I. INTRODUCTION

1.1 Background

Oil palm (*Elaeis guineensis* Jacq) is one of the plantation crops that has high economic value and is one of the sources of non-oil and gas foreign exchange earners in Indonesia. This tropical plant is a plantation which has the largest area. In 2015, the area of oil palm plantations reached 11.30 million hectares and was predicted to be 11.67 million hectares in 2016 (Respati, 2016). Dharmasraya is a district with the second largest area of oil palm plantations in West Sumatra Province after Pasaman Barat Regency. The area of oil palm plantations in Dharmasraya Regency in 2018 is 31,842 hectares (Central Statistics Agency of Dharmasraya, 2018).

Oil palm plants need climatic conditions, soil type, altitude and rainfall which is suitable for growing. Oil palm plants also need large amounts of nutrients for vegetative and generative growth, to obtain a high production needs optimal nutrient content (Hasriyanti *et al*, 2016). One of the efforts made by the owners of oil palm plantations in optimizing nutrient content is to do routine fertilization. The types of fertilizers commonly used are inorganic (chemical) fertilizers such as urea fertilizer $CO(NH_2)_2$), RP ($Ca(PO_4)_2$), MOP (KCl), HGFB (B_2O_3), Zn ($ZnSO_4.H_2O$), Cu ($CuSO_4.H_2O$), palmo (14-8-21-2) and kieserit ($MgSO_4.H2O$) (Riska and Hariyadi, 2016).

The use of inorganic fertilizers that are routinely used causes many negative impacts (Sutarta and Winanrna, 2002). The negative impact is that it can cause soil acidification and drastic worm population decline, which if it occurs continuously can cause soil fertility to be lost (Lestari, 2009). The use of inorganic fertilizers (N, P, and K) given to oil palm plants in st Sumatra Province during 2014 was

337,544,932 kg. Total inorganic fertilizer absorbed by plants only 147,395,219.40 kg, thus the total inorganic fertilizer that was wasted from oil palm plants was 180,149,712.60 kg. The environmental loss caused by this wasted fertilizer is that the fertilizer is washed into the river and sea so that it results in environmental damage (Hidayani, 2015). In addition, the costs incurred for fertilization were also quite high, ranging between 40-60% of the overall plant maintenance costs or around 24% of the total production costs (Adiwiganda, 2007).

The negative impact of routine fertilization in oil palm plantations can be reduced by returning organic material to the soil, namely by conducting organic fertilization and reducing the dose of the use of inorganic fertilizers (Rusman, 2004). One way to return organic material to the soil is by planting cover crop. cover crops are generally creepers that are planted between annual crops in rotation with annual crops or annual plants where these plants are as a pioneer plant for the rehabilitation of critical land. The function of cover crops is to cover the soil from direct exposure to rain water, rehabilitate critical land, maintain soil fertility, and provide organic material (Idjudin, 2011). Planting cover crops can accelerate and increase the content of organic matter and soil organic carbon through the accumulation of litter. The important role of cover crops is that it does not disturb the presence of main plants (Prayudyaningsih *et al*, 2015).

One of the effective cover crops used in oil palm plantations is cover crop originating from the *leguminosae* family as a cover for the lower area or the base of oil palm plantations which are usually referred to as LCC (Leguminosae Cover Crop) species. Planting LCC species in oil palm plantations is useful for supporting optimal growth and development of oil palm, especially in creating a better microenvironment. Microenvironment covers the state of the soil and the climate around oil palm plants. Growth and d lopment of good oil palm will ideally produce plants that have optimal productivity (Wirdhana, 2016).

LCC application is the right way to optimize land potential with the principle of eco friendly (Maaruf *et al*, 2017). The results of the analysis of variance showed that LCC cover crops significantly affected organic matter content, volume weight, and total pore space of the soil. This happens because soil surface litter donated by legume cover crops will decompose quickly by soil microorganisms that cause organic matter to increase (Refliaty *et al*, 2009).

One of the determining factors for the success of land improvement is the selection of the right type of LCC. The right LCC to be cultivated is LCC which has rapid growth and density, is capable of symbiotic mutualism with nitrogen fixation bacteria, and the resulting biomass is easily decomposed and can increase the soil nutrient of oil palm plantations. Thus, recommendations are needed for the most effective LCC species as cover crops in the area of oil palm plantations that can increase soil nutrients optimally. Therefore, it is necessary to conduct research on the efficient use of fertilizers using leguminosae cover crop (LCC) species in oil palm plantations in Dharmasraya Regency.

1.2 Problem Formulation

Based on the background of the problem above, the problem can be formulated in this study, namely:

1. Which LCC species have the highest germination rate?
2. Which LCC species have the highest biomass?
3. What is the comparison of soil nitrogen levels in soils using inorganic fertilizer with soil planted with LCC species?

1.3 Research Objective

The purpose in the study are :

1. To determine the LCC species that have the highest germination rate

2. To determine the LCC species that have the largest biomass
3. To determine the levels of soil nitrogen in soils that are inorganic fertilizers and soils planted with LCC.

1.4 Benefit of Research

The benefits of the research are:

1. Providing solutions to oil palm plantation owners to reduce the amount of inorganic fertilizer used in plantations.
2. Increase the use value of leguminosae species that are cheap and have high availability as an effective cover crop for oil palm plantations.
3. Can be used as a solution for the regional government of Dharmasraya Regency in an effort to reduce the amount of use of chemical fertilizers that are not eco friendly.