ENVIRONMENT ISSUES DUE TO OVERLY USE OF CHEMICAL FERTILIZERS IN PALM TREES PLANTATIONS

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ABSTRACT

The impact of overly use of fertilizers in the palm trees (Elais guinensiss Jacq) towards the environment is a serious problem in Indonesia. This research questions the use of fertilizers of the companies that apply this method in palm trees. Data obtained show that the use of nutrient nitrogen excessively increased the damage by pests and diseases, to prolong life, and plants more easily fall. Nitrate contamination is particularly harmful to infants and young children in causing methemoglobinemia, a reduction in the blood hemoglobin level. This research suggests to Indonesian government to regulate the use of fertilizers and control the multinational companies in application of chemical fertilizers.

Keywords: Overly use, chemical fertilizers, environment, damaged, harmful

INTRODUCTION

The dramatically growth of plantations of palm trees (*Elais guinensiss Jacq*) in Indonesia has negative impacts on the environmental issues. One of them is the overly used of chemical fertilizers. Fertilizer has been used in agricultural and plantation aspects since decades ago. It is done to fulfill the demand and necessity of people. Due to the high number of population nowadays, the demand of food in large number motivates the multinational companies to fulfill the cooking oil. Moreover, the land that is provided is no longer as large as before. It is said that the ratio of population is getting bigger in line with the demand of agricultural and plantation sectors but the land is limited. Soil has its diversity in providing nutrients for the plants and so does plants, they need different nutrients from the soil.

Fertilizer is used to help plants adding and providing nutrients. It is so hard to separate the role of fertilizer from the agricultural nowadays. Furthermore, the use of fertilizer must be in proper dosage to be applied in plants. Fertilizer must not be applied excessively. The use of excessive fertilizer will bring harm to the plants, animals and environmental around the agricultural area.

The main problem is, the use of fertilizer continiously in large amount will give bad effects towards the environment, especially for soil fertility. Plant will always absorb the nutrients from the soil and make the contain of nutrients will be decreasing and affect the soil fertility. It will hamper the plants growth or in worst case, the plants will not be grown at all. Toxicity occurs when a nutrient is in excess of plant needs and decreases plant growth or quality (McCauley et al, 2011 : 2). There are some main elements as nutrients for plants that should be provided by soil, they are nitrogen (N), phosphorus (P) and potasium (K). Global warming is another familiar environmental issue that fertilization can influence (Stewart, 2001 : 2). It

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is only 30% - 50% fertilizer that will be absorbed by the plants, the rest will be volatize as the gas emission which makes agricultural as one of the largest contributor to global greenhouse gases (GHGs).

Identification of the Problem

From the background of problem above, the writer finds some impacts of fertilizer usage on environment and people in the plantation areas; such as:

1) The kinds of fertilizer which effect the environment
2) The bad effects of fertilizer
3) The impacts of fertilizer toward environment
4) The impact of fertilizer usage in palm trees towards the environment

Formulation of the Problem

The problems in this research are formulated as below:

1) Does the usage of fertilizer affect the environment?
2) What kind of fertilizers that have influential impacts on the environment of palm trees?
3) What are the effects that caused by the fetilizer towards the environment?

OBJECTIVE OF THE RESEARCH

The objectives of this research are:

1) To find out the effects of the usage of fertilizer towards the environment.
2) To investigate what kind of fertilizers that have influential impacts on the environment of palm trees.

THEORETICAL FRAMEWORKS

The Overly Use of Fertilizers

The use of fertilizer to boost the growth of the plants has been apllying since decades ago. Mineral fertilizers are materials, either natural or manufactured, containing nutrients essential for the normal growth and development of plants (Isherwood, 2000: 7). Fertilizer is needed by the plants because most soil do not provide the essential nutrients required for optimum growth. Even if the plants would grow so big and good at the first time, the nutrients in the soil would be absorbed by them continiously. It means that if there is no fertilizer given for the soil, the nutrients will be absorbed by the plant without refilling it and the nutrients of soil will be wiped out and decrease the productivity of the plants in the end of the day. For some occasions, the fertilizer is used to make the plants grow faster, bigger and produce more in crop yield. Fertilizer for plants is like foods for humans. They need it to grow and to help them in producing the crop yield whether it is their fruits, leaves, trunks, etc. In some country areas, the agricultural and feild crop yield become one of the biggest aspects to increase the economical. The government is always looking for the latest technology to develop the fertilizer that is needed in agricultural sector because it is one of the ways that is done to control the number of export crop yield. Since the demand of food is now in the big number and rising up every second as the population grow so fast and rapid. So, it will save the financial of the area and also empower the local farmer to distribute their crop yields. That's how the fertilizer takes their part in the crop yield.

Each form of fertilization serves to provide soil and plants with nutrients that enable them to grow as best as possible and produce the maximum yield (Kotschi, 2015: 13). There are some nutrients that are needed by the plants that can be gotten from the soil and the fertilizer, they

are; nitrogen (N), phosphorus (P) and potassium (K) are referred to as primary or macronutrients, Calcium (Ca), magnesium (Mg) and sulfur (S) are termed secondary nutrients because they are less likely to be growth-limiting factors in soil systems, Zinc (Zn), chlorine (Cl), boron (B), molybdenum (Mo), copper (Cu), iron (Fe), manganese (Mn), cobalt (Co) and nickel (Ni) are termed micronutrients because they are found in only very small amounts relative to other plant nutrients in the average plant and they are least likely to be limiting plant growth and development in many soil systems. Thus, every soil provides different necessity for the plants. If soil does not provides enough nutrients for the plants, it will hamper the growth and vice versa, if the nutrients which are applied to the plants in the high amount, it will also worsen the plants growth. Each nutrients should be applied and fulfilled enough as the dosage that every plants needed.

Table 1. Average concentrations of 13 soil-derived (mineral) nutrients in plant dry matter that are sufficient for adequate growth

Element	mg/kg (ppm)	%	Relative Number of Atom
Molybdenum	0.1	--	1
Copper	6	--	100
Zinc	20	--	300
Manganese	50	--	1,000
Iron	100	--	2,000
Boron	20	--	2,000
Chlorine	100	--	3,000
Sulfur	--	0.1	30,000
Phosphorus	--	0.2	60,000
Magnesium	--	0.2	80,000
Calcium	--	0.5	125,000
Potassium	--	1.0	250,000
Nitrogen	--	1.5	1,000,000

(Source : Epstein, 1972)

Table 1 briefly shows the adequate amount of fertilizer that should be applied to the soil and absorbed by the plants to help the growth in proper crop yield.

The risk of nutrient loss in runoff and erosion increases if excessive rates of nutrients are applied (Anonym, 2013: 15). In some ocassions, there are some natural phenomenon happens in the field that may cause the loses of nutrients from the soil, in addition, applying more nutrients to in order to boost the growth will only let the nutrient loses much more as the natural phenomenon occurs. Moreover, adding fertilizer may influence the soil pH depends on how much amount the main elements applied. When fertilizer is applied to soil, nitrification and decomposition produce various acids.Liquid and poultry manures have relatively high concentrations of NH_4-N and low concentrations of organic matter; therefore, as is the case with NH_4- forming synthetic fertilizers, liquid and poultry manures may lower soil pH (Anonym, 2013 : 61). In strongly acidic soils, the availability of nutrients, above all phosphate, is limited, and the concentrations of toxic metals in the soil solution rises. At the same time, the life of microorganisms in the soil is heavily impaired and overall soil productivity is lower (Kotschi, 2013: 31).

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Evironment

Environment is the main factor for plants to keep on survival and grow. It is very important fro plants to live because environment has important materials to feed the plants. The soil contains of macro elements which is needed to make food for plants. The fertility of soil is determined by the existence of elements within the soil it self, both micro and micro elements (Sudarmi, 2013).

Often, when speaking of the agricultural impact on the environment, one restricts any consideration to processes of pollution of surface and ground waters from chemicals added to the soil during agricultural practices. No doubt, such processes exist and may have even a prominent importance. They are caused either by water infiltration in soil, with the consequent possibility of nutrient and pesticide leaching, or, if water undergoes surface runoff, by erosion processes, that can lead sometimes to transport of relevant amounts of soil particles to water stream (Sequi,1999 : 223).

Farmers use fertilizer to complete nutrients that is needed by plants. Fertilizer N, P, K is used to adding macro nutrients in order to increase the crop yield. Because of that the use of fertilizer is important for farmers and the state to increase the productivity in agricultural sector.

Eventhough fertilizer that is used by farmers is organic, but the lack of knowledge about the fertilizer usage becomes main problem that will give effect for environment. The impact of agricultural activity which uses in long term will affect to tthe human being, sooner or later.

The bad impact that may caused by the fertilizer towards environment as follow:

a. Syafruddin (2006) stated that an excess of nutrient nitrogen can increase damage by pests and diseases, to prolong life, and plants more easily fall.

b. Nitrate contamination is particularly harmful to infants and young children in causing methemoglobinemia, a reduction in the blood hemoglobin level. Because of this health hazard, a national standard was established to declare nitrate a contaminant at a level above 10 mg NO3 – N per liter (10 parts per million, or ppm) (Silva et all, 2000 :7).

c. Soil will contain of acid and has heavy catharsis because the form of this soil lack of micro nutrients which caused by catharsis that make it looses much amount of micro nutrients.

d. Most of the P causing problems is dissolved in surface runoff or carried on soil particles eroded from fields and washed into rivers, lakes, and the ocean. The release of P to runoff can be one of the most serious sources of P impairment to water bodies. The transported P-rich sediments can also release P into solution, sustaining the growth of aquatic organisms and resulting in an explosion of their populations, which, as described above, can affect the aquatic environment and be harmful to other organisms (Silva et all, 2000: 10).

e. Soil fertility will be decreased caused by nutrients unbalance or lack of ther nutrients, and also caused by mineral organic in soil is getting decreased. It is because of fertilizer usage without handling the measure dosage and excessive application in long term.

Problems caused by too much fertilizer make some impacts: Savci (2012: 77) elaborates that:

i. The amount of nitrate may increase in drinking water and rivers as a result of high levels of nitrogen fertilizer use.

ii. The amount of phosphate may increase in drinking water and rivers as a result of the transport of phosphorous fertilizer with the flow of surface.

iii. High level of Nitrogen fertilizer used plants grown in soils. It consists of carcinogenic substances such as nitrosamines, especially plants such as lettuce and spinach leaves are eaten. There are harmful accumulation of NO3 and NO2 [2-3]

Liquid fertilizer usage which comes from oil palm waste has also negative impact towards environment. In its application, liquid waste is used as fertilizer with pond system, where mud that produced from liquid waste is turned into fertilizer will be put in some water reservoir which is provided as place to deliver fertilizer to every oil palm trees in the area. But this pond system left settled the mud. It causes the mud covered land will turn phisically in temperature, moist, pH and also soil permeability. This physical changes effect the soil where the pond is made, mud decreases soil loose and also the peremability, thus release gas and water polution. This will not deflected so the soil will not be sprouted because the mud as the oil palm waste.

The use of organic fertilizer will not also repair the damage that has happened which is caused by applying manufactured fertilizer continiously in long term. It happens if farmers will only think about fulfilling necessity of nutrients quickly for the plants. The use of manufactured fertilizer recklessly causes soil damage, they are:

a. Soil acidity, causes the worm population and beneficial microorganism are decreasing drastically by applying nitrogen fertilizer continiously for 20 years.

b. The unbalance between organic material input that occurs or taken along when the harvest done so the soil will loose its nutrient.

c. Biological damage marked with biodiversity of soil organism is in low number.

d. Permeability and infiltration are getting low causes the durability of soil towards erotion is getting lower.

CONCLUSION

The use of excessive fertilizer does not help plants to grow well, on other hand, it hampers the growth or in worst case, the plants donot grow at all. If soil does not provide enough nutrients for the plants, it hampers the growth and vice versa, if the nutrients which are applied to the plants in the high amount, it will also worsen the plants growth. Adding fertilizer may influence the soil pH depends on how much amount the main elements applied. The impact of agricultural activity which uses in long term will affect to tthe humanbeing, sooner or later. Liquid fertilizer usageeffect the soil, soil loose and also the peremability, thus release gas and water polution. Permeability and infiltration are getting low causes the durability of soil towards erotion is getting lower.

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