernel (PK) as the products and the environmental assets in the form of rubber plant with the textile as the product. First, in the “persediaan” number 1, describe the information about the supply of the palm and rubber plant assets and their product in the physical terms (Ton). In number 2, the presented information is the value of the palm and rubber plant assets in the monetary terms (Rupiah). The combination of those two information might be used as the material in the decision-making the process. The second part is the “penggunaan” this particular part presented the information about the use of the environmental asset, especially palm and rubber plant. Number 1 presenting the use of the palm and rubber plant (CPO and PK for palm and Textile for rubber plant) information in the physical terms (Ton).

Meanwhile, number 2, presenting the information in the monetary terms (Rupiah). The last part is “sisaset,” is presenting the amount of the environmental assets left after the use process in the second part. The environmental assets are 101,009 ton in physical and Rp. 141,661,824,440 after the use process in the second part.

#### IV. Conclusions and recommendations

##### Conclusions

The flow of environmental assets system design for PT. Bakrie Sumatera Plantation using System Environmental-Economic Accounting (SEEA) that is suggested founded to be useful and more effective since the system produced the more well-informed material for decision-making process through it’s integrated presentation table. So, this system is worthy of being considered as a widely used flow of environmental assets tracking system for the corporation.

##### Recommendations

The recommendations for this research is, we should do more thorough research about the flow of environmental assets in the corporation and the information presentation method in the financial and annual reports should be renewed by adding the integrated presentation table or at least a supply and use table from SEEA Central Framework depends on the nature and the activities of the corporation.

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