



25th IVR World Congress  
LAW SCIENCE AND TECHNOLOGY  
Frankfurt am Main  
15–20 August 2011

**Paper Series**

No. 018 / 2012

Series C

Bioethics / Medicine / Technology / Environment

*Hiroshi Kabashima*

Social Costs, Limits to Growth,  
Right to Growth: An Approach to the  
Global Environment oriented to  
Philosophy of Law

URN: urn:nbn:de:hebis:30:3-248766

This paper series has been produced using texts submitted by authors until April 2012.  
No responsibility is assumed for the content of abstracts.

Conference Organizers:

Professor Dr. Dr. h.c. Ulfrid Neumann,  
Goethe University, Frankfurt/Main  
Professor Dr. Klaus Günther, Goethe  
University, Frankfurt/Main; Speaker of  
the Cluster of Excellence “The Formation  
of Normative Orders”  
Professor Dr. Lorenz Schulz M.A., Goethe  
University, Frankfurt/Main

Edited by:

Goethe University Frankfurt am Main  
Department of Law  
Grüneburgplatz 1  
60629 Frankfurt am Main  
Tel.: [+49] (0)69 - 798 34341  
Fax: [+49] (0)69 - 798 34523

## **Social Costs, Limits to Growth, Right to Growth:**

### **An Approach to the Global Environment oriented to Philosophy of Law**

*Abstract: The main Question of this paper is: how can we tackle the global warming in accordance with the economical growth especially in emerging countries?*

*K. W. Kapp, "The Social Costs of Private Enterprise" (1950), defines the social costs as direct or indirect damages which are not compensated by the producer, but added to the third parties. An example might be the disaster of the BP plant in April 2010, in which the polluter can hardly cover all the damages so as to make the seawater clean, to regenerate the harmed natural lives and to recover the jobs and the everyday life of the residents on site.*

*The Club of Rome, "The Limits to Growth" (1972), makes us aware of the five conditions which set the limits to growth: population, industrialization, pollution, consumption of food and natural resources, which tendentiously increase in a exponential progression. The GDP growth 10% a year means that it will be 2.59 times as large in ten years, whereas technology could resolve problematic concerning five elements at highest in arithmetical progression.*

*Remarkable would be that the modern industrial civilization has brought social damages in form of global warming. Developed nations have not payed for it yet. All the people in the world should have right to economical growth at any rate, which would however be limited by those five conditions. Conclusion: the developed nations should give up the consumption lifestyle for the sake of equal right of every citizen in the world to reasonable standard of living.*

*Keywords: global environment; global warming; climate change; Karl William Kapp; social costs; social damages; the Club of Rome; limits to growth; exponential progression; CO<sub>2</sub> emission; Kyoto Protocol; emerging countries.*

#### **I. Problematic**

Climate change is one of the most important issues in the international as well as domestic public policy, with which are concerned not only ecologically oriented, but also many usual citizens in the whole world. My report on hand will focus on that question, which aspects should be taken into consideration in view of the idea of justice, so as to reach a worldwide consensus and establish a solid foundation for legal measures tackling global warming. In the next section should be treated current circumstances in political as well as academic discussions around the issue of climate change. In the section three should be examined the

---

\* Professor for Jurisprudence at the School of Law, Tohoku University.

discussion of Karl William KAPP<sup>1</sup> in the field of political economics, who tried to clarify the environmental problems in view of “social costs” which are not able to be compensated within the market mechanism. In the section four should be retraced the report of the Club of Rome, “Limits to growth”<sup>2</sup>, which has considerably influenced the international public opinion concerning human environment and sustainable development. With a view to the problematic of “exponential growth”, it tried to make people aware that the uncontrolled competition in the private economy would lead to the limits to growth like as environmental problems.

The theme of global environment has been discussed since the end of the World War II in different academic fields. In the international public policy, it has been comprehensively picked out every ten years, firstly at “The United Nations Conference on the Human Environment” (UNCHE) in 1972 in Stockholm, ten years after that at the Stockholm plus ten conference in 1982 in Nairobi founding “The United Nations Environment Program” (UNEP), then at “The United Nations Conference on Environment and Development” (UNCED) in name of “Earth Summit” in 1992 in Rio de Janeiro, and lastly at “The World Summit on Sustainable Development” (WSSD) nicknamed "Rio+10" in 2002 in Johannesburg. Through discussions in those political practices, the central matter of the international environmental politics has arisen out of the conflict of national interests between developed and emerging as well as developing countries concerning the question, who are responsible for the environmental damage past and present, and who should therefore cover the costs for its recovery and conservation. In the section five should be sought for a guiding principle in such conflicts regarding right to growth.

My report on hand would thus like to identify our tasks in an international discourse for legal philosophy, particularly through reviewing the history of ideas about the theme of environment, because philosophical consideration on right, law and justice could suggest the importance of cooperation among the peoples, which would be a necessary condition for resolving the issue.

## **II. Discussions about climate change in politics and sciences**

More than 190 nations, and more than 120 leaders of them, attended the 15th Conference of the Parties of the United Nations Framework Convention on Climate Change (COP 15) in

---

1 Kapp, Karl William: *The social costs of private enterprise*, Cambridge, Mass.: Harvard UP 1950. (Kapp, K. W. 1910-1976)

2 Meadows, Donella H. et al., *The limits to growth: a report for the Club of Rome's project on the predicament of mankind*, 14th printing, New York: Universe Books 1974 (first printing 1972).

Copenhagen in December 2009<sup>3</sup>, which set itself targets to introduce comprehensive measures against global warming after the periods of the Kyoto Protocol not only for developed countries, but also for the other ones. According to the Kyoto Protocol adopted in 1997, the developed countries as a whole should cut 5 % emissions of green house gases from 2008 up to 2012 compared with the standard year of 1990, especially Canada and Japan 6 %, the USA 7 %, the EU countries 8 % and so on. Problems are thereby that the USA has not ratified it meanwhile, and that there are no binding measures for the developing countries. At the COP 15 therefore, the leaders of more than 20 significant countries, including the USA and China, tried to reach the “Copenhagen Accord”<sup>4</sup> binding all the parties up to 2020, the main points of which are that the increase in global temperature should be held below 2 degree Celsius, that developed countries should strengthen the emissions reductions initiated by the Kyoto Protocol and should implement the quantified emissions targets for 2020, that developing countries should implement mitigation actions which should be reported through national communications every two years on the basis of guidelines adopted by the Conference, that financial resources for forestry, technology and so on should be funded by developed countries and provided to developing countries approaching USD 30 billion for the period 2010-2012 so as heading toward a goal of mobilizing jointly USD 100 billion a year for 2020. It could not be, however, endorsed by several countries including Venezuela and Cuba because only the certain powerful countries led and determined the process of negotiation, which was not open and accountable enough to them. The Conference could therefore not adopt the Accord in form of valid international law, but merely take note of it, that means that the party countries recognized the presence of the Accord, which would get validity only through ratification of each party country.<sup>5</sup>

It is said not only that the Copenhagen Accord failed to come into effect, but also that it is neither sufficient nor efficient to tackle the issues of global warming.<sup>6</sup> Some of developing countries together with non-governmental organizations share the critical opinion with oppositional Cuba and Venezuela, remarking that the Accord required developing countries to make a lot of concessions, whereas neither efficiently controlled would be the target of emissions reductions for developed countries, nor sufficient would be the financial as well as technological support for developing from developed countries. Other NGOs criticize that the

---

3 Cf. The United Nations Climate Change Conference in Copenhagen, 7-19 December 2009, URL in internet: [http://unfccc.int/meetings/cop\\_15/items/5257.php](http://unfccc.int/meetings/cop_15/items/5257.php) (last seen on 04/Apr/2011).

4 Copenhagen Accord: Decision 2/CP.15, FCCC/CP/2009/11/Add.1, URL in internet: <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf#page=4> (last seen on 04/Apr/2011); see especially paragraphs 2, 4, 5 and 8.

5 Cf. also Articles in the Japanese newspaper, Kahoku-Shinpo, Sendai, on the 20th Dec. 2009.

6 Cf. Articles in the Japanese newspaper: Kahoku-Shinpo, Sendai, on the 01. Dec. and the 12. Dec. 2010.

USA and China, leading the process of negotiation, shared their national interests with each other in making the Accord insufficient in order not to be bound to it.

The next 16th Conference of the Parties (COP 16) took place in Cancun, Mexico, in December 2010, did not however bring the Copenhagen Accord into force, because Japan rejected the insistence of developing countries that the period of the Kyoto Protocol should be extended to the years after its end of 2012, for the reason that it would be binding only for Japan and the EU, but not for the USA and China. The Conference reached the “Cancun Agreements”<sup>7</sup>, which contains only programmatic sentences for reducing of greenhouse gases, so as to put off setting up the targets of the emissions reductions for the term after the end of the Kyoto Protocol. It might arouse the worry that if the COP 17 in 2011 can not reach any agreements, there will be no more binding measures in international law against greenhouse gases emissions.

Also in the domestic public policy in Japan, there are not sufficient measures against greenhouse gases emissions. Originally in its election campaign in form of manifesto, the Democratic Party of Japan (DPJ), which has come into power since September 2009, made the public commitment that the government would set itself targets to cut 25% emissions of CO<sub>2</sub> equivalent for 2020 and more than 60 % for 2050 compared with the standard year of 2009, and that it would consider to introduce a carbon tax, as well as an efficient emission trading scheme in the domestic exchange market based on the cap-and-trade system, as standard contract provisions for electric power companies to purchase in a fixed rate the electricity generated by renewable energy like as photovoltaic, wind and biomass energy.<sup>8</sup> Because the industry and economic organizations stood against an emission trade scheme, however, the DPJ government decided already in December 2010 to postpone introducing it indefinitely. The cabinet remarked whereas to introduce a carbon tax in 2011 and a purchase scheme in 2013, which seems insufficient, at least to environmental NGOs, so as to reduce 25 % greenhouse gases emissions.<sup>9</sup>

In the academic discussion, there is not always a common understanding about the climate change. The influential position, flowing into the IPCC report<sup>10</sup>, insists that without tackling climate change, the human life in the future will be severely affected. Representative

---

7 The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention: Decision 1/CP.16, FCCC/CP/2010/7/Add.1, URL in internet: <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2> (last seen on 05/Apr/2011).

8 Cf. Democratic Party of Japan: *The Democratic Party of Japan's Policy Platform for Government: Manifesto 2009*, Tokyo 2009, 21 (in Japanese), URL in internet: [http://www.dpj.or.jp/special/manifesto2009/pdf/manifesto\\_2009.pdf](http://www.dpj.or.jp/special/manifesto2009/pdf/manifesto_2009.pdf) (last seen on 09/ Apr/ 2011).

9 Cf. Articles in the Japanese newspaper, Kahoku-Shinpo, Sendai, on the 29th Dec. 2010.

10 Available is now the IPCC Fourth Assessment Report (AR4) and prepared for 2014 the Fifth Assessment Report (AR5), exactly seen in internet: URL: <http://www.ipcc.ch/index.htm> (last seen on the 09/Apr/2011).

of it is so called the “Stern Review” by Nicholas Stern.<sup>11</sup> It estimates, under a business-as-usual (BAU) scenario without actions against global warming, that the global average temperature will probably rise by 2-3°C from the pre-industrial level at the end of 21st century, which will not only affect seriously ecological systems, but also increase a wider range of impacts such as abrupt and large scale climate change. The economical loss will thereby amount, on average, to 5-10 % of global GDP, in poor countries more than 10 %. The present level of greenhouse gases in the atmosphere is ca. 430 ppm CO<sub>2</sub> equivalent measured in 2006, compared with ca. 280 ppm before the Industrial Revolution. Even if the annual flow of emissions does not increase beyond today's rate, the stock of greenhouse gases in the atmosphere will reach double pre-industrial levels before 2050, that is 550 ppm CO<sub>2</sub> equivalent. At this level of CO<sub>2</sub> e, the global average temperature will rise more than 2°C. In order to stabilize at or below 550 ppm CO<sub>2</sub> e, global emissions will need to be reduced by ca. 25 % of the current level up to 2050, which will cost, on average, ca. 1 % of the annual global GDP. Greenhouse gases emissions can be cut in following ways: firstly reducing demand for emissions intensive goods and services as well as establishing a carbon price through a carbon tax, emissions trading or emissions regulation; secondly increasing energy efficiency as well as switching to lower-carbon and high-efficiency technologies; and thirdly removing barriers to behavioral change as well as providing high-quality climate information and tools for risk management as setting standards for adaptation to behavioral change. Although it is difficult to consider all dimension of balancing between developed and developing countries in regard to efforts for sustainable development, those factors should be taken into consideration, namely calculations based on income, historic responsibility and per capita emissions, suggesting that rich countries should take responsibility for emissions reductions of 60-80 % from 1990 levels by 2050. In order to reduce emissions in developing countries in a cost effective way, it will be required to provide institutions for international carbon finance, to develop and apply the emissions trading scheme such as EU ETS to financing carbon programs in developing countries.

About the position of policy makers like as the Stern Review, there are a bunch of skeptical opinions in Japan. Some doubt, from scientific points of view, whether the climate is becoming warmer at all, whether the cause of global warming is greenhouse gases, whether

---

11 Stern, Nicholas: *The Economics of Climate Change: The Stern Review*, Cambridge: Cambridge UP, 2007; see also the internet publication, URL: [http://webarchive.nationalarchives.gov.uk/20110218135816/webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/stern\\_review\\_final\\_report.htm](http://webarchive.nationalarchives.gov.uk/20110218135816/webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/stern_review_final_report.htm) (last seen on 10/Apr/2011), Nicholas Stern (1946-): Professor at the London School of Economics and Political Science (LSE), former the Senior Vice President of the World Bank.

the forecast of global warming is exact, whether influences of global warming are estimated exactly. Others remark curiously on political-economical backgrounds in such ways like as the discourse of global warming comes from an hidden intention to promote the atomic power generation, or as the emission trading scheme is only useful for speculation in a form of money game, etc.<sup>12</sup> Among them, there are many differences in regard of opinion as well as academic significance.

My report on hand will not go into the political as well as academic debates about global warming. It would rather like to identify the issue on which the history of ideas has focused concerning environment. It will make therefore a short survey into the analysis of K. W. Kapp in the political economics in the next section, and into that of the system engineering by the Club of Rome in the section following that.

### **III. “Social costs” and “social damages” by K. W. Kapp**

Central in the Kapp's analysis is the assertions that the market mechanism in its ideal of perfect competition can neither prevent social damages like as environmental destruction, nor distribute social costs efficiently and fairly to the concerned parties.

Departing from the Kapp's explanation, it would be easier to understand what “social costs” are if we would take an example as follows. Brewers or distillers produce and sell beer or whiskey, some consumers of which turn into alcoholic as well known. Some alcoholics are brought into a hospital because of liver disease, others into a detention cell because of misdemeanor in the pub. In such cases, the costs for the hospitalization or detention are covered neither by the producer of beer or whiskey, nor by the seller of it, nor by the alcoholics themselves. Medical facilities or police system, which deal with those problems of alcoholics, are financed mostly by the society as a whole, mainly through public as well as private health insurance or taxation. As seen in this example, production of goods and services incurs the costs neither covered by the producer or seller, nor by the consumers themselves, but certainly by the society as a whole. This is what Kapp named “social costs”, in other words, “social damages”.

Starting with the easy example mentioned above, we can see the outline of Kapp's analysis as follows. The classical economics deals with the phenomena of social costs and

---

12 Cf. well known authors like, Watanabe, T., Ito, K: *Chikyu ondan-ka ron no uso to wana*, Tokyo: Bestsellers 2008 (title: *Lies and traps concerning global warming discussions*); Akasofu, S.: *Tadashiku shiru chikyu ondan-ka*, Tokyo: Seibun-do Shinko-sya 2008 (title: *Knowing exactly global warming*); Maruyama, S.: *Ima sokoni semaru “chikyu kanrei-ka”*, *Jinrui no kiki*, Tokyo: Bestsellers 2009 (title: *“Global cooling” now closing in on, crisis of mankind*); Takeda, K.: *Kagaku-sya ga yomi-toku kankyo mondai*, Tokyo: CMC 2009 (title: *Environmental issues interpreted by a scientist*).



social damages only as untypical exceptions or rather as confusing factors. Francois Quesnay or Adam Smith in the 18th century, for examples, identified the natural economical order as the systematic relation of such elements as price, production cost, profit, wage, rent, capital or whatever. They namely described the order emerging from free economical trades as ideal maximizing the sum of social welfare. In this sense, the classical economics in the 18th century appeared to be embossed with the normative characteristic. The neoclassical economics in the second half of the 19th century modified it from a positivist point of view. Alfred Marshall, for example, perceived that one could not measure the utility of the people in amount of the money in such an extreme situation as earning differentials and inequalities, and that the free function of supply and demand in the market could not always maximize the sum of the national welfare. Arthur Cecil Pigou, as a successor of Marshall, analyzed, within the framework of the neoclassical economics, that the cost for supplying public goods should be covered by the society as a whole. Kapp carried forward the intentions of those neoclassical economists, considered social costs and social rewards as something uneconomical or rather values immeasurable by money, and undertook the task to clarify internal relations between something economical and something uneconomical in the new framework of political economy. The central concern of Kapp's political economy can be seen in the assertions: “the social performance of the free market economy would still fall short of the economic optimum...”, and “the unplanned market economy fails to achieve the maximization of the want-satisfying power of scarce resources.”<sup>13</sup> In these sentences, Kapp does not insist on the planned economy.<sup>14</sup> His assertion would rather like to make aware of circumstances that the disorderly competition in the free market necessarily gives rise to inefficiency in form of social costs, because the human being shows irrational behavior in it and the private enterprise ignores social rewards for humans.

Kapp defines social costs as: “all direct and indirect losses suffered by third persons or the general public as a result of private economic activities”.<sup>15</sup> Production activities of the private enterprise sometimes cause the damage to the health or the property of labors or third persons, or also exhaust rapidly natural riches. Such intangible loss of values is shifted to the wide range of the society in form of social damages, because the private enterprise takes no responsibility for preventing the loss and paying the damage. The causality between production activities and social damages is in some cases direct one as at the accident in the working place where the range of involved workers is limited and the costs for the

---

13 Kapp, K. W.: *The social costs of private enterprise*, FN 1, 10 f.

14 Kapp, op. cit. (FN 1) 24.

15 Kapp, op. cit. (FN 1) 13.

compensation turn up immediately, in other cases indirect one as by the water or air pollution which affects wide range of social activities, and whose costs and damages turn up very slowly. At any case, it is difficult to make the private producer cover all the costs and damages, so as that the involved third persons and the society as a whole must cover them.<sup>16</sup>

Kapp deals with concrete examples of social costs such as lost human resources caused by workplace accidents and occupational diseases, air and water pollution, decreasing and exterminating wild animals and fish, exhausted natural resources of minerals and oil, lost regeneration of agricultural fields and forests, lost values of existing facilities because of technological innovations, compensation of living expenses for jobless, maintenance costs for idle facilities, inefficient production caused by monopoly and ration, or whatever. For an example of them, lost human resources caused by workplace accidents and occupational diseases could be understood as follows.<sup>17</sup> If the worker loses his ability to work because of the workplace accident, his income as well as the quality of his life certainly declines. The public insurance for workplace accident can cover only a part of his damages, so as that he by himself should pay the rest of the costs incurred by the accident. This means that his employer who produces goods or services can get rid of paying at least a part of the production costs. Actually, because the workplace accident or the occupational disease come out inevitably in a certain rate in the production process of goods or services, the cost for compensation should be treated as a part of the production costs. However, so far as the price of goods or services does not include this part of the production costs, neither the producer as his employer nor the consumer need to pay the total cost of the production. In addition, the workplace compensation insurance is partly financed by the public expenditure, substantially by the money of the taxpayers. This is a reason why the victimized worker by himself and the society as a whole should pay a part of the production costs, namely a part of the cost of the workplace accident. Kapp named these costs paid by the third person or by the society the “social costs”. Moreover, it is contradictory that the private enterprise usually raises the reserve fund for depreciation of facilities, but not the fund for loss of human resources, because the damaged worker can be replaced with another worker with the same wages. This is the reason why there is no incentive for the private enterprise to reduce workplace accidents and occupational diseases, so that the amount of the costs and the damages get larger. Furthermore, some workers find the workplace accident or the occupational disease of the others unproblematic and unnecessary to avoid so far as they are not involved in, because the

---

16 Cf. Kapp, *op. cit.* (FN 1) 13 f., 23.

17 Cf. Kapp, *op. cit.* (FN 1) 48 ff.

victimized worker drops out of the workplace, which means the decrease of the competition among the workers.

As seen in this example, we can recognize from a philosophical and ethical point of view that the market mechanism and the free competition in it can neither function efficiently to bring down the social costs, nor distribute them fairly to the responsible and the beneficial persons in view of distributive justice.

About environmental issues, Kapp explains in terms of social costs as follows.<sup>18</sup> Air and water pollution damages properties, human health, ecology of animals and plants, and so on. Not all those social damages are paid by the private enterprise as polluter. It is especially difficult to perceive and calculate how much it costs if the environment and the ecological system is once damaged, because the production ability of the nature keeps on for a long time and the human obtains rewards of it afterward. This is why it is difficult to charge the social costs for recovering the nature to the current account of production.<sup>19</sup> Moreover, it is impossible to recover it if natural resources such as minerals and oil are once consumed and exhausted. Difficulties concerning natural resources are posed under those complicated circumstances. So far as the private enterprise can retain the property right to the natural resource firstly through the actual exploitation in form of acquisition, the interested enterprises must take part in an intense competition for mining and exploitation, that leads to the price down of the natural resource at first because of excessive supply, and then to the sudden rise in price because of the awareness of exhaustion and shortage. In these ways, the free trade of natural resources in the competitive market cannot determine their unit price in an economical equilibrium so as to distribute them effectively. This is one of the reasons why production and consumption of natural resources potentially includes inefficiency incurring a large amount of social costs.<sup>20</sup>

Kapp's analysis of social costs suggests that while the market mechanism of capitalism makes it possible for the private enterprise to achieve economical growth through the free trade in it, it inevitably pushes social costs up and fails to prevent social damages. In this sense, capitalism contains in itself the fault that the market price does not include the full costs in production, at least not the social costs added to the victims or to the third persons. This fault within the capitalist mechanism does not conform to the idea of distributive justice,

---

18 Cf. Kapp, *op. cit.* (FN 1) 67 ff., 80 ff.

19 Cf. Kapp, *op. cit.* (FN 1) 94 ff.

20 Cf. Kapp, *op. cit.* (FN 1) 106 ff. In terms of social costs, we could nowadays consider how many such an environmental disaster causes severe social damages, like as the oil spill from the offshore oil well of the British Petroleum into the Gulf of Mexico in April 2010, or as the radiation releases from the Fukushima 1 Nuclear Power Plant after the enormous earthquake in March 2011.

which requires equitable distribution of right and duty to the concerned parties. In order to realize the idea of distributive justice, it is necessary to calculate the sum of social costs quantitatively based on an exact accounting, and to set up fair conditions in legal institutions for free trade in the competitive market. It is thereby important to identify the rule of costs distribution among the responsible persons who brought the social costs up to the society and the beneficial persons who derived the benefits from the circumstances where the social costs are paid by the victims or also by the third persons.

#### **IV. “Limits to growth” by the Club of Rome**

The Club of Rome is a global think tank in form of non-profit NGO engaging professionals from the fields of diplomacy, industry, academia and civil society, founded in 1968 by an Italian industrialist, Aurelio Peccei, and a Scottish scientist, Alexander King, who “came together to discuss the dilemma of prevailing short-term thinking in international affairs and, in particular, the concerns regarding unlimited resource consumption in an increasingly interdependent world”.<sup>21</sup> They had thereby an intention to raise the awareness of world leaders on the crucial global issues of the future. In seeking for a new approach, they tried to apply the methodology of system engineering, especially computer simulation, so as to analyze the long-term consequences of growing global interdependence. Their first report was published in 1970 with the title: “The Limits to Growth”, edited by Dennis and Donella Meadows and the others from the MIT Project Team.<sup>22</sup> It explores a number of scenarios to reconcile sustainable progress with environmental constraints.

The report focuses mainly on the thesis that it is impossible for the mankind to grow infinitely because of its natural constraints, which consists of those five interrelated elements as population, industrialization, pollution, foods consumption and natural resources. There is a tendency of these five elements toward exponential growth in their mutual influences.<sup>23</sup> The table below displays the exponential growth indicating that the growth rate will be multiplied by itself in the next term, in comparison with the arithmetical growth where the growth rate will be simply added to the original quantity. Taking the original quantity as 1 and the growth rate as 3 %, 7%, or 10 % a year, the quantity after 10 years will be each with 1.34, 1.97, or 2.59 in an exponential growth as well as each with 1.3, 1.7, or 2 in an arithmetical growth.

---

21 The Club of Rome: “The Story of the Club of Rome”, in internet:  
URL: <http://www.clubofrome.org/eng/about/4/> (last seen on 19/Apr/2011).

22 Cf. Meadows, D. et al. (eds), *The limits to growth*, FN 2.

23 Cf. Meadows, D. et al. (eds), op. cit. (FN 2) 25 ff.

	exponential	arithmetical	exponential	arithmetical	exponential	arithmetical
year / rate	3%		7%		10%	
starting year	1.00	1	1.00	1	1.00	1
after 1 year	1.03	1.03	1.07	1.07	1.10	1.1
after 2 years	1.06	1.06	1.14	1.14	1.21	1.2
3 years	1.09	1.09	1.23	1.21	1.33	1.3
4 years	1.13	1.12	1.31	1.28	1.46	1.4
5 years	1.16	1.15	1.40	1.35	1.61	1.5
6 years	1.19	1.18	1.50	1.42	1.77	1.6
7 years	1.23	1.21	1.61	1.49	1.95	1.7
8 years	1.27	1.24	1.72	1.56	2.14	1.8
9 years	1.30	1.27	1.84	1.63	2.36	1.9
10 years	1.34	1.3	1.97	1.7	2.59	2

Thomas R. Malthus is the first one who pointed out in his book “An Essay on the Principle of Population”, published from 1798 to 1826, that the exponential growth of population would bring serious problems in the economical and social life of human beings. His remark is that the foods production cannot catch up with the population growth, because the farmland can be developed at highest in arithmetical increase, whereas the population grows exponentially. Originality in the report of the Club of Rome can be seen in its aim to give the public opinion a warning that not only population, but also the other conditions for human life such as industrialization, pollution, foods production and natural resources are related with each other in terms of their exponential growth, so that they would take a harmful influence to the human existence. The table above shows for example, if the industrialization of a country brings about an increase in its Gross Domestic Product (GDP) by 7% a year, the GDP will become 1.97 times as large in ten years, even if there is no increase in population in this term. It suggests thereby that natural resources of water, oil, or minerals will be consumed double so much as before, and that pollution will become double so serious. In these circumstances, it could be doubted for good reason, whether the technology could make a progress enough to catch up with the increase of problems. At any rate, technology is conditioned by its own logic, and does not develop until the problem arises, as our historical experiences teach us a lesson.<sup>24</sup> The more rapidly and seriously the problem such as pollution or exhaustion of natural resources would arise, the more difficult it would be to solve it through the technological innovation.

---

24 Cf. Meadows, D. et al. (eds), op. cit. (FN 2) 129.

The report of the Club of Rome applies the methodology of computer simulation to the fields of public policy and calculates how far the mankind should control the increase in population or also in energy consumption in order to avoid crises of human existence. Today, 40 years after the publication of the report, the mankind has luckily no experiences of such a crisis yet, partly because the main parties in the international public policy have cooperated with each others in carrying prescriptions in the report into practice, partly because the calculation in the report was not exact enough to predict the human future because of unknown factors affecting it. At any rate, it is not a matter in my report on hand to improve the computer simulation of how the human future looks like based on newly acquired scientific knowledge, but to examine how significant the report of the Club of Rome remains in the history of ideas, so as to find out a moral compass for human activities at present and in the future.

## **V. Limits to growth, right to growth**

Although the international society has already recognized, in the normative level, the equality of each nation and the human rights of each individual, there are, however in reality, huge gaps between rich and poor nations or rather also individuals, which is getting larger and larger.<sup>25</sup> In these circumstances, income and the standard of living of the citizens in emerging countries, especially in Brazil, Russia, India, China, and the South Africa, so-called the BRICS, is rapidly increasing. As seen above however, there are certain limits to growth for them, so as to develop themselves endlessly at a growth rate of 7% a year or more. One of the most difficult issues to resolve is, needless to say, global warming caused by excessive consumption of fossil fuels. We should tackle these problems which determine the limits to growth, while we should, at the same time, recognize to all the individuals in the world their own right to becoming rich and enjoying an high standard of living. In other words, it is not a privilege of the citizens in the OECD countries to be rich and enjoy a comfortable and cultural life, for which a certain amount of fuel consumption is necessary. One of the most significant factors thereby is the fact that the population in the BRICS countries is more than double as larger as in the OECD countries.<sup>26</sup> From this point of view, we could focus on the task of the

---

25 In regard to the Least Developed Countries (LDCs), cf. The United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and the Small Island Developing States (UN-OHRLLS), "Least Developed Countries: About LDCs", in internet

URL: <http://www.unohrlls.org/en/ldc/25/> (last seen on 29/Apr/2011); also within the developed countries, the gap between the rich and the poor can not be treated as marginal any more, cf. Ehrenreich, Barbara: *Nickel and dimed: on (not) getting by in America*, Waterville, ME: Wheeler Pub., 2003.

26 The level of population in millions in 2007 is total 6,671.227 in the world, 190.120 in Brazil, 141.941 in Russia, 1,128.521 in India, 1,329.090 in China, 49.173 in South Africa, so as 2,838.845 in the whole BRICS,

international society to harmonize the right of individuals to wealth and better life with the limits to economical growth of the whole world.

In order to pursue this matter, we would take the increasing Chinese economy as an example of BRICS. Since 1990, the Chinese economy has increased in the growth rate of more than 10 % a year in average, so as that the Chinese Gross Domestic Product in 2005 amounted 4.26 times as large as in 1990, and the similar growth rate has been and will be kept also in the years after 2005. In parallel with the economical growth, the CO<sub>2</sub> emission from energy use in China in 2005 increased 2.27 times as much as in 1990.<sup>27</sup> According to the report of the Club of Rome, the energy consumption increases in exponential growth and brings energy resources to being exhausted, even though the technological innovation makes the energy use more efficient. In addition, it raises the problem of the heat pollution, the phenomenon that the temperature rises in the near of the heat source with high energy consumption, which causes local abnormal weather such as urban heat island, short of water, or also a bad influence on the ecology.<sup>28</sup> The heat pollution will remain problematic as one of the causes of global warming, even when the nuclear energy is used in place of fossil fuels so as to reduce emissions of green house gases. Even in the optimistic scenario of successful control over the population growth, the Chinese economy would, sooner or later, confront with limits to growth determined by pollution, short of water, exhaustion of natural resources or whatever, if it would carry forward the development and industrialization of all the society with huge population in the growth rate of 7 % a year or more.

At the same time, the Chinese citizens have their own right to earning more income by working and to enjoying a higher standard of living. This individual right to personal development should not be restricted for the reason that the national economy would confront with the limits to growth. At least, their economical right should be equal to that of the citizens in the OECD countries in terms of income and the standard of living. In the reality however, the average income of a Chinese in 2008 amounts 3,403.52 USD in conversion, which is 11 times as low as 38,271.39 USD of a Japanese in conversion and 14 times as low as 47,392.75 USD of an US American.<sup>29</sup> In order that the average income of a Chinese would be equal to that of an US American, the Gross Domestic Product in China should be about 60 times as large as the current amount, because the population of 1,329.090 millions in China in

---

whereas 301.128 in the USA, 127.771 in Japan, and 1,183.167 in the 30 OECD countries; cf. OECD Factbook 2010, in internet URL: [http://www.oecd-ilibrary.org/economics/oecd-factbook\\_18147364](http://www.oecd-ilibrary.org/economics/oecd-factbook_18147364) (last seen on 29/Apr/2011).

<sup>27</sup> Cf. the table 1, 2 below.

<sup>28</sup> Cf. Meadows, D. et al. (eds), op. cit. (FN 2) 73 f.

<sup>29</sup> Cf. the table 1 below.

2007 is about 4.4 times as large as that of 301.280 millions in the USA. This would be however impossible to realize because of the limits to growth, which means that it is impossible for the Chinese people to realize their own right to being as rich and to enjoying the same standard of living as an US American because of the constraints of global environment, even though they have the desire and the competence to do it.

Generally formulated, it seems to be impossible for all the citizens in the world to realize the right to earning the same income and enjoying the same standard of living as the citizens in the OECD countries. These circumstances do not conform to the idea of distributive justice, if the right to economical wellbeing would be only endorsed in the theory, but not in the reality. If the citizens in the OECD countries might try to maintain their acquired privilege of wage and consumption lifestyle in the name of environmental conservation, the citizens in the other countries could have no chance to participate in such a privilege. In order to avoid this unjust situation, it would be necessary to find out a common standard of income and consumption appropriate to all over the world, which would compel the citizens in the OECD countries to bring down their standard of living.

Though this would be a severe condition for the citizens in developed countries, we could easily understand it assisted by the Kapp's analysis. What he teaches us today, is that the global market mechanism, within which each national state keens on its GDP increase under the WTO rules of free trade and investment, contains in itself neither control mechanism to avoid the social damages, nor institutional system to distribute social costs fairly to the concerned parties. The global warming at present is social damages of the whole world caused by the product activities mainly in developed countries, long term effects of which become actual today to push up the social costs for managing it. It can be also said that developed countries could accumulate their wealth in form of capitals because they could shift the social costs incurred by their production activities onto the following generations and the developing countries. They are not, however, willing to pay the social damages and the social costs for recovering global environment, but trying to control the economical growth of developing countries in the name of climate change as a human crisis. In these circumstances, they should rather pay the social costs by themselves, because their industrialization and mass production is the main cause for the climate change and global warming. This would mean at any rate that the citizens in developed countries should give up a part of their income and consumption and cover the social costs for the environmental conservation with their accumulated wealth. If they bring down their standard of living, the way to the enrichment will be open also to the citizens in emerging as well as developing countries, so as that we can



find out an equilibrium concerning income, consumption and the standard of living, which should be accepted by all the citizens in the world.

From this point of view, such an authoritative discussion as the "Stern Review" does not show a sufficient concern that the social costs incurred by developed countries since the industrial revolution should be estimated based on scientific calculation and distributed to the responsible and the beneficial parties. The Stern Review is coming from the premise that the costs for the global warming and the benefits of the economical growth will be optimal if the increase in global temperature should be held below 2 degrees Celsius compared with the standard before the Industrial Revolution, but it fails to consider the ethical question who should pay the costs for it in order to distribute them fairly after the idea of justice. The same problem is involved also in the principle of "common but differentiated responsibilities" (CBDR) provided in the paragraph 1 in the article 3 of the "United Nations Framework Convention on Climate Change" agreed in 1992.<sup>30</sup> The principle of CBDR indeed acknowledges that there are differences in regard to the responsibility for the global warming between developed and developing countries, but does not know who should pay the costs for it, and how many, so as to distribute them fairly based on scientific calculation and knowledge. Because there is no objective framework for costs distribution, it is difficult in the international conference on the climate change to reach an agreement about international public policy between developed and developing countries.

## **VI. Closing words**

We have conducted a short survey on discussions about environment in the history of ideas. It is clarified that the economical growth through free trade in the competitive market will reach the limits set by global warming or also exhaustion of natural resources, and that the market mechanism can not distribute social costs efficiently and fairly to the concerned parties. In current circumstances of the international society, neither the citizens in developed countries will agree on reducing the acquired standard of living, nor the citizens in emerging as well as developing countries will give up realizing their own right to becoming rich and enjoying a modern life. Here arise conflicts of interests between rich and poor nations, which are comparable with those between the ancient regime and the bourgeoisie in the modern revolutions, where the oligarchies would not abandon their feudal status and privileges while the bourgeoisie would get over the feudal obstacles to their economical growth. The result of the modern revolutions is the victory of the bourgeoisie over the oligarchies. How about the

---

30 Cf. United Nations Framework Convention on Climate Change by the United Nations in 1992, in internet URL: <http://unfccc.int/resource/docs/convkp/conveng.pdf> (last seen on 30/Apr/2011).

current conflicts in terms of the global environment? So far as S. Huntington predicted that the international relation in the 21st century would be characterized as "clash of civilizations"<sup>31</sup>, we might consider the environmental conflicts between the USA and China as the clash between the American consumption way of living and the Chinese myth of eternal growth. By all means, it is impossible for the both of developed and developing countries to continue to increase production activities and energy consumption without any restriction.

It would be a good occasion for us to remember the ancient ethics in order to find out a moral compass for the future, namely, being moderate in wants, brave in straggle, wise in thinking and harmonious in these virtues, which leads you to just condition in your mind. We, the citizen of the world society, should be content with a moderate standard of living, have courage to tackle human crises, and consider seriously living together with each other on the earth. Our common goal would be to develop our co-existence in a harmonious condition. In this way, my report on hand is an attempt to reflect upon environmental issues in view of the history of ideas.

Address:

KABASHIMA Hiroshi, Aoba-ku Kawauchi 27-1, 980-8576 Sendai/ Japan.

---

31 Huntington, Samuel P.: *The clash of civilizations and the remaking of world order*, New York: Touchstone, 1997.

GDP in China, Japan, USA 1990-2015 Based on: International Monetary Fund, World Economic Outlook Database, April 2010

Country	China		China		Japan		Japan		Japan		United States		United States		United States	
	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices	Gross domestic product, constant prices
Units	RMB	USD	Units	USD	JPY	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD	USD
Scale	Billions	Billions	Units	Billions	Billions	Billions	Billions	Billions	Billions	Billions	Billions	Billions	Billions	Billions	Billions	Units
1990	1,934.78	390.28	341.35	445,170.99	5.2	3,030.05	24,547.04	8,033.93	1.88	5,800.53	23,197.70	8,033.93	1.88	5,800.53	23,197.70	23,197.70
1991	2,112.78	409.17	353.27	460,087.31	3.35	3,464.93	27,959.08	8,015.13	-0.23	5,992.10	23,647.57	8,015.13	-0.23	5,992.10	23,647.57	23,647.57
1992	2,412.79	488.22	416.68	464,559.25	0.97	3,781.78	30,408.22	8,287.08	3.39	6,342.30	24,699.63	8,287.08	3.39	6,342.30	24,699.63	24,699.63
1993	2,750.68	613.22	517.41	465,709.45	0.25	4,340.89	34,791.19	8,523.45	2.85	6,667.33	25,629.13	8,523.45	2.85	6,667.33	25,629.13	25,629.13
1994	3,110.92	559.23	466.6	470,856.50	1.11	4,778.99	38,196.39	8,870.68	4.07	7,085.15	26,906.53	8,870.68	4.07	7,085.15	26,906.53	26,906.53
1995	3,450.93	727.95	601.01	479,716.40	1.88	5,264.38	41,968.58	9,093.75	2.52	7,414.63	27,826.60	9,093.75	2.52	7,414.63	27,826.60	27,826.60
1996	3,795.92	856	699.41	492,367.90	2.64	4,642.55	36,930.26	9,433.93	3.74	7,838.48	29,076.55	9,433.93	3.74	7,838.48	29,076.55	29,076.55
1997	4,148.89	952.65	770.59	500,066.40	1.56	4,261.84	33,821.23	9,854.35	4.46	8,332.35	30,541.33	9,854.35	4.46	8,332.35	30,541.33	30,541.33
1998	4,472.41	1,019.48	817.15	489,820.70	-2.05	3,857.03	30,526.86	10,283.53	4.36	8,793.48	31,857.84	10,283.53	4.36	8,793.48	31,857.84	31,857.84
1999	4,812.33	1,083.29	861.21	489,130.00	-0.14	4,368.73	34,511.71	10,779.85	4.83	9,353.50	33,501.68	10,779.85	4.83	9,353.50	33,501.68	33,501.68
2000	5,216.69	1,198.48	945.6	503,119.80	2.86	4,667.45	36,800.44	11,225.98	4.14	9,951.48	35,251.93	11,225.98	4.14	9,951.48	35,251.93	35,251.93
2001	5,650.09	1,324.81	1,038.04	504,047.50	0.18	4,095.48	32,214.33	11,347.18	1.08	10,286.18	36,064.52	11,347.18	1.08	10,286.18	36,064.52	36,064.52
2002	6,164.48	1,453.83	1,131.80	505,369.40	0.26	3,918.33	30,756.08	11,552.98	1.81	10,642.30	36,949.99	11,552.98	1.81	10,642.30	36,949.99	36,949.99
2003	6,781.11	1,640.96	1,269.83	512,513.00	1.41	4,229.10	33,134.47	11,840.70	2.49	11,142.18	38,324.38	11,840.70	2.49	11,142.18	38,324.38	38,324.38
2004	7,466.33	1,931.65	1,486.02	526,577.70	2.74	4,605.94	36,058.72	12,263.80	3.57	11,867.75	40,450.62	12,263.80	3.57	11,867.75	40,450.62	40,450.62
2005	8,243.06	2,235.93	1,710.00	536,762.20	1.93	4,552.19	35,633.04	12,638.38	3.05	12,638.38	42,680.64	12,638.38	3.05	12,638.38	42,680.64	42,680.64
2006	9,199.76	2,657.85	2,021.98	547,709.30	2.04	4,362.58	34,150.33	12,976.25	2.67	13,398.93	44,822.96	12,976.25	2.67	13,398.93	44,822.96	44,822.96
2007	10,397.22	3,382.44	2,559.95	560,650.80	2.36	4,377.96	34,267.77	13,254.05	2.14	14,077.65	46,629.69	13,254.05	2.14	14,077.65	46,629.69	46,629.69
2008	11,390.57	4,519.94	3,403.52	553,960.70	-1.19	4,886.96	38,271.39	13,312.18	0.44	14,441.43	47,392.75	13,312.18	0.44	14,441.43	47,392.75	47,392.75
2009	12,385.54	4,908.98	3,677.86	525,170.70	-5.2	5,068.06	39,731.04	12,987.35	-2.44	14,256.28	46,380.91	12,987.35	-2.44	14,256.28	46,380.91	46,380.91
2010	13,629.09	5,364.87	3,999.41	535,130.09	1.9	5,272.94	41,365.76	13,390.07	3.1	14,799.56	47,701.81	13,390.07	3.1	14,799.56	47,701.81	47,701.81
2011	14,979.43	5,987.55	4,441.41	545,646.79	1.97	5,377.43	42,239.45	13,731.56	2.55	15,397.16	49,158.60	13,731.56	2.55	15,397.16	49,158.60	49,158.60
2012	16,445.79	6,698.89	4,944.34	556,750.88	2.04	5,548.57	43,653.12	14,060.91	2.4	16,048.20	50,752.58	14,060.91	2.4	16,048.20	50,752.58	50,752.58
2013	18,034.64	7,504.21	5,511.17	566,706.29	1.79	5,744.20	45,278.55	14,412.99	2.5	16,761.26	52,506.30	14,412.99	2.5	16,761.26	52,506.30	52,506.30
2014	19,771.14	8,414.66	6,149.07	576,954.45	1.81	5,972.12	47,179.49	14,757.92	2.39	17,490.34	54,272.00	14,757.92	2.39	17,490.34	54,272.00	54,272.00
2015	21,646.43	9,436.84	6,861.73	586,934.32	1.73	6,192.11	49,041.02	15,110.61	2.39	18,249.56	56,092.27	15,110.61	2.39	18,249.56	56,092.27	56,092.27
Estimates																
Start After	2008	2008	2008	2008	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009	2009

CO<sub>2</sub> EMISSIONS FROM ENERGY USE (e), 1980-2005  
TOTAL EMISSIONS OF MAJOR GREENHOUSE GASES\*, 1990-2005

	China	Japan	USA	OECD Europe	EU15	OECD	World
	CO <sub>2</sub> EMIS- SIONS million tonnes	CO <sub>2</sub> EMIS- SIONS million tonnes	CO <sub>2</sub> EMIS- SIONS million tonnes	TOTAL EMIS- SIONS CO2 equivalent 10000 t	TOTAL EMIS- SIONS CO2 equivalent 10000 t	TOTAL EMIS- SIONS CO2 equivalent 10000 t	CO <sub>2</sub> EMIS- SIONS million tonnes
	growth rate in %	growth rate in %	growth rate in %	growth rate in %	growth rate in %	growth rate in %	growth rate in %
	TOTAL EMIS- SIONS CO2 equivalent 10000 t	TOTAL EMIS- SIONS CO2 equivalent 10000 t	TOTAL EMIS- SIONS CO2 equivalent 10000 t	TOTAL EMIS- SIONS CO2 equivalent 10000 t	TOTAL EMIS- SIONS CO2 equivalent 10000 t	TOTAL EMIS- SIONS CO2 equivalent 10000 t	TOTAL EMIS- SIONS CO2 equivalent 10000 t
	growth rate in %	growth rate in %	growth rate in %	growth rate in %	growth rate in %	growth rate in %	growth rate in %
1980	1418	869	4668				18085
1981	1406	846	4602				17656
1982	1465	825	4371				17675
1983	1539	832	4346				17798
1984	1677	891	4532				18382
1985	1725	872	4556				18683
1986	1829	872	4533				19034
1987	1967	879	4680				19677
1988	2115	947	4886				20369
1989	2196	975	4944				20759
1990	2244	1068	4850				21024
1991	2360	1066	4822				21078
1992	2468	1076	4891				20968
1993	2689	1075	5036				21172
1994	2781	1125	5110				21284
1995	3022	1141	5109				21808
1996	3195	1155	5290				22512
1997	3133	1150	5436				22663
1998	3197	1119	5485				22819
1999	3090	1157	5530				22981
2000	3077	1172	5701				23487
2001	3123	1157	5623				23599
2002	3346	1194	5653				24076
2003	3871	1203	5712				25090
2004	4587	1201	5792				26520
2005	5101	1214	5817				27136
variation % Since 1990							

Based on: IEA, CO<sub>2</sub> Emissions from Fuel Combustion 2009 – Highlights, URL: [http://www.iea.org/publications/free\\_new\\_Desc.asp?PUBS\\_ID=2143](http://www.iea.org/publications/free_new_Desc.asp?PUBS_ID=2143); OECD Environmental Data COMpendium 2006/2007, URL: <http://www.oecd.org/dataoecd/60/12/38105210.pdf>; UNFCCC, Data for greenhouse gas (GHG) total, URL: [http://unfccc.int/ghg\\_data/ghg\\_data\\_unfccc/time\\_series\\_annex\\_i/items/3814.php](http://unfccc.int/ghg_data/ghg_data_unfccc/time_series_annex_i/items/3814.php); The World Bank Databank, CO<sub>2</sub> emissions (kt), URL: <http://data.worldbank.org/topic/environment> (last seen on 2010/06/29)