

# Carbon Emissions And Mitigation Actions In Merauke

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**Abstract.** Merauke district is one of the areas developing still need clearing land required for the expansion of farming land, Plantations and land clearing to a new settlement. Using forward looking method, Clearing land for the benefit of development produce carbon emissions. Carbon emissions 2014 to 2025 of 40.4 million tons CO<sub>2</sub>-eq with a total emission clean 20.7 tons CO<sub>2</sub>-eq. While carbon emissions Merauke in 2030 decreased to 37.3 million tons CO<sub>2</sub>-eq with a total emission clean of 15.4 million tons CO<sub>2</sub>-eq. To reduce carbon emissions, Merauke do 6 action plan mitigation in unit agricultural planning wetlands and agriculture dry land, production forest, natural heritage land, an absorbing area, mangrove forests and plantation. The carbon emissions reduction in 2030 namely 15.41 % equivalent to 51.5 million tons CO<sub>2</sub>-eq decline emissions from 6 mitigation action.

Keywords: **emission carbon, the action of mitigation, forward looking.**

## 1 Introduction

Since 20 to 30 years ago, the temperature at the earth it is getting hotter because the sun long wave radiation infrared beam or heat waves) emitted by the earth trapped a thick coat of consisting of numerous gas, so as to cause heat could not be separated into space so that the temperature of the earth to warm up, it was when we were in the fetid one quadrillionth of a in glass houses. Hence, the incident one quadrillionth of a it is called as the greenhouse effect. Warming caused by greenhouse effect can be dirasakanoleh of the universe who the earth , so this incident also is called as global warming (ICRAF, 2016 ). The impact of the greenhouse effect also in taste in indonesia.

The environmental damage in indonesia this has already been seen severe and show which tends to continually increase. Vandalism and degrading a forest as well as the pressures on the environment have causing the occurrence of extraordinary environmental disasters. Besides there was a flood everywhere, also occurred the real climate change very real. The temperature of the earth have feels hot due to the lack of veils land by plants due to the conversion of land and because of the work of humans that is not responsible as pembabatan replanting the forest without followed. In addition of the big issues to be overcome the world today that is the increasing number of population and development of science and technology.

The increasing number of population in the earth in severe need of food, clothing and board. Third these needs in severe need of the generation of natural resource such as food and non food. Without there is

protection and natural resource and norma law that protects natural resources, the people will mengekplotiasinya with arbitrary to mewujutkan third these needs. As a result natural resources will be destroyed and finally ended up at of environmental damage that into splints life on earth.

The government of Indonesia in the document of national medium term development plan (the RPJMN) have the commitment want to lower your of emission carbon that are the main cause of global warming as one of contribute to the in komitment the world. The targets achievement related to a decrease in the emission of GRK in the document of the planning development years 2015 - 2019 this is the decrease in the city the emission of GRK to last at least five priority sectors: forestry and peat, this form of agriculture have, all of his energy and of transportation can be made , industry and wastes of, closely resembled those of the 26 % in the year 2019.

The national emissions to support all regions in the nkri to donate emissions of energy sector and non energy. One of the areas must also participated in national effort is Merauke. Merauke as one part of the unity of Indonesia have their land more or less 4.6 million ha with a kind of land use land for 52,5 % conservatory zones, the cultivation 47,5 % (BPS, 2016). In 2015 until 2017, District Merauke backed by project LAMAI arranging development low emission documents as one commitment of the regional government to played a role in carbon emissions reduction efforts nationally.

Regency of Merauke would have sent down the carbon emission based land to the sector .Of the region and the potential for development of land use in

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kabupaten merauke very high. The potential of high of land use in line with high population growth and development both demands to clothing, food, and board. One effect of land base development of emission carbon. These berasarkan, then done a writing of scientific using data the assessment conducted by a team in which there are outstanding activities working group he belongs to a study, academics merauke district backed by lamai. Where in writing about measuring things inimembahas executives the emission of carbon and an effort to conduct the action of mitigation to reduce of emission carbon that in make of human activity in the use of land.

Research objectives that is know the of emission carbon Merauke Regency based the highest inflation figure of land based on the regional landscaping plan and development in the region plan in the future and know the mitigation to lower the emission of carbon in Merauke.

## 2 Method

The methodology uses the ekploratif use of secondary data. In making the mitigation based on estimation carbon emissions the future use of looking forward with basic data on carbon emissions past (minimal) baseline. Basic data used to analyze emission levels past the map land data closing time series in 1990, 2000, 2005, 2010 and in 2014 and maps plans space pattern planning merauke 2010-2030 district year. Furthermore the data processed using software lumens (the land use planning for low emission development strategy) using integrated approach and analysis of trade off which includes: planning sustainable development, planning use land, and action planning mitigation the overall.

The method forward looking is projecting emissions future based on the estimated the future. Scenario baseline forward looking here based on interpretation documents planning use.

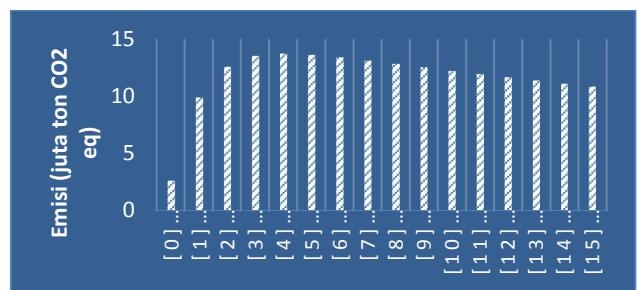
## 3 Results And Discussion

### 3.1 Calculation the Merauke Regency carbon emissions by using the method and minimal baseline forward looking.

Regency of merauke have two options baseline scenario that can be used as the basis for rails. Second that option is baseline obtained from the projection the rate of change of land use that occurred in the so historical and scenario baseline by using interpretation of the regional development (forward looking). Second method can be used to calculate the emission Regency of merauke the past and the future. This to get a and can memperbandingan between the condition of having been happened to the condition of being planned and how a consequence of emission inflicted.

Basic year projection emission use years basic projection 2000, 2005, 2010, and 2014 .The calculation on the level of carbon emission from sector based land by using historical baseline and forward looking.

Second this method used to see the difference in the emission merauke in future. The calculation on the emission by using the method histirical baseline and forward looking in the basic 2014.



**Fig. 1.** The projection based on historical year issue.

Fig. 1.,, shows that in 2014-2015 total emission carbon Merauke Regency reached 34 million tons CO<sub>2</sub>-eq. But from of emission carbon that produced there are the process sekuestration carbon of 31.4 million tons CO<sub>2</sub>-eq. Sekuestrasi carbon is arrest and storage carbon dioxide (CO<sub>2</sub>) of the atmosphere for long periods (Wikipedia, 2018)

Sekuestration carbon storing carbon dioxide or other forms of carbon the long term, who also is one way memitigasi global warming and climate change. Sekuestrasi carbon also has been proposed as a way to slow accumulated greenhouse gases in the atmosphere and sea, released by burning fossil fuels. In 2014-2015 total of clean emissions reached 2.7 million tons co2-eq. According to the data the analysis at present in Table 1., that the total emissions per year merauke tended to the natural or environment in menyerap carbon being produced decline.

Emission projections will come by the use of that the emission baseline minimal total regency of merauke 2014 up to 2022 will have visit rate increase. While starting in 2022 up to 2030 the merauke are going down. An increase in the emission of clean a year in merauke may be due to the of the capability of the in absorbing carbon that is in the atmosphere into decline because of human activity increasing especially clearing land as an effort to speed up the development.

A period of the year 2014 until 2030 carbon emissions a tendency declining but the level of absorption of carbon also tended to decline also and more stable.Total emission every year just by is also insignificant. It was suspected to because the number of covering land begins to decrease and the ability absorption carbon decline. Research Rankin *et al* (2011) revealed that factors that have had a positive impact on the disclosure of greenhouse gas emissions is a system management of the environment, of corporate governance, corporate disclosure project (CDP), size corporate and type industry.

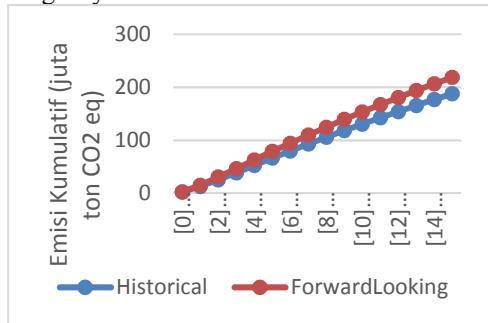
Is technical immediate plans in place of land use in kabupaten merauke in the future .This will be the same area of land development plan of the regions to overflow

into his .In that we have no idea in table on initial conditions before the general use of land in the form of the forest primet for the use of the opening lainseperti rice fields and agriculture , more land to a new settlement as well as for the oil palm plantation .A consequence clearing land in the region one of them is increase carbon dioxide co2 as one of the major causes globat warming or often called by the emission of carbon.

According to the analysis done by a team on Merauke tipre in 2015 using data a carbon basis in 2014 that carbon emissions from year 2014 in a prediction will increase from year to year such as in 2014 until 2025. Years 2025 - 2030 will decline but insignificant. Data on examination of the projected carbon emissions merauke by using the method historically different. It is directly proportional to the net emissions annually.Tota emissions by a year merauke forward looking rose. Total net predictions emissions merauke years 2030 namely 15.4 million tons CO<sub>2</sub>-eq, total the issue far lebuh high in compare using minimal the method baseline Merauke years 2030 total emissions clean but 10.8 million tons CO<sub>2</sub>-eq.

### 3.2 Baseline as the determination of the election

A Figure 3., express its strongest comparison a rail that is was created based on minimal the baseline (of an azure color) and are based on any forward looking the baseline (of the red color of). Blue line by the way look fairly high relative give the effect on the emission of cumulative and years old are 2030. It shows field is emerging that the incidence in the past including its will continue to happen to name sales agents of who came and placed under the the needs of regional development plans their fate an example to which is expected to happen (any forward looking). It is estimated that of land use their fate an example to which is expected to happen of various veils lest they should understand the acquisition of land for and had a reserve high carbon will convertible to increase the residents economy the region and the distribution of plans of land use, it also represents a consequence of a variety of plans for the construction of from national level which will be carried out in regency of Merauke.



**Fig. 2 Compatison Reference Emission Level**

Based on the analysis shows that the carbon emission from based sector land by uses the method forward looking emission levels are higher compared to a method of minimal baseline. The rate of the emission of every year that is always increasing is used to that the campaign mitigation in regency of Merauke.

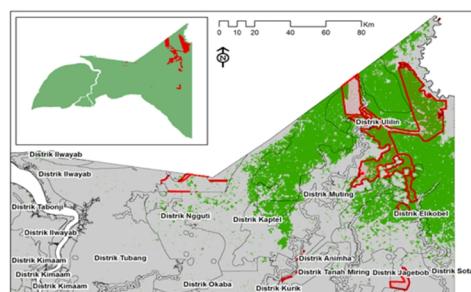
The action of mitigation is everything the efforts carried out to reduce and minimize the impact of a scene, so the form of need to be given at the before for the incident .While mitigation definition in line with the act trusted in, climatology and geophysics agency article 1 (one) explained above that control is a vindication of mitigation to reduce the risk due to climate change through activities that could reduce the emission of / improve the absorption of greenhouse gas emission from a variety of sources.

### 3.3 The Action of Mitigation Merauke Regency

Presidential regulation no. 61 2011 on a national action plan (RAN) the reduction in greenhouse gas (GRK) the implementation of the indonesian government s commitment to lower emissions by 26% with the effort to own and 41% with international support by the year 2020 delivered in front of the leaders of the countries at a meeting g-20 pittsburgh, united states 25 september 2009, made effort to reduce greenhouse gas (GRK) be mandatori which should be done not only by the central government, but also are mandatory for the government provincial and district.

To support those and based on the results of the analysis done by a team a working group TIPRE , so the emission and sources from the identification development issues in Merauke the following proposed some the action of mitigation and have been in proposed key as changes cannot be made to the parties in Merauke .The action of main mitgasi consisted of six action as follows.

1. The Action of 1: reduce emissions in the area which have potentially lost the opening of a large scale by preventing the burning process and it prevent the conversion of the forest the local wisdom based in units of plantation planning.



**Fig. 3.** The location was conducted the action of mitigation 1 which is in the district of Ului.

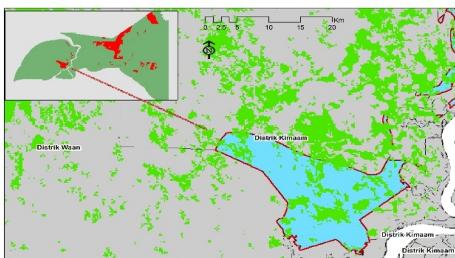
Process or the stage of activity to conduct action of mitigation first are among others :

- Mapping the right ulayat clan and sub clan to ensure legal for business and locals associated with calculation of the value of the clearings asih on a large scale;
- Mapping regulations for the implementation nkt for invesrtasi based land;
- The revision rtrw to clarify deliminasi conservation areas and cultivation;

- Strategic environmental assessment planning Merauke Regency;
- The study to synchronize planning programs development.
- Identification and mapping with the conservation high area;
- Socialization the government related to NKT;
- Building partnerships company and community ( CSR , and others );
- Counseling to the entrepreneurs and the people not to do burning forest deliberate;
- Investment based on the land to build an early detection forest fire;
- Monitoring and evaluation and the supervision.

The action of mitigation first will be implemented in the district of Ulilin by keeping of swamp forests a primer or passing through forest a prime directive from of the conversion that occurs based on the conditions that is ever happened in the past. The same area of land that must be kept namely 5.600 than one hectare in size/years .The action of mitigation by preventing koertion the forest to people in the area in the plantation sector can be lowered the emission of 10,97% or 2,446,630.86 tons on higher demand for CO<sub>2</sub>-eq / years.

## 2. The Action of 2: the plant agroforestri based seed lands local on not be used in units of planning production forest.



**Fig. 4.** The Action to be Implemented Second Mitigation in the District Kimaam

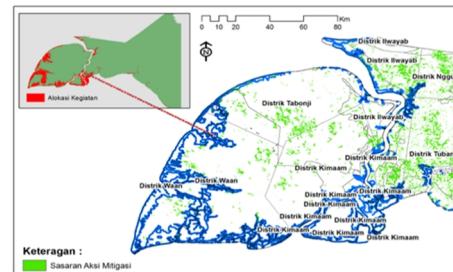
The process or steps that could be pursued in order to implement the action of this mitigation :

- Capacity building and land ownership by doing ground check, identification, mapping, socialization and agreement the boundaries;
- Planning the implementation of the action of mitigation in the region by putting together documentation, coordination activities, the implementation of plan to skpd socialization, and licensing;
- The selection of the types of crop land in accordance with their condition to land analytical work, the selection of types of crops, irrigation plan; The implementation of program agroforestry is by applying a series of main activities which were land preparation, planting, maintenance and monev and reportig.

Regional trade the action of mitigation could reduce emissions in kabupaten merauke as much as 0,004 % or 784.61 tons of CO<sub>2</sub> per year in unit of planning of

production forest and from the results of the analysis the action of mitigation will be carried out in the district of kimaam with experience in the implementation of agroforestri plant local school with superior as wide as 100 ha/year

## 3. The Action of 3: increased carbon absorption through mangrove tree planting in the area allocated as the mangrove forests became the conversion and prevent other land use.



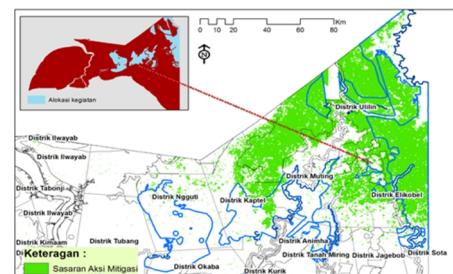
**Fig. 5.** The action to be implemented mitigation three categories in the district waan

Process or langkah-langkah that could be pursued to reduce emissions in the area mangrove forests :

- Mapping mangrove forest area;
- Law enforcement about c illegal mining activity in the area which is not allowed to prevent the conversion of mangrove forest be excavation C (1.4 %);
- Planting of mangroves according to the growth growth on land that is not be built like scrub and open land ( 1,48 % );
- To socialize the regulations in the various fields of business;
- monitoring and supervision.

Low emission in the area by preventing the conversion of hutan mangrove forests became other of land use can be lowered in kabupaten merauke by 0.10 % or equivalent to 21,731.40 tons of co2 per year .The action of mitigation to three will be implemented in the district of waan with planting the tree in critical areas ( shrubs ) covering a total of 15 ha per year care of forests and mangrove 94 ha/year

## 4. The action of 4: maintain reserve carbon in the area of woods and prevent the conversion of forests became any other use in unit of planning a water catchment area.



**Fig. 6.** Location carried out the action mitigation fourth that is in the District of Elikobel

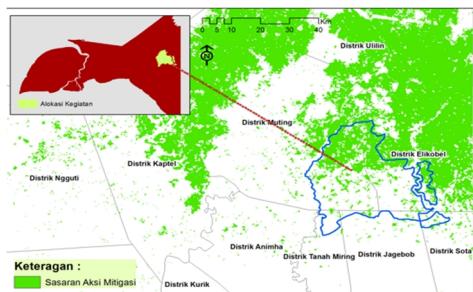
The process or activity that can be done to lower amisi among others :

- The infiltration mappingr;

- Prevent the conversion of the forest (6,9%),
- Integrated patrol plantation,
- The restrictions on the permit to use in the area water absorption
- Meminimalis clearings in the area a buffer at absorbing areas

Maintain reserve carbon in regions are allocated as absorbing by preventing conversion forests became other land use could reduce emissions in Merauke of 2.94 % or about 656,843,48 tons of CO<sub>2</sub>/year. Emission reduction in unit absorbing planning to be carried out in the District Ulin with forest conversion of 225.000 ha/year.

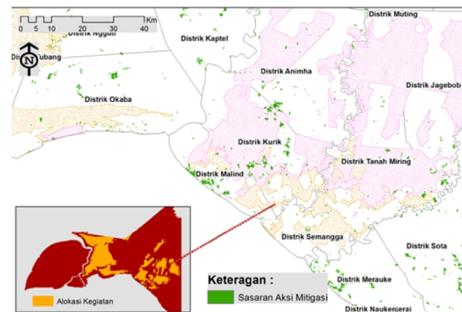
5. The Action of 5: maintain reserve carbon in the area are allocated as natural heritage land by preventing the conversion of forests became other area of land use



**Fig. 7**. The location was conducted the action of mitigation to a five that is in the District of Elikobel and Muting Activities can be done to conduct action of mitigation on a natural heritage that is planning :

- Mapping the natural heritage;
- Handling critical areas in the natural heritage using kritis land for planting plant agroforestry;
- Public socialization about natural heritage encroachment on the impact of the forest;
- Do not do the conversion of natural heritage just because supporting areas at least 500 m. the action of mitigation to a five will be carried out in a unit perencaan natural heritage land that can be lowered emission kabupaten merauke as much as 0.89 % or 198,926.11 tons of co2 a year with guard the woods in natural heritage everything ha per year .The point of regional trade the action of miitigasi in unit of natural heritage planning will be carried out in a district elikobel and district muting.

The action of 6: maintain reserve carbon in the central area agricultural production Merauke through the increase on a farm productive, the use of farmland non-produktive area, the system implementation agroforestry.



**Fig. 8.** The action was mitigation to six the district pock and malind

Activities (processes) can be done to conduct action of mitigation in unit of agriculture i.e. as follow:

- Certainty and land ownership by do ground check, identification, mapping, socialization and agreement;
- Planning the implementation of the action of mitigation with doing the preparation of documentation, coordination activities, socialization the implementation plan, and licensing;
- Electing a crop that matches the ground by melkaukan analysis land, an election crop, and irrigation plants;
- Implement the program agroforestry by conducting tillage before planting, planting of crops agroforestry matches the land, penelihataan, monitoring and evaluation and the reporting agroforestry integrated programs.

The implementation of the mitigation to six will be implemented in unit agricultural planning in points of the implementation in the district and malind pock. The mitigation to reduce emissions done in critical areas by implementing agroforestry in land with 50 ha/years in the acreage of a farm wetlands and ha/25 years in agricultural land dry land. Mitigation this action could reduce emissions by 15.41% equivalent to 51,5 million tons of CO<sub>2</sub> eq/ ha in 2030.

To carry out mitigation actions the local government can encourage the implementation of mitigation into the regional planning documents so that it becomes the obligation of each agency in implementing land-based mitigation.

#### Conclusion

1. Carbon emissions district merauke future considering development issues of land use as clearings for agriculture, residential and clearings to palm plantations and rubber. The clearings in Merauke the amount of carbon emissions fore such as in 2030 a month 37.3 million tons CO<sub>2</sub>-eq while its net emissions 15.4 million tons co2-eq;
2. The efforts made by Merauke backward for emission sent down to carry out 6 the action of mitigation in unit of plantation planning , agriculture westland and agriculture dryland, mangrove forest, water catchment area, of production forest, land and natural heritage .Low emission target merauke 2014 - 2030 namely

15.41% with low emission in the number of pariode are 51.5 million tons CO<sub>2</sub>-eq;

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