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Soil Carbon Stock in Sub-optimal Land Rice Paddy Watersheds Due to Climate Change on Development *Cymbopogon nardus* L. Simawang Village, West Sumatra, Indonesia

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Abstract

Simawang area is one of the critical areas (sub-optimal) that experienced drought from climate changes. Potential dry land belonging to sub-optimal in Simawang, West Sumatera, Indonesia not been fully utilized for agricultural cultivation. Simawang village, West Sumatera, Indonesia is formerly known as the rice barn, due to the climate change area is experiencing a drought, so the rice fields that were once productive now a grazing paddock because of lack of water. This study aims to calculate the soil carbon stock in Simawang village, West Sumatera Indonesia. The study was conducted in Simawang village, Tanah Datar regency, West Sumatera from October 2014 until December 2017. The study was conducted on sub-optimal land to be planted with *Cymbopogon nardus* L. (Sereh wangi in Indonesian language). Composite soil sampling conducted at a depth of 0-20 cm, 20 – 40 cm. Based on the depth of soil carbon stocks gained higher ground 6473 t ha-1 at a depth of 0-20 cm at a depth of 20-40 cm. Efforts to increase soil carbon is expected to be cultivated through *Cymbopogon nardus* L. planting has been done.

Keywords: climate changes, sereh wangi (*Cymbopogon nardus* L.), soil carbon stock, sub optimal land.

INTRODUCTION

Simawang area is one of the critical areas (sub-optimal) that experienced drought from climate changes. Potential dry land belonging to sub-optimal in Simawang, West Sumatera, Indonesia not been fully utilized for agricultural cultivation.

Land cultivation is one of the sectors that have the potential of carbon sequestration and storage. Source absorber and storage / backup carbon agricultural sector is different for each land use. The amount of carbon stocks in each land use varies, depending on the diversity and densityof plants, soil fertility, climatic conditions, altitude above sea level, the length of the land used for a specific use, and how management.

A carbon stock below the surface (below ground) soil consists of roots and soil organic matter. Efforts to increase soil carbon through land use with adaptive plant, according to climatic conditions and soil characteristics also use organic matter (manure/green manure) and reducing the use of inorganic fertilizers will reduce CO_2 emissions.

On the land is left fallow, generally CO_2 emitted into the atmosphere. This is caused by the absence of planting and the process of photosynthesis, so there is no media that serves as a CO_2 sink.

Simawang village, West Sumatera, Indonesia is formerly known as the rice barn, due to the climate change area is experiencing a drought, so the rice fields that were once productive now a grazing paddock because of lack of water.

This study aims to calculate the soil carbon stock in Simawang village, Tanah Datar regency, West Sumatera, Indonesia [1].

METHODS

The study was conducted in Simawang village, Tanah Datar regency, West Sumatera from October 2014 until December 2017.

The study was conducted on sub-optimal land to be planted with *Cymbopogon nardus* L. (Sereh wangi in Indonesian language). Composite soil sampling conducted at a depth of 0-20 cm, 20 – 40 cm.

The calculation of soil carbon stock using the following formula:

$Ct = Kd \times \rho \times \%\ C\ organic$

where:

Ct = soil Carbon (g cm^{-2})

Kd= depth of soil (cm)

ρ = bulk density (g cm-3)

% C organic was obtained from the results of soil analysis in the laboratory (Lugina *et al*., 2011) [3].

DISCUSSION

The results showed that soil carbon stock in the sub optimal land in Simawang, Tanah Datar, West Sumatra, Indonesia for the development of *Cymbopogon nardus* L. shown in Figure 1.

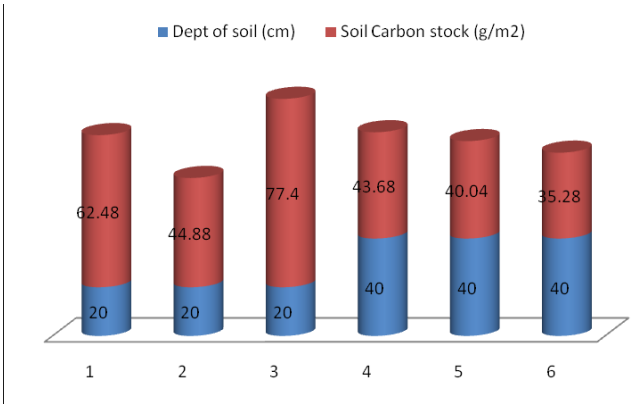

Figure 1: Soil Carbon stock before planting *Cymbopogon nardus* L. at the different depth of soil.

Soil carbon stock before planting *Cymbopogon nardus* L. at the depth of soil 0 – 20 cm higher than 20-40 cm. This is because land is left as pasture. Soil carbon stocks will increase if the cultivated land in accordance with the characteristics of the land and adaptive plants. Therefore, the cultivation of *Cymbopogon nardus* L. in the future is expected to increase soil carbon stocks. Thereby indirectly reducing CO2 emissions, so it can cope with climate change that occurred in Simawang, Tanah Datar regency, West Sumatera, Indonesia.

Indonesia is in a third country CO emitters in the world. Indonesia is in the second under the United States and China, the number of emission output reached two billion tons of CO2 per year or accounted for 10% of the CO emissions in the world [2].

Agriculture is a sector that is experiencing significant impacts of climate change. Hence the need for efforts to reduce CO2 emissions.

CONCLUSION

Based on the depth of soil carbon stocks gained higher ground 6473 t ha-1 at a depth of 0-20 cm at a depth of 20-40 cm. Efforts to increase soil carbon is expected to be cultivated through *Cymbopogon nardus* L. planting has been done.

REFERENCES

[1] Lugina, M. Ginoga, K.L. Wibowo, A. Bainnaura, A. Partiani, T. Standard Operating Procedures (SOP) for Measurement and Calculation of Carbon Stock in the Conservation Area. Research and Development Center on Climate Change and Policy Research and Development Ministry of Forestry, Republic of Indonesia Cooperation with the International Tropical Timber Organization (ITTO). Bogor. 34p. 2011.

[2] Hairiah, K and Rahayu, S. 2007. Measurement of 'carbon stored' in a wide variety of land uses. World Agroforestry Centre ICRAF Southeast Asia Regional Office. Bogor. 88 p. 2007.