Promotion of CO₂ Assimilation by Effective Use of NOx and NP is Best Method to Produce Much Fish and Protect Global Warming

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Abstract

Since the industrial revolution, burning of fossil and production of CO₂ and NOx increased greatly. Increased CO₂ and NOx promoted the CO₂ assimilation. Production of grain and fish increased. About 360 billion tone CO₂ is produced by burning of much fossil. About 14.4 billion tone NOx is produced in 2015. Most of emitted CO₂ is fixed by CO₂ assimilation. But since developed country started NOx elimination and NP elimination at around 1975, half of produced NOx is eliminated. 3 billion tone NP in waste water is eliminated by activated sludge process. Nitrogen and phosphorous concentration of sea decreased. CO₂ assimilation and plankton growth are reduced remarkably. Therefore, fish industries of Europe and Japan decreased and GDP growth stopped for 30 years. I estimated how much damages are given to Europe and Japan by NOx and NP. We must promote CO₂ assimilation and promote industry by complete use of emitting NOx in exhaust gas and NP in waste water.

Keywords: NOx Elimination; NP Elimination; CO₂ Assimilation; Global Warming; Fish Production

Introduction

Fossil fuel burn releasing CO₂ and heat. CO₂ assimilation reaction is the reaction of CO₂ with water producing carbohydrate and O₂ absorbing heat. Burning reaction is reverse reaction of CO₂ assimilation. If we can compensate the generation of CO₂ and heart of burning with the absorption of CO₂ and heart by CO₂ assimilation, global warming will be protected [1-29].

70 % of CO₂ assimilation is said to be carried out at sea.

The growth of plankton is dependent on light and nutrient availability. Supply of nutrients are important on future plankton productivity [30].

When we look at how nutrient nitrogen are supplied. NOx is main source of nutrient nitrogen. When something is burned, CO₂ is produced and NOx 1/25² of CO₂ is also produced. About 360 billion tone CO₂ is produced by burning of much fossil. About 14.4 billion tone NOx is produced in 2015. Most of emitted CO₂ is fixed by CO₂ assimilation. But since developed country started NOx elimination and NP elimination at around 1975, half of produced NOx is eliminated. When we look at how nutrient phosphorous are supplied. Excreta is main source of nutrient phosphorous. Excreta of developed country are eliminated. Then CO₂ assimilation and plankton growth are reduced remarkably at developed country. In this paper I wish to show 1. Why global warming is progressing. 2. Why fish production of Europa and Japan decreased. 3. How much loss and damage are produced by doing NOx elimination and NP elimination. I wish to show the situation of Japan who doing NOx elimination, and NP purification of waste water completely.

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**Why global warming is progressing**

Since the industrial revolution, burning of fossil and production of CO\(_2\) and heat increased greatly. Increased CO\(_2\) and NOx promoted the CO\(_2\) assimilation. Production of grain and fish increased. About 360 billion tone CO\(_2\) is produced by burning of much fossil. About 14.4 billion tone NOx is produced in 2015. Most of emitted CO\(_2\) is fixed by CO\(_2\) assimilation. But since developed country started NOx elimination and NP elimination at around 1975, half of produced NOx is eliminated. NOx is main nitrogen fertilizer. NP in waste water is main phosphorus fertilizer. Therefore, CO\(_2\) assimilation is retarded. And emitted 360 billion tone CO\(_2\) is not fixed completely. Concentration of CO\(_2\) increased about 2 ppm. In 2016, 142 billion tone CO\(_2\) is remaining to give global warming. Before 1970, same amount of emitted CO\(_2\) is fixed by CO\(_2\) assimilation. After 1980, CO\(_2\) concentration increasing. This mean that amount of CO\(_2\) fix become smaller than emission. In 1985 CO\(_2\) emission is 210 billion tone, CO\(_2\) fix is 150 billion tone. In 2000 CO\(_2\) emission is 250 billion tone, CO\(_2\) fix is 150 billion. In 2010, CO\(_2\) emission is 300 billion tone, CO\(_2\) fix is 170 billion tone. In 2017 CO\(_2\) emission is 360 billion tone, CO\(_2\) fix is 220 billion tone. NOx and NP are very effective activator of CO\(_2\) assimilation, fertilizer.

Many developed countries are eliminating 6 billion tone NOx, by the reaction with ammonia

\[ 4\text{NO} + 4\text{NH}_3 + \text{O}_2 \rightarrow 4\text{N}_2 + 6\text{H}_2\text{O} \]

Then CO\(_2\) assimilation is retarded. CO\(_2\) fix, around 6 x 25= 150 billion tone, is retarded. Heat absorption is retarded. Global warming is progressing.

NP elimination in wastewater should be stopped. Japan constructed 2200 wastewater purification stations to eliminate NP in the wastewater generating much CO\(_2\).

I investigated Yamazaki wastewater purification center at Yamazaki, Kamakura in Japan. This center cover 96881 persons. Water 98287 m\(^3\) containing Nitrogen 40 mg/l, Phosphorous 4.2 mg/l is treated by activated sludge process. Air is bubbled for ten hours to give water containing Nitrogen 7.5 mg Phosphorous 2.7 mg/l. Consuming 8841200 kWh electricity. This data showed that 7.34 Kg Nitrogen, 2.65 Kg.

Phosphorous is eliminated in one day at this center. This data indicates 7.34 x 12000000/96881 x 365 = 140 million tone nitrogen, 12.8 million tone phosphorous are eliminated in Japan in one year. Population of Japan is 1.2 billion. 8841200 x 12000000/96881 = 110 billion kWh electricity is consumed in Japan for the treatment of wastewater. This correspond 100880/110 = 1.11% of total electricity consumption 100880 kWh of Japan.

If waste water purification is not done in Japan, 140 x 25 = 35 million tone CO\(_2\) is not produced and 35 million tone plankton can grow and 35 x 1/10 = 3.5 million tone fish will be produced. People need not pay water purification fee 30 $ (1$/m\(^3\)) per month.

Relation of CO\(_2\) emission, CO\(_2\) fix, NOx emission, Fish production [21-24].

The increase of CO\(_2\) and NOx production increased the CO\(_2\) assimilation. The increase of CO\(_2\) assimilation increased the production of grain and fish. The production of grain in 1960 0.85 billion tone in 2010 2.6 billion tone 3 times. The population of the world in 1960 30 billion, in 2017 73 billion.

Plankton is the foundation of the ocean food chain. Plankton is eaten by many fish and fish is eaten by many fish and animals.


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Method to decrease CO₂ release

Japan increasing 9.2 billion tone CO₂, Germany increasing 4.3 billion tone CO₂, UK increasing 1.6 billion tone CO₂, Turkey increasing 3.2 billion tone CO₂ and Italy increasing 0.3 billion tone CO₂. Japan producing 1 billion tone CO₂ for the elimination of NOx NP. If Japan stop elimination of CO₂ NP, Japan can reduce 1 billion tone CO₂ release. Japan can increase 0.5 x 25 = 12.5 billion tone CO₂ fix and can produce 12.5 billion tone plankton. Japan can increase 12.5/20 = 0.6 billion tone fish. If they stop NOx NP elimination. They can accelerate plankton growth and can fix increasing CO₂. Japan, Germany, UK and Italy cannot fix produced CO₂ at his countries. Because countries are small. They should consider sea as a farm of plankton, fish and farm to fix CO₂ then they can fix produced CO₂ at his surrounding sea.

Why fish production of Japan decreased [12,13]. Japan was producing 12 million tone fish in 1970. Top in the world. But fish production decreased to less than 3 million tone now. I wish to explain the reason why fish production of Japan decreased when most of other countries increasing fish production.

As mentioned at previous paper [1,2], I was born at Seto inland seaside beach at Kurashiki in 1930. Seto inland sea (sea between Shikoku and Chugoku in Japan). This district is no thunder district. Supply of NOx by thunder is not possible. Sea was filled with seaweed and fish before 1980. Two news about the red sea (red plankton growth) at near hatchery fish plants at Kagawa prefecture, and much water weed growth at Biwako lake in Japan were reported. These were special event at special district. Aquaculture by imported fish powder is done at Kagawa prefecture. Then red plankton grow Official thought never red plankton growth at sea. Official define nitrogen, phosphorous and CO₂ as three evil for environmental protection. Official established very strict rules that NOx in exhaust gas of electricity generation plant, chemical plant, iron making plant should be zero. NP in wastewater should be zero. In 1960, 60 thousand tone triply phosphate is used as detergent additives. The use of this phosphate was inhibited. Many wastewater purification centers were established. The nitrogen and phosphorus in the wastewater were eliminated by activated sludge process. And all N P in the wastewater become zero. Growth of plankton and weed were stopped. Eel glass (amamo) disappeared. Kaki on rock disappeared. Seagull (Kamome) disappeared. Fish cannot grow at no plankton no weed sea. Japan produced 11.5 million tone fish, top in the world in 1984 But fish production decreased to 3.5 million tone 7 th place in 2018. This (800 million tone) is huge decrease by decrease of plankton by decrease of nitrogen concentration of sea water. Japan is eliminating 0.5 billion tone NOx since 1984. Fish price increased 1960 0.3 USD/kg, 1970 0.5 USD/kg, 1980 1 USD/kg, 1990 2 USD/kg, 2000 3 USD/kg, 2010 4 USD/kg, 2018 8 USD/kg. Price of 800 million tone fish is 8x 8000000000 = 640 billion USD. Japan losing fish 640 billion USD (540 USD per person) each year. About 2 million fisherman lost job. Japanese eat fish as main protein source. But fish price increased more than 10 times. Then Japanese cannot eat much fish. fish/meat eat ratio decreased from 1945 99/ to 2018 30/70. Fish were cheap than meat before 1970. Japanese can live longest, average men can alive 80.5 years (third), women can alive 86.83 years (top in the world) by eating fish. But now fish is much more expensive than meat since nutrient N and P elimination rule. We Japanese may loose long-life record. Rice production reduced. 1970 12 million tone to 2018 7.82 million tone.

Since Japan started NOx elimination and NP elimination in 1980, GDP growth rate [18] increased only 1.6 % from 1985 to 2017. Government debt balance/DGP is 237%, worst in 188 countries NOx elimination and NP elimination should not be done to protect decline of food production.

GDP and population can be increased by effective use of NOx and NP [15,18].

The increase of CO₂ and NOx production increased the CO₂ assimilation [27]. The increase of CO₂ assimilation increased the production of grain and fish. Increase of grain increased population. Population in 1960 30 billion, in 2017 73 billion. The production of grain in 1960 0.85 billion tone in 2010 2.6 billion tone 3 times. NOx emission in 1960 4 billion tone, in 2017 14.4 billion tone. The production of grain in India increased 5 times from 1950 to 2010. In1950 0.5 billion tone, 1060 0.7 billion tone, 1970 1 billion tone, 1980 1.2 billion tone, 1990 1.7 billion tone, 2000 2.2 billion tone, 2010 2.5 billion tone, CO₂ emission is now 24 billion tone. NOx emission increased to 1 billion tone. The increase of NOx contributed for the production of 2.5 billion tone grain. Population of India increased 1951 3.8 billion to

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2014 12.5 billion. 3.3 times grain production increased 5 times. The countries who use NOx, NP are growing and increasing population. The countries who eliminate NOx, NP are declining and decreasing population.

Grain and fish production of Japan decreased Food production ratio (food produced at his country) from 100% in 1945 to 37 % in 2015. Population of Japan is decreasing about 0.4 million per year. It is estimated that population of Japan in 2118 will be fifty million (about 40% of present population).

Japan producing 12 billion tone carbon dioxide. Area of Japan is 3.8 x 10$^5$ km$^2$ Japan can fix 3.3 billion tone CO$_2$ Japan must fix 7 billion tone carbon dioxide. Japan must reduce 7 billion tone CO$_2$ emission to reduce 7 million tone carbon dioxide. We must absorb carbon dioxide by CO$_2$ assimilation at 2.1 times wide area of sea. We must provide nutrient N P to the sea.

Japan producing 12 billion tone CO$_2$ and 0.5 billion tone NOx. Fixing 3.3 billion tone CO$_2$ at 3.3 x 10$^5$ km$^2$ land. Emitting 1 billion tone CO$_2$ for eliminating of NOx. Emitting 1 billion tone CO$_2$ for Drainage cleaning. If these are stopped, 0.5x 25 =12.5 billion tone CO$_2$ can be fixed.

\[ 1+1+ 0.5 \times 25 = 14.5 \text{ billion tone CO}_2 \text{ emission will stop. Japan CO}_2 \text{ res is 4.95 billion tone.} \]

If Japan stop NOx elimination, wastewater purification, Japan can produce 2 billion tone fish 8 million tone rice and DGP growth rate increase 8 %, increase population and can protect global warming [28,29].

Summary

NOx elimination and NP elimination are reducing CO$_2$ assimilation, grain production, fish production, DGP growth rate and population. NOx produced by burning should be released as it is and NP in waste water should be released as it is.

Bibliography


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