28. Global Population Problem of Developing Countries

発展途上国の地球的人口問題

Etsuo YAMAMURA*

山村悦夫

ABSTRACT ; The population projection for the world and the two major continents namely Asia and Africa are indicated. The fact that about 80 percent of the world's population is likely to live only in the two major contients namely Asia and Africa. Moderate increase in population is expected prevail in South and North American countries. The increase in population in Europe, Soviet and Oceania represent a low and stable in crease.

The population potential rate (PTM/METSM) for Asia are 1.09 and 1.24 respectively. The population potential rate for Africa is greater than Asia, which implies that Africa will face to a serious environmental threat.

KEYWORDS; Developing countries, Population problem, Global environment.

1. Introduction

These has been a pronounced deterioration of living environment around the would threatening the very existence of living organisms on earth. The uncontrolled and widespread human activities have been causing serious damage leading to unstableness in achieving sustainable environment.

The developed countries have been gradually getting economically disadvantaged by the poisonous waste accumulated in air, water and soil. The poisonous waste products begin to harm crops, forests, fisheries, livestock and also human being, particularly the newborns.

In the developing counties, poverty causes a widespread and steady degradation of the productive capacity of woodlands, rangelands and agricultural soils, caused by inappropriate deforestation, overstocking of pastures, overharvesting of cropland and woodland as well as overexploitation of fragile and other marginal lands. The struggle to obtain enough water, food, wood fuel and shelter for daily survival from a dwindling resource-base may result in public unrest, even civil conflict and the migration of environmental refugees, and in extreme cases, it can bring about destabilization of a country.

2. Population projection

The gravity of the environmental deterioration in will be increased manifold by population explosion that is likely to take countries in the near future.The major urban countries in the world in general and Asian and African continents especially are likely to be flooded with high level of population influx.The population projection made using both Present Trend Method (PTM)* and Modified Exponential Time Series Method (METSM)** for the world, the two major continents namely Asia and Africa, major countries in the world and important cities indicate that drastic

＊Graduate School of Environmental Earth Science Hokkaido University　北海道大学大学院地球環境科学研究科

increase in population will continue to pose a serious threat.

The table 1.1 indicates the population projection for the world and the two major continents namely Asia and Africa. The table 1.1 indicates the fact that about 80 percent of the world's population is likely to live only in the two major continents namely Asia and Africa. Moderate increase in population is expected prevail in South and North American countries. The increase in population in Europe, Soviet and Oceania represent a low and stable increase.

The population potential rate (PTM/METSM) for Asia and Africa are 1.09 and 1.24 respectively. The population potential rate for Africa is greater than Asia,which implies that Africa will face to a serious environmental threat.

The table 1.2 illustrates the population projection for some of the major countries which have been registering a high level of population growth. The population potential rates for China, India, Nigeria and Brazil are 1.146, 1.022, 1.273 and 1.019 respectively. Nigeria in Africa registers the highest population potential rate.

The table 1.3 explains the population increase in some of the major cities. The population potential rates for Djakarta, Bangkok and Madras are 1.041, 1.168 and 1.026 respectively. Bangkok city registers the highest population potential rate. In addition to these national and regional problems, we face the global environmental changes such as Acidification, Ozone depletion and the Greenhouse effect caused by high waste of developed countries. The global environmental problems are likely to have quite serious impacts which in turn may lead to the disadvantage of all nations worldwide in the coming decades.

The problem of acid precipitation from burning of fossil fuels is the single largest environment problem connected to energy today. Large areas in the world, especially in Europe and North America are affected with the results of widespread forest damage and decline of forest agricultural productivity. Many countries receive much more acid precipitation from other countries than what they discharge for themselves. The problem of air pollution and acidification which was rather a regional problem a few decades ago is now rapidly becoming a global problem.

Deforestation and associated desertificatiton, partly due to the very complicated and poorly understood social ecological processes, are primarily caused by expanded agriculture and associated overgrazing, industrial, needs large-scale export oriented forestry and an ever-increasing demand for energy from the growing city population.

Release of Carbon Dioxide from fossil fuel combustion, deforestation to a certain extent and a number of other gases discharged from certain industrial and biological sources result in a build-up of Greenhouse effect in the atmosphere. This process has the potential to change the Earth's climate profoundly in the near future. It is expected that if the present trends are to continue the level of Carbon Dioxide in the middle of the next century will be double, the level before the Industrial Revolution. This means that the mean temperature would arise (1.5 to 4.5 centigrads) and the sea-levels would also rise (20-100 centimeters). Large areas in the world would be vulnerable to the rise in the sea level. Flooding will certainly damage the shallow countries such as Bangladesh, Nile Delta, Netherlands island nations such as the Seychelles and the Maldives, and other several estuaries and harbours.

3. Conclusion

It is possible to state several reasonable definitions for a sustainable world from the technological sense. But, the necessary policy directions or the institutional framework are get to emerge. The sustainable world of the future we intend to seek is one in which adequate supply of commodities and /or services to satisfy people's want is guaranteed for centuries, at the same time, the resultant environmental consequences do not constitute on unacceptable burden on the society. Thus it becomes necessary to investigate a number of paths which converge towards the reference

model (sustainable world) . The adaptive process of the system and its stability with the aid of Model Reference Adaptive System is to the sustainable world, once the reference world is established.

Table 1.1 Projected population for the world and the two major continents-Asia and Africa.

Reference Area	Method of projection	Population in Billions					
		years					
		2000	2010	2020	2030	2040	2050
World	PTM	6.26	7.20	8.07	8.80	9.71	10.61
	METSH	6.26	7.10	7.55	8.39	9.04	9.66
Asia	PTM	3.71	4.23	4.68	5.18	5.71	6.25
	METSM	3.71	4.23	4.48	4.99	5.37	5.72
Africa	PTM	0.86	1.14	1.44	1.63	1.85	2.07
	METSM	0.86	1.04	1.13	1.34	1.50	1.67

Table 1.2 Projected population for major countries

Reference Area	Method of projection	Population in Billions					
		years					
		2000	2010	2020	2030	2040	2050
China	PTM	1.29	1.39	1.47	1.65	1.79	1.93
	METSH	1.29	1.39	1.47	1.54	1.54	1.64
India	PTM	1.04	1.22	1.31	1.47	1.64	1.80
	METSH	1.04	1.22	1.31	1.46	1.63	1.73
Nigeria	PTM	0.150	0.200	0.250	0.290	0.325	0.364
	METSM	0.150	0.170	0.200	0.230	0.260	0.286
Brazil	PTM	0.179	0.207	0.233	0.257	0.286	0.314
	METSM	0.179	0.207	0.233	0.256	0.284	0.308

Table 1.3 Projected population for major cities

Reference Area	Method of projection	Population in Millions					
		years					
		2000	2010	2020	2030	2040	2050
Djakarta	PTM	10.48	12.83	15.17	17.52	19.87	22.22
	METSH	10.48	12.83	15.17	16.97	18.88	20.75
Bankok	PTM	6.65	8.65	10.66	12.66	14.67	16.67
	METSM	6.65	8.65	9.76	11.39	12.83	14.27
Madras	PTM	7.17	8.61	10.06	11.50	12.95	14.40
	METSM	7.17	8.61	10.06	11.46	12.78	14.04

* The PTM method of population projection includes birth and death rates and the upward mobility of age group with respect to time.

** The METSM method of population projection includes the following equation $Y = K - a \cdot b^{t}$. where, $a > 0$ and $0 < b < 1$ or $a < 0$ and $0 < b < 1$. The estimation of K indicates upper or the lower boundary of population projection. The coeffiionts can be calculated using the following expressions;

$$b = \frac{\Sigma_3 y_t - \Sigma_2 y_t}{\Sigma_3 y_t - \Sigma_1 y_t}$$

$$a = \left(\Sigma_1 y_t - \Sigma_2 y_t\right)\frac{b-1}{\left(b^n - 1\right)^2}$$

$$K = 1/n\left[\Sigma_1 y_t + \frac{\left(b^n - 1\right)^2}{b-1}a\right]$$

where,

$\Sigma_1 y_t$ is the sum of y_t from $t = 0$ to $n - 1$

$\Sigma_2 y_t$ is the sum of y_t from $t = n$ to $2n - 1$

$\Sigma_3 y_t$ is the sum of y_t from $t = 2n$ to $3n - 1$

If $b > 1$, particualy in the case of developing countries where rapid population increase takes place the maximum value of b is taken as 0.999.

Reference
(1) Yamamura, E (1991): Model reference adaptive pollution control analysis in global environment, Studies in Regional Science, 21(2)24-34.
(2) Yamamura, E (1993): Introduction to Model Reference Adaptive Theory, Institute of Environmental Creation, International Series Vol,1.