



(RESEARCH ARTICLE)



Activation of fish industry and agriculture by sufficient supply of nitrogen and phosphorous is easy and sure method to protect global warming and to increase GDP and national wealth

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Abstract

Global warming is caused by lack of N and P by the elimination of NO_x and NP in seven developed countries. Global warming can be protected, if enough amounts of nutrients containing nitrogen and phosphorous are supplied. Most easily available substances containing N and P are NO_x and NP in waste water. If developed countries stop the elimination of NO_x and NP, CO₂ assaulting is activated and global warming will stop. Developing countries like China, India and Indonesia, do not eliminate NO_x and NP and use as fertilizer. Then CO₂ assimilation is activated CO₂ fix is activated. Agriculture and fish industries are activated. GWPR (Global Warming Protection Ratio of this countries (CO₂ emission/CO₂ fix) is lower than 1. We must promote CO₂ assimilation by complete use of NO_x and NP in waste water. And addition of fertilizer to the sea will increase CO₂ assimilation and fish production. Activation of fish industry and agriculture by sufficient supply of nitrogen and phosphorous is easy and sure method to protect global warming and to increase DGP and national wealth.

Keywords: NO_x; CO₂ assimilation; Protection of global warming; GWPR; NO_x elimination; NP in waste water

1. Introduction

Why global warming is happening. Concentration of CO₂ is increasing 20 ppm each year. Many researcher including Dr. W. Nordhaus (Nobel Economic Science Prize winner 2018) say global warming comes from the increase of CO₂ (ref 54). Paris agreement asking us CO₂ emission must be equal as CO₂ fix and progress by 2050.

The author defined the ratio CO₂ emission / CO₂ fix as GWPR (Global Warming Protection Ratio) and investigated the reason why global warming is progressing by the analysis of CO₂ emission, CO₂ fix, how CO₂ is used, NO_x emission, how NO_x is used amount of grain production, amount of fish production, population, GWPR, GDP at each countries, from 1960 to now. The result: Global warming is caused by decrease of CO₂ assimilation by the rack of nitrogen and phosphorous by the elimination of NO_x, NP. (ref 1-53) CO₂ is used in nature by CO₂ fix by CO₂ assimilation. Therefore, activation of CO₂ assimilation is easy and best and only way to fix CO₂ We can provide enough nitrogen and phosphorous easily by use of NO_x, NP in waste water and NP fertilizer. Then we can promote CO₂ assimilation and we can fix CO₂ and we can activate agriculture and fish industries. And we can increase GDP.

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2. NO_x is best compound to reduce CO₂ (Ref 7)

Developed countries misunderstood the utility and toxicity of NO_x. Wikipedia reported many thousand toxicity of NO_x and no utility of NO_x. Even through NO_x is used as fertilizer 2 hundred years ago. NO_x is main natural fertilizer and amount is 1.4 billion tone about 10 times of synthetic nitrogen fertilizer.

Developed countries extend the regulation of NO_x at car to the factory like electricity generation plant and forced to eliminate NO_x by immersion of ammonia in to the exit gas.

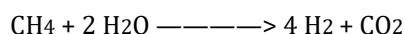


This procedure use 1.2 billion tone methane and produce 3.3 billion tone CO₂ for the production of 3.4 billion tone ammonia and eliminate 3 billion tone NO_x which can fix 75 billion tone CO₂. (ref 5, 7, 15, 19, 29, 53). Global warming has started at around 1980 when developed countries have started NO_x elimination. GWPR (CO₂ emission/CO₂ fix) of the developed countries is higher than 1, because CO₂ assimilation is retarded by NO_x, NP elimination. GWPR of Japan who doing NO_x, NP elimination most severely is (CO₂ emissions 12/CO₂ fix 3.5) = 3.4. This number 3.4 is far top in the world accepting very severe criticism. followed by Germany 2.2, UK 1.7 and Italy 1.2., GDP increase rate of developed countries is low as 1-3. GDP of Japan does not increase since 1980 to now because fish production decreased from 12 million tone in 1980 to 4 million tone in 2018.

On the contrary, developing countries like China, India and Indonesia use NO_x, NP in waste water as fertilizer. CO₂ assimilation is activated. Production of grain and fish increased rapidly in proportion to the increase of CO₂ emission, NO_x emission. Fish production of China increased from 1960 1.5 million tone to 2017 85.30 million tone, 57 times. Only plankton fixed 1.7 billion tone CO₂, 17 % of total 10 billion tone CO₂ emission. GWPR of these country show lower than 1. China 1.0, India 0.8, Indonesia 0.3. GDP of these developing countries is high 6 because food production increased.

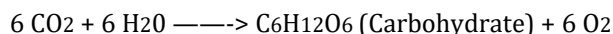
3. Trial to use hydrogen as fuel is not clever

The Idea to establish low carbon society is not clever (ref 55-57, 53) Developed countries, like Japan (ref 58) are trying to decrease CO₂ emission by none carbon compound and they are trying to use hydrogen as no CO₂ emission fuel. This idea is wrong completely. Hydrogen is produced by following scheme,



8 gram hydrogen is produced from 16 gram methane producing 44 gram carbon dioxide. Therefore, hydrogen is not fit for no CO₂ emission fuel. (ref 52, 53)

4. CO₂ assimilation is the reaction of CO₂ with water



Velocity of CO₂ assimilation is carried out in proportion to the concentration of CO₂, H₂O, sunshine, Nutrient N, Nutrient P Nutrient mineral as shown by following equation

$$V = A (\text{CO}_2) (\text{H}_2\text{O}) (\text{sunshine}) (\text{N}) (\text{P}) (\text{mineral})$$

CO₂ assimilation is promoted by increase of CO₂. Zaichun Zou (Ref 58) reported the change of global change of leaf area from 1982-2000. Total area of increased green is 18 million km², double of USA area. Many investigator reported that CO₂ increase is good effect for climate and plant growth. CO₂ assimilation can be activated by increase of N, P concentration. (ref 7, 13, 19, 29, 46, 53)

Japan is increasing GWPR by the procedure to decrease CO₂ emission

CO₂ emission per person of Japan in 2018 is 8.9 tone This value is higher than Germany 8.9 UK 5.0, Italy 5.8, France 5.0 CO₂ emission of Japan in 1980 was 3.5 hundred million tone. CO₂ emission of Japan in 2018 is 12 hundred million tone. The rise from 3.5 to 12 is caused by following 10 procedures.

- About 1 hundred million tone CO₂ is produced for the construction of 2230 waste water purification center.

- About 1 hundred million tone CO₂ is produced for the operation of waste water purification center.
- About 1 hundred million tone CO₂ is produced for the construction of 1893 high temperature incinerator
- About 1 hundred million tone CO₂ is produced for the studies of decarbonylation
- About 1 hundred million tone CO₂ is produced for the studies of hydrogen production and transfer from Australia to Japan
- About 1 hundred million tone CO₂ is produced for the set up of solar electricity generation plant
- About 1 hundred million tone CO₂ is produced for the studies of CO₂ capture and storage (ref 58)
- About 1 hundred million tone CO₂ is produced for the donation of electricity plant to developing countries.
- About 1 hundred million tone CO₂ fix is reduced by stopping bon fir. Because burning of 1 hundred million tone wood produce 4 million tone NO_x and 4 million tone NO_x can fix 4x 25= 1 hundred million tone CO₂
- About 1 hundred million tone CO₂ fix is reduced by stopping the construction of new linear motor car Shinkansen Tokyo- Nagoya.

5. Method to reduce GWPR

GWPR (global warming protection ratio) is CO₂ emission/CO₂ fix) Therefore if we wish to reduce GWPR. We can do by reduce CO₂ emission or Increase CO₂ fix. CO₂ fix is reduced from 5.5 to 3.5 hundred million tone by elimination of NO_x and NP. CO₂ emission increased from 7 to 12 by the reason mentions above.

Therefore,

GWPR in 2018 is (CO₂ emission 12/ CO₂ fix 3.5) =3.42 GWPR in 1980 was (CO₂ emission 7/ CO₂ Fix 5.5) = 1.27.

Japan can reduce GWPR. If Japan return to the state in 1980 when no ammonium addition to the exit gas of factory and release waste water as it is and allow bon fir, Then GWPR return from 3.42 to 1.27. This is easy and sure way and need no money. If Japan wish to reduce from 1.27 to 1.0 or less than 1. Addition of fertilizer to sea and stir deep sea water and surface water, allow the use of TPP (tripolyphosphate) and increase NP concentration of sea and increase plankton like East China Sea, This is easy and sure way to get protection of global warming and to fit Paris agreement as shown in Table 5.

6. Do not afraid of red tide and eutrophic

Red tide appeared at near fish farm plant at Kagawa prefecture in Japan. Japan government thought this is caused by eutrophic of the sea and set up 2200 wast water clean center and eliminated all N and P in waste at all arial of Japan. Then red tide did not happen again. Plankton and sea weed do not grow and fish, clam, nori production dropped remarkably. Dr Sudo (ref 79) say red tide are happening at Arctic Ocean many time. Top fishing sea of the world is Easy China sea. About 80 million tone fish is produced at East China sea. Red tide is happening frequency at East China sea Concentration of N, P of East China sea is high and much NO_x and NP are supplied from top industrial area. South west of Shanghai. Therefore increase of NP is important for the production of fish and for the CO₂ assimilation and CO₂ fix. We need not afraid red tide and eutrophic.

Developed countries must stop NO_x NP elimination to increase the N P concentration of sea water. Then nitrogen and phosphorous are supplied led and CO₂ assimilation is activated and CO₂ fix is increased and food production increase. Then Global warming will stop and GDP will increase and growth of the countries will be accomplished.

6.1. Japan government should promote agriculture and fish industry to increase CO₂ fix.

To increase CO₂ fix, promotion of CO₂ assimilation by supply of nitrogen and phosphorous is best and only sure method to protect global warming.

6.2. Japan government must abandon three laws.

- Concentration of NO_x in exit gas of factory must be near zero.
- Waste water must be cleaned at wastes water clean center until concentrations of nitrogen and phosphorous are near zero.
- Prohibit bon fir.
 - By stopping of 2.5 million ton ammonia, elimination of 2.5 million tone NO_x is saved and 10 million tone CO₂ emission is saved and elimination of 2.5 million tone. NO_x is saved and 50 million tone CO₂ fix is expected.

- By stopping of agitation at waste water clean center and do fermentation, 0.1 billion tone CO₂ emission can be avoided. Concentration of NP increase. About 20 million tone fish will be produced. GDP increase rate increase and prosperity at local district will be recovered
- Bon fir produce NO_x 2 million tone NO_x can fix 50 million tone CO₂ and can produce 50 million tone food.
- Then GWPR will recover from 2018 3.4 to 1980 1.2, But still above 1. We must lower GWPR from 1.2 to 1.0 by the addition of fertilizer.

6.3. Recovery of fish production of Japan

I was born in 1930 at small town Kojima, Kurashiki, Japan. This town is located at sea beach in Seto inland sea. Japan. Bottom of the sea was filled with sea weed (eel grass). At around 1980, red tide appeared at near fishery plant, at Kagawa prefecture Japan. Then Japan government build 2200 water clean center at all over of Japan and eliminated nitrogen and phosphorous completely by activated sludge process. Also NO_x in exit gas of all plant was eliminated by ammonia. Then nitrogen concentration of sea decreased. From 1980 0.40 mg/l to 2015 0.05 mg/l. Sea weed do not grow. Plankton do not grow Nori growing plant stopped. Fish production decreased from 1980 0.45 millions tone to 2018 0.05 millions tone as shown in table 1 (ref 5, 13, 75)

Table 1 Relation of NO_x, NP elimination with Fish production at Seto inland sea

N mg/l		Fish mill t	Total nitrogen t/day	Total phosphorous t/day
60	1980	0.40	0.45	670
46	1985	0.40	0.45	620
42	1990	0.30	0.32	620
40	1995	0.22	0.22	620
39	2000	0.22	0.21	600
32	2005	0.15	0.22	450
25	2010	0.05	0.10	400
-	2015	0.05	0.08	-
-	2018	0.05	0.05	-

Table 2 Sand lance production and N concentration

	Sand lance tone	N concentration (micro mole)
1980	8000	12
1985	4000	5
1990	7000	9
2000	2050	5
2010	2530	3
2016	1500	3

Hyogo prefecture demonstrated the decreased production of sand lance (ikanago) by the decrease of nitrogen concentration. Ikanago production decreased from 8000 tone in 1980 to 1500 tone in 2016 by decrease of N concentration from 12 micro mole to 1 micro mole/ as shown in Table 2. (ref 76)

7. Addition of fertilizer to sea to increase fish production and CO₂ fix

Addition of fertilizer NP to sea is effective method to increase CO₂ assimilation. (ref 48)

The cost of fertilizer like urea, ammonium phosphate, TPP (Triphosphosphate) 318 tone price 6.36 million dollar (318000kg x 2\$/kg) is 1/800 of lost money 8 hm dollar by the decrease of fish production (ref 42, 43). 318 tone P is same amount as P eliminated at waste clean centers in Japan. We can get much precious fish.

Japan government is spending 5 billion dollar for protection of global warming yearly. (ref 55) This money is enough to provide NP fertilizers. Nitrogen phosphorus concentration of sea increase to N 33 µg/L, P 2.9 µg/L to increase fish production to 200 million tone. And we can fix CO₂ 3 billion tone CO₂. We can extend this strategy to the world, Then we can increase fish production to 700 million tone fish fixing 700x 25 = 17500 million tone (17.5 billion tone) CO₂. This indicates more than 14 billion tone CO₂ fix will be possible and GWPR become lower than 1 and much food will be produced and national wealth will increase. See Table 5

Yahoo news Gendai business Fro 1 (ref 80) reported At Biwa lake Shiga pref Japan is dying because lack of oxygen. Dissolved oxygen level downed to 1 mg/ L. Similar phenomena is reported in 2020 may 13 at Nihon keizai news paper.

I thought that this is caused by insufficient CO₂ assimilation. And investigated the production of fish. (ref 81, 82) In 1955, 10616 ton fish (fish plus clam) was produced. But the production decreased to 713 tone in 2017.. Fish production 3000 tone in 1964. 2800 tone in 1979, 1520 tone in 2004, 1060 tone in 2014. Ayu production decreased 1760 tone in 1760 and 279 tone in 2017.

Honmoroko production decreased from 209 tone in 1889, and clam (shizimi)

Proudction decreased from 8000 tone in 1855 to 2060 in 1959, 840 in 1779, 520 in 1989, 70 in 2005, 53 in 2017.

Decrease of ten thousand tone fish show 10000x 10 = hundred thousand tone plankton is not produced. Almost same amount of CO₂ assimilation is not done. As same weight of CO₂ give same weight of plankton. CO₂ assimilation give 32/44 weight of oxygen. Failure of hundred thousand tone CO₂ fix mean failure of 100000 x32/44= 72727 tone oxygen generation is stopped. Therefore Biwa lake become no oxygen.

Clam (shizimi) production decreased. The reason will be decrease of Calcium. Because calcium concentration is low at Biwa Lake and river coming in Biwa lake contain low concentration. There is no lime stone mountain around Biwa lake. Six thousand tone clam is produced yearly. Then Calcium ion at Biwa lake become scare. If lime is provided, Calcium ion increase and CO₂ assimilation is activated and clam production and CO₂ fix will increase. Oxygen lack will be improved.

Fish like aye and honmoroko decreasing. I think this is caused by the scare of phosphorus.

Table 3 Total fish, Ayu and clam production (ref 82)

	Total fish t/Y	Fish t/Y	ayu t/y	honmoroko t/y	clam (shizimi) t/y
1955	10616	-	-	-	8000
1964	-	3000	-	-	-
1969	-	3000	-	-	2060
1979	-	2400	-	-	840
1989	-	2800	1760	209	520
2004	-	1520		-	70
2014	-	1060		5	-
2017	713	-	279	9	53

Phosphorous concentration and T P load decreasing yearly. Phosphorous load decreasing after 1985 by NP elimination policy and waste water purification.

In 1990 fish catch was 3800 tone, In 1995 2200 tone, in 2005 1400 tone, in 2015 950 tone. TP load in 1990 was 440 tone, in 1995 420 tone, in 2005 280 tone, in 2015 220 tone. Fish catch decreased when TP load decreased. One phosphorous can fix 110 CO₂

Table 4 Relationship between fish catch and TP lord (ref 83)

Relationship between fish catch and TP loads in Lake Biwa		
Year	Fish catch (t/Y)	T P Loads (t/Y)
1985	3000	460
1990	3800	440
1995	2200	420
2000	2000	340
2005	1400	280
2010	1200	220
2015	950	220

To increase fish and clam production, we should not do NP elimination. By addition of urea, ammonium phosphate, lime to Biwa lake, we will be able to get 8000 tone Shizimi and we will be able to fix 10000x25 = 250000 tone CO₂. (ref 50)

7.1. GWPR and GDP of the world

CO₂ emission and CO₂ fix was same at before 1975. GWPR was 1. Elimination of NO_x and NP started at 1985. CO₂ fix become smaller than CO₂ emission.

GDPR at 1985 was 1.33 and GWPR at 2018 was 1.63.

By addition o fertilizer and stopping of NO_x, NP elimination GWPR of 2022 will be 1 and GWPR of 2030 will be able to 0.9 and GWPR of 2050 will be 0.8 and GDP of 2022 will be 4%, 2030 5 %. 2050 6 %. These values are ideal value we are expecting to reach. (ref 48-53)

Table 5 Comparison of GWPR, GDP of world at 1860, 1980, 2018, 2022, 2030 and 2050 (Ref 33-49)

	CO ₂ em hmt	CO ₂ fix hmt	NO _x em hmt	NO _x con g/kWh	Wd	Fertilizer hmt	Fish hmt	Population billion	GWPR	GDP inc.r %
1960	100	100	4	1.6	do	0	35	30	1	5
1975	170	170	6.8	1.6	do	0	-	40	1	5
1985	200	150	8	1.6	no	0	35	46	1.33	5
2018	360	220	14.4	1.0	no	0	150	73	1.63	1
2022	300	300	0.5	1.6	do	10	300	78	1	4
2030	300	270	0.51	1.6	do	30	500	85	0.9	5
2050	270	220	0.5	1.6	do	50	600	100	0.8	6

CO₂em (CO₂ emission) , CO₂fix, , NO_xcon (NO_x concentration at exit gas) , Wd (Wastewater dumping) , GWPR, GDP (GDP increase ratio)

7.2. Increase of CO₂ fix and grain production by increase of firm land (ref 53)

The energy which sun give to earth is about 10 thousand times of energy which mankind need. Plant can accept this energy directly and do CO₂ assimilation

1 hectare (100 m x 100m) of sea jungle can 32-92 tone CO₂, wood can fix 7.5 tone CO₂, rice field can fix 18 tone CO₂ and produce 6 tone rice. If plant wheat at winter time, 36 tone CO₂ is fixed. There is 0.81 million hectare uncultivated land. If we plant rice, then 145.8 million tone CO₂ is fixed. And if we plant rice and wheat at 1.52 million rice field, 15.2x 36 = 547.2 million ton CO₂ will be fixed. If Japan government pay small part of Global warming protection money 30 billion \$ for the recovery of non cultivated land to rice field and for the support of wheat production. Then 547 million tone CO₂ is fixed and 350 million tone grain is produced and country side is reactivated and global warming is protected.

In such way, we should activate CO₂ assimilation at sea and land, CO₂ fix increase and global warming is protected. and GWPR become under 1. Many grain and fish, sea weed Nori are produced. GDP increase rate will increase more than 6 %. Population will increase and national prosperity will be obtained.

8. Conclusion

Global warming is caused by scare of nitrogen and phosphorous by the elimination of NO_x and NP. By developed countries If developed countries stop NO_x, NP elimination, and add fertilizer to sea, CO₂ assimilation and CO₂ fix is activated. GWPR become lower than 1 GDP increase rate become high by the increase of food production. Global warming will stop and national wealth will increase.

Compliance with ethical standards

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