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ENVIRONMENTALLY SUSTAINABLE CITIES IN ASIA: DIVERSITY IN APPROACHES AND CHALLENGES

Contents

1. Rapid Economic Growth, Widening Income Gaps and Increasing Social Inequities in Asia under Globalization

In terms of GDP growth since 1965, as shown in Table 1 below, the developing countries as a whole have grown faster than the developed region and in the developing region, Asia (East and South Asia) has grown fastest, with East Asian growth exceeding

Table 1 Economic Growth, by Region, 1965-2008

	1965-70	70-80	80-90	90-2000	2000-08
East Asia	7.2	6.6	8.0	7.2	9.1
South Asia	3.7	3.5	5.7	5.6	7.4
LAC	6.0	5.5	1.7	3.3	3.9

MENA	6.1	5.2	3.0	3.0	4.7
ECA	n.a.	n.a.	1.8	-1.9	6.3
SSA	4.8	4.0	1.7	2.4	5.2
Developing	5.8	5.3	3.4	3.6	6.4
Developed	3.6	3.1	2.9	2.3	2.4

Sources: World Bank, *World Development Reports, 1982, 1992, 2002 & 2010,* Table 4, pp. 384-385.

South Asia. There has also been a wide disparity in economic growth rates among Asian countries, as shown in Table 2 . As a result of a sustained economic growth

Table 2 Economic Growth of Selected Asian Country, by Country

	70-80	80-90	90-00	2000-08	2011	2008 PPP GNI per capita	2008 FEMR Per capita
Developing	5.3	3.4	3.6	6.4	n.a.	5,330	2,789
EAP	6.6	8.0	7.2	9.1	**7.7**+	5,398	2,631
China	5.5	9.5	10.3	10.4	9.1	6,020	2,940
Indonesia	7.2	5.6	4.2	5.2	6.0	3,830	2.010
Malaysia	7.9	5.7	7.0	5.5	5.0	13,740	6,970
PNG	2.2	2.0	4.0	2.3	7.7	2,000	1,010
Philippines	6.1	0.9	8.5	5.1	4.6	3,900	1,890
ROK	9.6	9.6	5.7	4.5	4.6	28,120	21,530
Singapore	8.3	6.6	7.8	5.8	5.0	47,940	34,760
Thailand	7.1	7.9	4.2	5.2	4.5	5,990	2,840
Vietnam	n.a.	6.8	8.7	7.7	6.8	2,700	890
SA	3.5	5.7	5.6	7.4	**8.0**	2,754	986
Bangladesh	4.3	3.7	3.6	5.9	6.3	1,440	520
India	3.2	5.8	6.0	7.9	8.0	2,960	1,070
Pakistan	6.7	6.3	11.2	5.8	4.0	2,700	980
Sri Lanka	5.6	3.9	9.8	5.5	7.0.9	4,480	1,790
OECD	3.1	2.9	2.3	2.3	n.a.	37,141	39,345
Australia	3.0	3.1	4.1	3.3	n.a.	34,040	40,350
Japan	6.8	4.1	1.3	1.6	-2.07	35,220	38,210

New Zealand	1.9	1.5	3.0	3.0	n.a.	25,090	27,940
World	3.5	3.2	2.6	2.8	2.8	10,357	8,613

Sources: World Bank, WDR 1992, 2002 & 2010; AsDB, Asian Development Outlook (ADO) 2010; and IMF,

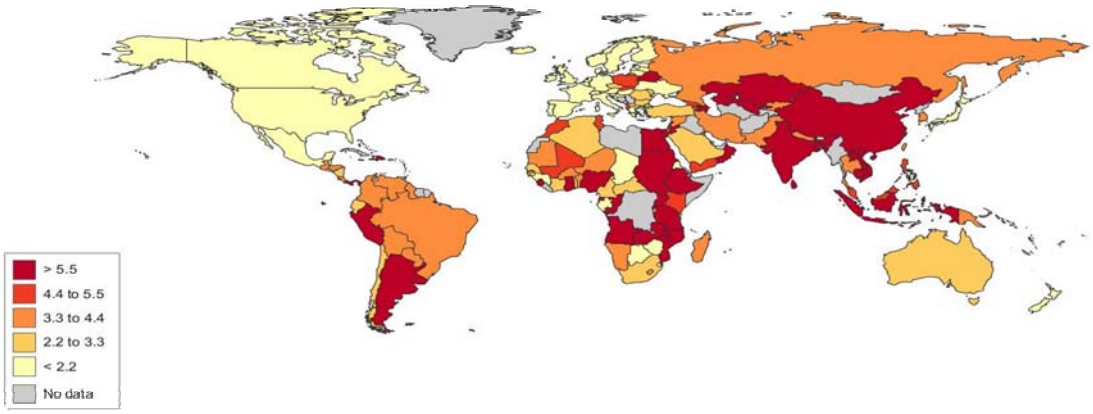
Notes: * Figures for Bangladesh and Pakistan are identical, as they were undivided during this period;

+ for East Asia, with 5.3 for Southeast Asia and 5.0 for the Pacific island countries. Figures for 2011 are estimates predicted by AsDB in ADO, 2010.

during the last half a century, the developing region which occupied only 24.6% of the world's GDP in 1970, today constitutes 27.2%. When calculated on the purchasing power parity basis, the developing region now comprises as high as 43.2 % of the world's GNI with 15.0 % for East Asia and 6.1% for South Asia.

It is no exaggeration to say that the rapid economic and per capita income growth of the developing Asian countries during the last half a century has reflected the strong will and aspirations of the governments and people of the developing Asian countries to catch up with developed countries, but also has resulted from the equally rapid pace of economic globalization through trade, investment and financial liberalization undertaken by most developed countries on the basis of the Washington Consensus spearheaded by the Bretton Woods Institutions.(See Chart 1) At the national

Chart 1 Annual average growth rates of GDP, by country, 1990-2008



Source: Computed from World Ban, World Development Report, 1990-2008.

level, however, economic globalization has widened income gaps, gave rise to environmental degradation and weakened social cohesion and stability not only in developing but also in developed countries, and in some developing countries resulting even in social unrest. Also, at the global level, economic globalization, while contributing to higher global economic growth through international trade and investment expansion on the basis of comparative advantages, have intensified an unbridled exploitation of natural resources in poor countries, widened absolute income gaps between rich and poor countries, lessened cultural diversities and threatened health and other dimensions of human security and precipitated the globalization of economic fluctuations which is in turn enhancing the threat of protectionism and even terrorism and breeding xenophobia and international tensions in some cases.

2. Rapid Pace of Urbanization and Enhanced Environmental Degradation

With rapid economic growth has come a rapid pace of urbanization and a steady expansion of mega-citiy population in both developing and developed countries of Asia and the Pacific region, as shown in Table 3 and 4 below. Like economic globalization,

Table 3. Growth of Population and Urbanization, 1970-2025

	Population		Population Growth Rates		Urbanization	
	2010	2030	1975-1995	1995-2015	1990	2010
Developing	5,843.4	7,169.0	1.9	1.3	n.a.	n.a.
East Asia	1,974.3	2,204.3	1.3	0.7	28.1	45.3
China	1,354.1	1,462.5	1.2	0.6	26.4	47.0
Indonesia	232.5	271.5	1.7	1.1	30.6	44.3
Malaysia	27.9	35.3	2.5	1.6	49.8	72.2
PNG	6.9	10.1	2.5	1.9	15.0	12.5
Philippines	91.6	124.4	2.3	1.8	48.6	48.9
Singapore	4.8	5.5	2.2	1.1	100.0	100.0
Thailand	68.1	73.5	1.3	0.6	29.4	34.6
Vietnam	89.0	105.4	1.9	1.3	20.3	30.4
South Asia	1,719.1	2,158.2	2.3	1.5	26.5	31.7

Bangladesh	154.4	203.2	2.2	1.6	19.8	28.1
India	1,214.5	1,484.6	1.9	1.3	25.6	30.0
Pakistan	184.8	265.7	2.8	1.9	30.6	35.9
Sri Lanka	20.4	22.2	1.1	0.4	18.6	14.3
Developed*	1,056.0	1,129.6	0.6	0.5	72.0	77.1
Australia	21.5	25.7	1.3	1.0	85.4	89.1
Japan	127.0	117.4	0.5	- 0.1	63.1	66.8
New Zealand	4.3	5.0	0.9	0.8	84.7	86.2
World	6,908.7	8,308.9	1.6	1.1	42.6	50.5

Sources: UNDP, *HDR 2007/8,* Appendix Table 5, pp.243-246 and *HDR 2010,* Table 184-187

Note: * Figures for urban population as % of the total are for OECD countries only.

Table 4 Steady Expansion of Megacity Population in Asia, 1975-2025

Cities	1975	2007	2025	Cities	1975	2007	2025
Tokyo-Yokohama	26.6	35.7	36.4	Shanghai	7.3	15.0	19.4
Mumbai	7.1	19.0	26.4	Karachi	4.0	12.1	19.1
New Delhi	4.4	15.9	22.5	Osaka-Kobe	9.8	11.3	11.4
Dhaka		13.5	22.0	Beijing	6.0	11.1	14.5
Kolkota	7.9	14.8	20.6	Manila	5.0	11.1	14.8

Source: UNESCAP, Statistical Yearbook for Asia and the Pacific 2010;
UNDP, Human Development Report 2007/08

Note: In million.

urbanization has brought with it both bright and dark dimensions to the quality of human lives. Often observed among the brighter aspects of urbanization is an increased accessibility to better-paying job opportunities, higher-quality educational, health and cultural programmes and faster and more frequent transportation facilities essential to a higher level of the quality of life.

Here again, however, people in those developing Asian countries without adequate administrative, technological and financial capacity have been affected with a varying degree of adverse impact of urbanization such as urban sprawling, suburban

deforestation, traffic congestion in city centers, noise, air and water pollution, slums and squatters, poor sanitation and higher health risks.(See Table 5 and Chart 2)

Table 5. Air Pollution in Major Cities in Asia, 1990s

	Seoul	Pusan	Kwgzh	Dalian	Shghai	Bkk	Manila	Jakarta
A	84	94	295	185	246	223	200	271
B	44	60	57	61	53	11	33	n.a.
C	1.5	1.6	2.5	1.9	n.a.	>30	>30	23
D	60	51	136	100	73	23	n.a.	71

Source: World Bank, *WDR 2002.*

Notes: A-Particulate matter (μg/m³) ; B-SO2 (μg/m³) ; C- CO (ppm) ; D-NO2 (μg/m³)

Chart 2 Air pollution in Ahemdabad, November, 2010 and in Hanoi, February, 2011

By courtesy of R&K Associates.

By courtesy of R&K Associates.

These health hazards and deteriorating amenities associated with a rapid pace and a higher level of urbanization are being compounded with an equally rapid, if not faster, increase of household and industrial wastes far beyond municipal treatment capacity, as shown in Table 6 below.

Tabled 6. Solid Wastes in Asian Countries, 1993-2010

	1993	2000	2010
China	50,000	130,000	250,000

India	39,000	82,000	156,000
Indonesia	5,000	12,000	23,000
Malaysia	377	400	1,750
Pakistan	786	1,735	3,100
ROK	269	670	1,265
Thailand	882	2,215	4,120
Vietnam	460	910	1,560
Japan**	39,700	40,600	41,700

Sources: UNESCAP, *State of the Environment in Asia and the Pacific, 2000;* Secretariat of the Base Convention, *The Country Facts Sheets*; MOE, *White Paper on Recycling Society 2005*

Notes: * 1,000 tons; ** Industrial Wastes.

Also, a high concentration in both developing and developed countries of office and commercial buildings in city centers meant for increased micro-level business efficiency associated with the economy of scale and aggregation is often resulting in a higher macro-level inefficiency through traffic congestion, higher environmental and disaster risks and at times even social risks arising from sharper confrontation among conflicting parties.(See Chart 3) Rising heat waves in city centers resulting from

Chart 3. High-rise Buildings in Bangkok, 2010 and Traffic Congestion in Seoul,2004

By courtesy of R&K Associates By courtesy of Prof. Hayashi, Nagoya U.

inefficient and highly subsidized use of hydrocarbon energy sources under an increasing

motorization associated with urban lifestyles are intensifying the pressures of global warming. Furthermore, the urban, time- and space-wise high-pressured patterns of life are increasing the incidence of ulcer, cancer and other stress-related health risks.

3. Local and Central Government Responses to Arrest Further Environmental Degradation in Asian Cities

Asian cities have been warned since decades ago to deal with natural disasters that deprived their inhabitants of lives and assets every year. Governments of developing

Table 7 Years of Life Lost due to Environmental Risks in Asian Countries:

	China	India	Asia/Pacific
Water supply and sanitation	4.5	11	10
Malaria	0	0.5	1.5
Indoor air pollution	9.5	6	4
Urban air pollution	5	2	2
Agro-industrial wastes	1.5	1	1.5
Under 5 mortality rates(%)	4.1	9.8	4.4/9.7*

Sources: Douglas V. Smith & Kazi F. Jalal, ADB, .*Sustainable Development in Asia,* Table 4-5,

Note: (*) - Data for East Asia and the Pacific/South Asia, Relevant Years in 1990s

Asian countries, however, had not been seriously concerned with environmental health risks until the findings of an Asian Development Bank's study presented in 1998, as shown in Table 7 above. Today, as shown in Table 8 below, nearly all stakeholders in different occupations not only recognize the seriousness of environmental risks, but consider that they will grow in Asia from year to year in the near future. Most prominent among them are water pollution and shortages, followed by global warming,

Table 8 Threats to Human Security in Asia

	Low	Moderate	Serious	Very Serious

High energy prices	12 (12)	28 (24)	42 (38)	18 (22)
Water pollution & shortage	28 (17)	35 (27)	30 (37)	6 (15)
Global warming	35 (22)	29 (25)	26 (28)	10 (22)
Failure of the Doha Round	28 (22)	33 (35)	24 (25)	12 (13)
Protectionism	26 (24)	38 (31)	29 (34)	6 (8)
Terrorists	21 (27)	33 (31)	26 (26)	8 (11)
Sharp decline in asset markets	31 (22)	37 (39)	23 (24)	6 (8)
Natural disaster	34 (30)	34 (32)	24 (24)	5 (9)
Current account imbalance	30 (22)	38 (40)	21 (22)	6 (7)
Avian flu and other pandemics	33 (30)	32 (27)	17 (20)	6 (7)
Proliferation of preferential TA	40 (22)	36 (39)	18 (20)	4 (5)

Source: PECC, State of the Region, 2007-08, Table 2, pp.45-46.

Notes: Respondents to the above survey taken in 2007 were: 107 businessmen, 68 government officials, 166 academics and researchers, 14 media persons, 5 civil society representatives and 22 others. Of these 382 respondents, 228 are from Asia. Figures are for the next 1-2 years, whereas those in brackets for 3-5 years or longer.

natural disaster and Avian flu and other pandemics. It is natural that in response to these perceived environmental threats, governments of Asian countries have been taking measures at both central and local levels including legislative and administrative and technological research and development (R&D) actions.

1) Legislative and Administrative Measures by Central Government

Central governments in Asian countries have passed a series of laws and regulations on preventive and remedial measures, installed regulatory mechanisms, scientific research and juridical institutions, and enhanced fiscal, financial and administrative support to local governments to minimize environmental degradation and improve the living environment of their people. National legislation for reducing air, water, soil and noise pollution has installed Polluter Pay Principle (PPP), arrested deforestation by imposing penalties and criminal charges against violation, promoted 3Rs (reduce, reuse and recycle) for paper, electrical and electronic home appliances, automobiles, etc. by way of internalizing environmental costs and encouraged a shift of energy sources from hydrocarbon to natural and renewables through fiscal and financial incentives in the main, but in a few cases through carbon taxes and emission

trading. Also, national legislation has encouraged local governments to build environmentally sustainable cities and communities (ESCs) appropriate and conducive to each in terms of topographic, ecological, economic, financial and social characteristics and cultural heritages.

A series of administrative guidelines and safeguards including distribution of national hazard maps have been issued by central governments to protect human lives against natural disasters, take all necessary relief measures affecting people's daily living, install green government procurement programme, promote education for sustainable development (ESD), and encourage environmentally sustainable patterns of production and consumption. Also, calls for all stakeholders such as local governments, private sector and NGOs have been made to join their heads, hands and hearts together to cope with environmental degradation including nuclear hazards in some relevant countries and promote environmental sustainability in their respective activities. Depending upon the socio-political environments specific to countries and sub-national regions, either top-down or bottom-up, or both approaches have been taken, all with a view to effectively implementing the legislative measures, although their effectiveness has varied among different countries and sub-national regions, depending on their own administrative, financial and technological capacity. Common across many countries of Asia and the Pacific region are: inadequate financial, human and institutional capacity, insufficient awareness not only among policy makers (politicians) but also among the people on the street of the current and future threat to environmental sustainability, and furthermore an inadequate support of the international community including, as being observed, repeated failures at COP meetings of reaching a consensus on the post-Kyoto international arrangements on climate change after 2012, in spite of urgency demonstrated by small island countries.

In many countries of the Region, national governments have developed Environmental Model City Programmes whereby cities and provinces interested in transforming themselves into environmentally sustainable districts have been selected by national government authorities as such. In applying for such award by national government, cities and provinces have submitted their own programmes detailing short, medium and long-term plans and quantitative targets for achieving or exceeding national targets, for example, for carbon dioxide emission and solid waste reduction, or for replacement by recycled paper and renewable energy. National government award have included among others tax exemptions, grant-in aid and/or low-interest loans, as

practiced in China, Japan, ROK and Thailand. These national EMCs/EMCs have been replicated by a few other countries of the region, with support given by bilateral and multilateral donors. The two High-Level Seminars for ESCs under the East Asia Summit/Environmental Ministers' Meeting (EAS/EMM) have been instrumental to such replication in Asia and the Pacific region.

2) Legislative and Administrative Measures by Local Governments

Closest to community residents, local governments have in general been ready and quick in responding through ordinances and guidelines to various issues raised in their communities, whether in reducing and eliminating air, water, soil and noise pollution and household and industrial wastes or in expanding greenery, ensuring food and traffic safety and disaster relief and prevention, improving public access to sanitation, health and other social services and promoting education for environment and sustainable development.

Provincial governors, city mayors and councilmen, when elected directly by community voters, have usually been better performers than their counterparts appointed by central governments, to make their communities safe, clean and amenable. Governance effectiveness, however, has varied, depending on the leadership of these policy makers and the degree of mutual confidence and trust between them and community residents which often rises in accordance with the latter's participation in local government decision-making processes and formal and informal process of consultation among the parties concerned Provincial and municipal legislative ordinances and guidelines for environmental protection, to be effective, are worked out usually through cooperation between local assemblies and executives, with participation by representatives of different stakeholder groups in local communities in the decision-making processes. They have to be consistent with national legislative and regulatory framework to qualify for central government decentralization measures and fiscal and financial assistance. Most often provincial and municipal executives are formulating provisions of proposed environmental legislation for submission to local assemblies for decision. When opposed by government executives either in substance or for financial implications, it is not so rare that some groups of community residents/voters have opted to submit their own legislative proposals to local assemblies where councilmen sympathetic to such community proposals would join their forces together to eventually enact them into local ordinances and guidelines.

City managers have now found that the first step required for building ESCs/EMCs is the collection, analysis and publication of accurate data on various dimensions of the urban environment at a regular interval, which today is far from adequate in many cities of Asia and the Pacific not only due to lack of financial, human and institutional capacities but also insufficient recognition among city officials and community residents of the urgency and range of environmental protection. Recruitment of scientific and technical staff who have received professional education in the field of the environmental science and technology is found as totally inadequate in many cities, and so with opportunities for training of the people engaged in environmentally related jobs. This is particularly significant in case of Japan which is now undergoing, immediately following the East Japan Great Earthquake and Tsunami (EJGET), an unprecedented experience of nuclear power plant explosions one after another, resulting in the steady emission of all sorts of radiation materials exceeding the internationally approved safety standards. Among those radiation materials requiring immediate response measures are iodine (I) 131 and 132, cesium (Cs) 134, cobalt(Co) 56 and 60, Zirconium (Zr) 95, Lantan (La) 140 and plutonium 238, 239 and 240.

Confronted with large fiscal deficits every year and heavy fiscal deficits outstanding, city managers have found it extremely difficult to give priority to environmental protection and ESC/EMC development, however desirable in the longer term perspectives, which requires reallocation of the limited current and future city budgets. In spite of such bottlenecks, some municipal majors and provincial governors have taken bold actions to initiate green town concept and found it essential to link with local economic development and employment expansion, to be accepted widely by community residents. City managers have also found that the closest possible cooperation is required from the board of education at municipal and provincial levels to strengthen environmental education at all levels of educational institutions and at the informal level to mobilize the support of community residents to ESC/EMC development.

4. Diversity and Challenges in Building Environmentally Sustainable Cities (ESCs) and Environmentally Model Cities (EMCs) in the Asia-Pacific Region

1) Background

In Asia a series of intergovernmental meetings have been organized to promote ESCs/EMCs under the sponsorship of various international organizations covering either the entire Asia-Pacific region or part of the region Most prominent among them

have been the meetings organized by the East Asian Summit (EAS), the ASEAN Plus Three (APT consisting of ASEAN ten member countries, China, Japan and ROK) and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) headquartered in Bangkok, Thailand.

EAS organized its Third Summit Meeting in Singapore in November, 2007, issuing Singapore Declaration on Climate Change, Energy and Environment which referred to the need for building ECO-friendly cities in its member countries composed of ASEAN 10 members, Australia, China, India, Japan, New Zealand and ROK. The Meeting of the G8 Environmental Ministers' Meeting in Kobe in May 2008 installed the Low Carbon Society Research Network (LCS-RNet) among the G8 member countries. The Meeting of the Network of East Asian Think Tanks (NEAT), established under the aegis of APT, installed its own Working Group on the Environment and began to do a collaborative study on Climate Change, issuing in Singapore in June, 2008 a joint policy recommendation on actions to be taken by its 13 member states to reduce emission of greenhouse gases (GHG). EAS Environmental Minister's Meeting in Hanoi in October, 2008 recommended ESCs to be its priority area for intra-EAS/EMM environmental cooperation. The Meeting of NEAT, WG/Environment made policy recommendations on Eco-Cities in Singapore in June 2009. Also, a High-Level Panel of the ESCAP Committee on Environment and Development met in Bangkok in December, 2009 on Key Challenges, Opportunities and the Way Forward in the Area of Environment and Development、especially focused on Enhanced Access to Services Towards Socially Inclusive and Sustainable Development on Water, Sanitation, Energy, Transport and Housing.

To promote ESCs/EMCs in Asian countries and to identify specific areas of international cooperation for the purpose, the First Meeting of the High Level Seminar (HLS) on Environmentally Sustainable Cities (ESCs) was organized in Jakarta in March, 2010 by ASEAN Secretariat and the Governments of Indonesia and Japan. This inter-governmental and inter-city seminar was followed simultaneously by the Asian productivity Organization (APO) headquartered in Tokyo which organized in Jakarta an international private sector symposium on ECO-friendly infrastructure development, commercial and industrial building and home construction, participated by a large number of private sector corporations of Japan and other Asian countries. There was also a Meeting of APT/NEAT, WG/Environment on Water Resources Management in Singapore in June, 2010 in connection with Singapore International Water Week

(SIWW) which issued policy recommendations specifically aimed at improving water supply and quality as well as more effective water demand management in the 13 APT member countries.

In order to deepen the understanding on the policy requirements for expanding ESCs/EMCs throughout Asia and mobilizing the efforts of central and local governments and other stakeholders in the region as well as international organizations, a Meeting of the International Forum for Sustainable Asia and the Pacific (ISAP) 2010 on Sustainable and Low Carbon Development was organized in Yokohama in July, 2010 by the Institute for Global Environmental Strategy (IGES) in collaboration with the Asian Development Bank and World Bank to identify Innovative Pathways for Asia-Pacific region and on possible IGES/World Bank Collaboration for Supporting Country-Based Model Cities Programme in Asia. The PECC General Meeting in Tokyo organized in October, 2010 on New Vision for APEC and Toward Further Regional Economic Cooperation had a working group session on ESCs/EMCs. In 2011, the National Institute for Environmental Studies (NIES) headquartered in Tsukuba Research Metropolis, Japan organized Tokyo Symposium on Low Carbon Asia under LCS-RNet in Tokyo in February, 2011, followed by the Second Meeting of the HLS on ESCs in Kitakyushu City in March, 2011. In April this year there will be a PECC Meeting in Perth on Environmental Sustainability in Urban Centers：Efficiency and New Technologies, Best Practices for the Provision of Public Services for a Better Protection of the Environment, to be followed in September, 2011 by a Meeting of APT/NEAT, WG/Environment on Natural Disaster Relief and Preventive Measures in Asia and a Third Meeting of the HLS on ESCs to be held in Phnom Penh in March, 2012.

2) Requirements for Building ESCs/EMCs

As a result of all these efforts by governments, private sector and NGOs, while paying due attention to differences in socio-economic, ecological and cultural traditions among different countries and communities, ESCs/EMCs in Asia and Pacific region are addressing common agenda on applying their respective expertise and technologies in such areas as: i) urban planning including environmentally sustainable transportation, ii) green building, iii) urban water supply and sewage treatment, iv) urban greenery, urban biodiversity conservation and urban landscape, v) sanitation and waste management, vi) 3Rs and resource efficiency improvement, vii) air, noise, water and soil pollution control, viii) co-benefit approaches to climate change and pollution control,

ix) adaptation to climate change in cities, x) urban infrastructure building and xi) reduction of natural disaster risks. It is important to note in this connection that all those seminars and symposia on ESCs/EMCs and liveable cities have been found as a useful tool for sharing experiences and best practices among all countries and communities interested in building and reinforcing ESCs. Also, all the national governments in the region have now launched some ESCs/EMCs programme and projects in collaboration with various stakeholders within national borders and in the international community where political leadership at the top is the key to their initiation and success.

3) Barriers to Building ESCs/EMCs

In spite of such progress for initiating ESCs/EMCs, there are still a number of barriers in many Asian countries to the task at hand. First of all, there is a lack of consensus among community residents not only of the need for building ESCs/EMCs, but also on what kind of ESCs/EMCs are to be built. Many residents are opposed to any change of their residential districts and/or quarters. Also, most major cities and metropolis in Asia, having large population, covering large space and with emotional attachment to their own residential communities, have found it extremely difficult to reach consensus among community residents on building ESCs/EMCs. Even when eventually agreed upon the need for them and what types they ought to be, specific issues such as when, where and how to start have brought the consensus into sharp dissension, delaying the whole process of building ESCs/EMCs. Secondly, there is an important question of the high cost of building ESCs/EMCs. Built up over centuries, remodeling of any major cities into ESCs/EMCs has been found extremely costly to local governments which are already heavy in fiscal deficits outstanding. Financing by public-private partnership, the only way out for realizing ESCs/EMCs cost-effectively, has often been marred in Asia by corruption and/or extraordinarily excessive charges on account of the lack of good governance, transparency and accountability of both public authorities and private entrepreneurs. Thirdly, a serious question remains in many Asian countries of an inadequate human and institutional capacity for planning and implementing local development programmes for building ESCs/EMCs. With the exception of a few metropolis in Asia and the Pacific, region most are inadequately equipped with appropriate institutional mechanisms and under-manned by appropriate expertise to undertake the remodeling of their ancient cities into ESCs/EMCs. Assistance of foreign expertise, private and public, is urgently required to install proper human and institutional capacity.

4) Diverse Approaches to ESCs/EMCs

As large as 60 cities in Asian countries participated during the years 2000-2010 in a series of international conferences organized by Kitakyushu City for ESCs under the Kitakyushu Initiative for a Clean Environment in association with ESCAP Ministerial Conference on Environment and Development (MCED). Under this long-term ESC development programme, different cities. confronted with differing environmental issues, have taken different approaches to building ESCs/EMCs in the first instance.

Weihai City, China have focused on reduction targets for sulfur dioxide (SO_2) emission and chemical oxygen demand (COD), respectively, of 5 % and 15 % as compared with 2005 levels. Surabaya City, Indonesia, Sibu Municipal Council, Malaysia and Bago City, Puerto Princesa and San Fernando City, Philippines, all have focused on waste reduction targets respectively of 40%, 10-15%, 60 %, 68% and 28% and promotion of waste segregation at source and household composting. Ulsan Metropolitan City, ROK has given top priority to reducing municipal waste down to 0.9 kg per day and achieving a recycling rate of 65 %, while Kathmandu Metropolitan City, Nepal to improving overall urban environmental conditions. Environmental policy priority of Cebu City, Philippines has remained on municipal waste and plastic use reduction respectively by 50 % and 75 %, whereas that of both Bangkok Metropolitan Administration and Nonthaburi Municipality, Thailand has been on municipal waste reduction by 30%. The main concern of Muntilupa, Philippines has been with installing cost-wise affordable, less energy intensive, less polluting, and less spacious wastewater treatment, with replication in Demaguete and San Fernando Cities in the country, while that of Municipality of Korat, Thailand with the use of filter system and grease traps and of Pang-Kone Municipality with a clustered approach of constructed wetlands. Cities of San Fernando , San Carlos, Metro Clark, Sagay, Calbayog and Davao, all in the Philippines, as well as Sibu City, Malaysia and Kathmandu Metropolitan City, Nepal have focused on sanitary landfill, with gas for electricity generation and a flare system to burn excess and unutilized gas. Cities of San Fernando and Puerto Princesa, Philippines have given top priority to promoting marine sanctuary and reforestation through bio-engineering and zoning of environmentally critical areas. While setting and achieving all these specific targets do not by themselves solve wide ranging issues of urban environmental protection, there is no doubt that they do contribute to enhancing environmental awareness among community residents and eventually to the urgent need for building ESCs/EMCs.

As compared with the above specific target approaches by central and local governments in Asia, the low carbon city development programme under LCS-RNet, 2009-2011 aims at contributing to building ESCs/EMCs through a variety of sector initiatives for low-carbon society at the national and local levels. These drafts are comprehensive in terms of setting multiple targets, implementation and monitoring programmes including procedures for achieving the targets. The joint study among research institutions in Asian countries under this programme has now produced drafts of Japan Scenarios and Actions Towards Low-Carbon Societies, Shiga's Scenario Towards the Realization of a Sustainable Society, A Roadmap Towards Low Carbon Kyoto, Sustainable Low Carbon Development Towards 2030 in Vietnam, Low Carbon Society Scenario Towards 2050: Indonesia, Scenario Analysis on Low Carbon Economy Development in Jilin City, China, Low Carbon Society Vision 2030: Thailand, Low Carbon Society Vision 2050: India, Low Carbon Society Vision 2035: Ahmedabad, Low Carbon City 2025: Sustainable Iskandar, Malaysia and finally Towards Putrajaya Green City 2025, Malaysia. It is hoped that through closest possible cooperation and consultation between these research institutions and central and local governments in Asia a wide range of policy recommendations based on their study will be translated into actual government policies in Asia countries.

ESC development programme under East Asian Summit Environmental Ministers' Meetings (EAS/EMM) and ASEAN Working Group on ESCs (AWGESC) initiated since 2010 has focused its sustainable development activities on such issues as urban air quality management (Bangkok Metropolitan Area, Thailand, Iloilo City, Philippines and Singapore, ROS), a whole range of environmental issues (Cagayan de Oro City, Philippines, North Kuching City, Malaysia and Yichang City, Hubei Province, China), planning for a liveable city (Gwanggyo New Town, Geonggi Province, ROK), Eco town development; (Kitakyushu City, Japan), waste collection and minimization (Luang Prabang, Lao PDR), urban solid waste management (Phnom Penh City, Cambodia, Surabaya City, Indonesia and Tirupati, India), and adaptation to climate change (Puerto Princessa City, Philippines and Yokohama City, Japan). Here again it is hoped that through joint participation of all stakeholders including public and private sectors and NGOs and enhancing their closest possible cooperation and coordination, there will be accelerated replication of ESCs in the near future from one city to another within and across countries of the Asia and the Pacific region, with initial funding by international development and finance institutions interested in the development of

Sustainable Asia and Asian Cities..

5. Appendix: A Brief Chronology of the Steps taken by All Stakeholders including the Government of Japan (GoJ) to deal with the East Japan Great Earthquake/ Tsunami (EJGET) and Tokyo Electric Power Company's (TEPCO's) Fukushima No. 1 Nuclear Power Plant Disaster (NPPD), 11 March-11 May, 2011 and Lessons Learnt from the EJGET and NPPD

A. Brief Chronology

1) Establishment at 2:50pm on 11th March of the Office for Emergency Disaster Response (OEDR) headed by PM under Office of the Prime Minister (OPM) in response to the EJGET announced at 2:46 pm on the Richter scale of M8.8 and to the TEPCO'S NPPD resulting from EJGET, in order to analyze, evaluate and monitor all the developments in the adversely affected areas (AAAs) and inform the public on a regular interval with the assistance of Nuclear and Industrial Safety Agency (NISA) under Ministry of Economy, Trade and Industry (METI) and Nuclear Safety Commission (NSC) attached to OPM;

2) Declaration at 7:50 pm on 11th March by Government of Japan (GoJ) of the Emergency Nuclear Accident under the Law of Special Measures against Nuclear Disasters upon notification by Tokyo Electric Company(TEPCO) of the malfunctioning of the Emergency Core Cooling System (ECCS) of Fukushima Dai-Ichi Nuclear Power Station's Nos. 1, 2, 3 nuclear power plants;

3) Mobilization on 11th March of National Self-Defense Forces (NSDF), National Fire Fighting Brigade, National Police Agency and GoJ Bureaucracy Forces to the AAAs to ensure speedy rescue of those buried and still alive, to prevent traffic congestions on major turnpikes and highways leading to the AAAs, to ascertain airspace safety over the AAAs, and to restore electricity, water supply and all the other essentia l services critical to human lives; these national forces were also instructed later to deal with those bodies and debris left destroyed by EJGET;

4) With respect to NPPD, attempts by TEPCO to cool the reactors were continued right after EJGET, but failed due to the breakdown of external electricity supply and emergency diesel power station, resulting in the OEDR's emergency evacuation decree at 5:44am on 12th March targeted at those living within 3 km diameter to be extended to those living within 10 km and then triggered by the hydrogen explosion at No. 1 nuclear power plant at 3:36pm another decree at 6:30pm on 12th March for those living within 20km diameter from the site of NPPD to evacuate to those

distant areas not yet affected and for all local governments elsewhere to assist those requiring evacuation; in the meantime over 20 earthquakes above M6 in the AAAs on 11th and 12th March;

5) Triggered by hydrogen explosion at No.3 nuclear power plant at 11:00am and the exposure of fuel rod to open air at No.2 plant at 6:00 pm on 14th March and its subsequent explosion at 6:14am on 15th March and the fire breakout at No.4 plant at 9:38 am, GoJ finally issued its third decree at 11:00 am this time aimed at those 167,000 living within the neighborhood of 20-30 km diameter from the site of NPPD to stay indoor for the time being until required to evacuate ;

6) Appeal on 15th March by Fukushima Prefecture Governor to all local governments all over Japan including those in Fukushima Prefecture to accommodate all evacuees from the NPPD and neighboring areas;

7) Appeals on 15th March by National Provincial Governors and Mayors' Councils to all the member local governments to send necessary professional staff to their counterparts in the AAAs to deal with those then residing in temporary shelters (over 150,000 persons)and those evacuees;

8) Spontaneous dispatching of volunteers by all stakeholder groups including private sector and the collection and remittance of cash relief
contribution (already amounting to US$1.4 billion during the last two months) and in-kind relief materials (foodstuff, drugs, blankets, quilt,
clothing, batteries, kerosene, gasoline, stoves, etc. amounting to $0.5 billion) to the AAAs and the formation on 14th March of National EJGET Volunteer Group to coordinate NGO and NPO assistance ;

9) Request by GoJ on 15th March to the international community to prevent further NPPD, including the establishment of Emergency Joint Japan-U. S. Task Force to arrest and prepare for the meltdown of TEPCO's NP plants in Fukushima Prefecture and contain its unforeseenadverse impact on the health of people working at NPPD site and living in the neighboring areas;

10) With all efforts by TEPCO for cooling the reactors having been failed during the last few days at Nos. 1 -3 plants and the spent fuel rod pool at the No.4 plants where there had been a sharp rise of their container temperature due to a steady exposure of nuclear fuel rods to open air, the National Firefighting brigade , Tokyo Police Agency and NSDF came to assist and resorted to massive fill-in of sea water into reactors and their containers, only to find leakage of water into the nearby sea;

11) NISA decided to review the current nuclear power plant safety regulations and guidelines and on 16th March issued its special request to all the Japanese power

companies operating NP plants in the country to inspect and enhance their safety measures in the light of an enormous increase was witnessed of radiation level at the main gate of Dai-Ichi NPS from 0.06 μsv/hour at 9:00am on 11th March through 380 μsv/hour at 10:00 am on the following day to 751.2 μsv/hour at 2:20am on 14th March and 3,130at 9:37pm on the same day to 11,930μsv/hour at 9:00am on 15th March and 10,000 μsv /hour at 10:40am on 16th March;

12) Government prohibition on 30th March of the shipment of certain sorts of vegetables and fish from the high radiation areas of the AAAs In Fukushima, Ibaraki and Tochigi Prefectures, exceeding the national safety standards;

13) Decision on 4th April on the cash grant of ¥1 million per household and government commitment to later compensation to those evacuated under the official order and those farmers and fishermen affected by TEPCO's NPPD, possibly amounting to US$100~120 billion to be financed by TEPCO, other NP companies, with assistance of GoJ;

14) Drafting since 12th March of several necessary legislations and the supplementary budget 2011 , totaling JPY4 trillion expenditures at the national level, and including the emergency use of the budgetary allocation for government contribution to national pension fund for this fiscal year;

15) Establishment on 9th April of the National Rehabilitation and Reconstruction Council for East Japan Great Disaster (NRRC) under OPM to draft by end June an overall reconstruction plan and programmes, with budgetary implications which may include among others a proposal for consumption tax increase from 5 % to 10 %, the temporary suspension of individual and corporate income tax relief/exemption measures and the installation of Disaster Relief and Reconstruction Fund (DRRF), a special fund separate from the General Government Account; the DRRF may consist of the possible revenues from the proposed National Reconstruction Bond issue, Disaster Reconstruction and Solidarity Tax and cash contributions to GoJ from corporations, NGOs and individuals in Japan and overseas, all for the relief, rehabilitation and reconstruction of the affected region estimated to exceed US$300 billion during the coming five years;

16) GoJ's recommendation on 14th April to those living within the neighborhood of 30-40 km diameter from the site of NPPD to stayindoor for the time being and be prepared to evacuate any time when announced officially by GoJ;

17) Increase of monitoring stations on nuclear radiation not only in the nearby AAAs but also in different parts of the country and subsequent announcement of the restrictions on the shipment of tea leaves in Kanagawa and

other areas as well as that of other farm products whose radiation level has exceeded their respective national standards;

18) Proposed installation of the NP Compensation Organization for the compensation for victims in current and future NP disasters to be financed from contribution of all power companies, loans from government-financed financial institutions such as Policy-base Investment Bank and Agro-Forestry Central Fund, as well as government budgets;

19) Approval on 16th May of the First Supplementary Budget 2011 which includes among others the reallocation of the approved budget
including the partial suspension of child allowance increment and reduced turnpike toll collection to generate public finance essential t o emergency relief and rehabilitation estimated to amount to $50 billion;

20) GoJ's annoucement of the schedule on 21 May to let the evacuees now housed at temporary evacuation centers and elsewhere to return to their homes within 3-20 km and in the special restricted areas of five cities outside 20 km diameter from the site of NPPD for a maximum two short hours and for only one person per household (27,000 households) to fetch any valuables from their houses ;

21) GoJ's request on 22nd May to Chubu Electric Power Company to shut down their Kashiwazaki Nuclear Power Plant in Shizuoka Prefecture till such time when all the precautionary measures such as the safety and assurance of external power supply and emergence power supply and the construction of a solid , high-rise walls on the adjoining seaside would have been taken by the Company against a possible Tokai/Tonankai Great Earthquake and Tsunami that may occur any moment as predicted by earthquake experts since some time ago, and the decision by the Company to shut down until such time;

22) Announcement on 17th May by TEPCO and GoJ of a revised schedule of decommissioning of all the 4 nuclear reactors at Fukushima Dai-Ichi NPS by end November 2011, but a serious doubt has already been expressed by experts on the validity of the new schedule, like its previous one announced a month ago;

23) TEPCO's new finding on 29 May, on the repeated instruction by GoJ , that the reactors No.1-3 were all had their nuclear fuel melt down by early morning of 12 March, contrary to their earlier announcement that they had not been melt down, raising further suspicion on the accuracy of TEPCO's inspection and findings;

24) Address on 29th May by Prime Minister Kan Naoto at G8 Summit in France on the GoJ's determination to minimize the adverse impact of EJGET and the TEPCO's NPPD among those suffering from them and bring the NPPD under

control as soon as possible , to reduce Japan's dependence on nuclear power steadily by increasing the use of renewable energy such as solar ,wind and geothermal power to 20% of the total electricity requirement of Japan by 2020 and propose a international regulatory framework on nuclear power generation and convene in Japan in 2012 an international conference on nuclear power generation;

25) Final decision on 31st May by Compensation Study Committee of Experts to compensate all the farmers and fishermen in the AAAs whose produces including animal meat products had been prohibited from delivery to market under government order and compensate those people housed at temporary evacuation centers and elsewhere on their actual cost of transportation and accommodation for evacuation as well as their psychological stresses based upon measurable and verifiable data;

26) Accelerating government reform measures including the separation of NISA from METI, promoter of nuclear power generation and its merger with NSC or any other organization based on the three principles of independence, openness including rapid access of the public to critical information on nuclear power plants all over the country and comprehensiveness including measures to be taken against any possible natural and accidental disasters;

B. Facts and Figures for EJGET and NPPD as of 31 May, 2011

1) Human suffering, as reported by Yomiuri

On 31 May, 2011	On 13 March, 2011
Loss of life: 15,281 persons	<— 763 persons
Missing: 8,492 persons	<— 1,419 persons (injured)
Persons left homeless and being housed at temporary shelters: 102,271 persons	<— 639 persons

No. of evacuees from the TEPCO's NPPD site: 115,032 persons + ?

2) Disaster wastes, not taking into account automobiles, ships, machinery and other large-scale: solid wastes: 25 million tons: 16 million tons in Miyagi, 5.8 million in Iwate and 3.2 million in neighboring Pacific coast prefectures, now being collected at nearby temporary fenced (against wind blown-offs), fire-proof (against natural fire and explosion) and chemically treated (against hazardous and toxic substance) make-shifts for final disposal later at the stockyards equipped with high-efficiency separation and incineration units, all of which is estimated to cost over JPY1 trillion.;

3) Direct cash relief by GoJ and cash compensation by TEPCO already paid to the AAAs: US$0.5 billion;

4) Delivery to the three prefectural governments , Ibaragi, Iwate and Miyagi, of the cash donation from people at home and overseas to Japan Red Cross and the Community Chest amounting to $1.4 billion and in-kind voluntary assistance totaling $0.5 billion which include among others the dispatching of over 15,000 medical doctors, nurses and nursing assistants by 846 Disaster Medical Assistance Teams for Emergency Relief from all over the country;

5) Subsidy to local communities of JPY12,000 per day per person under the national government scheme for debris clearance in the AAAs;

6) Local communities have already begun to build temporary make-shift collective and individual houses for those people housed at and off temporary shelters, in addition to renting the vacant apartments and houses for sub-leasing to them with a monthly subsidy of JPY60,000~ 80,000 ;

7) Evacuees from the area within the 20 km diameter from the NPPD area have returned home for a short duration of 2 hours at the designated time beginning on 21th May for their important personal effects and/or looking after their cattle and pigs left unattended;

8) Assistance to those housed at temporary shelters and outside as well as for debris clearance in the AAAs by over 40,000 civilian volunteers during the Gold Holidays of 29th April through 5th May, followed by weekend volunteers after 5th May

9) Outburst of protests all over the country to GoJ's decision to allow all schools for health safety to permit the use of school grounds exposed to nuclear radiation at 2.38 micro-sieverts per hour and 20 milli-sievert per year and the subsequent withdrawal of the GoJ's decision;

10) Many cities and towns in Fukushima Prefecture beyond 30 km from the NPPD area have decided to slice the surface soil of school ground by 3-5 centimeters and bury them under fresh soil (not exposed to radiation) in holes dug one meter deep, costing a total of nearly JPY600 million;

11) Resignation of the president, senior vice president and auditor of TEPCO and its corporate decision to reduce both the number of advisers from 24 to 13, the remuneration of its CEOs and other senior directors by one half and its all company employees by 10 percent, as well as selling off of its assets including company housing and corporate shares held, all to generate a total of JPY1.1 trillion to pay the currently estimated compensation to those people living and those organizations operating in the AAAs;

12) TEPCO's consolidated balance sheets ending March 2011 shows a total annual sale of JPY5,368.5 billion, operating profit of ¥3,99.6 billion, current profit of ¥317.6

billion and the total annual loss of JPY1,247.3 billion which was comprised of the special loss due to EJGRT and NPPD amounting to JPY1,017.5 billion (cooling of the reactors and prevention of radioactive materials costing 426.2 billion, dismantling of all the four reactors ¥207 billion, de-functioning of the 5th and 6th power plants of Dai-Ichi NPS and the Dai-Ni NPS ¥211.8 billion, postponing the installation of the Dai-Ichi NPS's 7th and 8th nuclear power plants 39.3 billion, and rehabilitating steam-powered plants ¥49.7 billion and others ¥83.3 billion), resulting in the reduction of the company's consolidated equity capital from ¥2,465.7 billion in March, 2010 to ¥1,558.1 billion as of end March, 2011;

13) Government announcement on 19th May of the average annualeconomic growth rates to have fell down to a negative 3.7% for fiscal 2010 (personal consumption by negative 0.6%, plant and equipment investment by minus 0.9%, public sector investment by negative 1.3%, with residential investment by a positive 0.7%);

C. Major Failures of TEPCO and the Government of Japan

1. TEPCO' most serious failures

a) Inadequate investigation into all the possible risks associated with nuclear power (NP) plant construction, operation, maintenance, monitoring and reporting;

b) Failure to enhance precautionary measures to meet possible accidents resulting from malfunctioning of cooling equipments and the corporate decision to postpone the replacement of a series of boiling water NP plants by 1986, ignoring recommendations by an independent study group on NP generation;

c) Failure to investigate immediately after EJGET into possible malfunctioning of the cooling equipment with Fukushima Dai-ichi Nuclear Power Station's NOs. 1~4 power plants, and to report to NISA on the various accidents at the six plants that have been caused by EJGET and take necessary repair actions immediately;

d) Failure possibly on the ground of optimism and corporation's priority to finance to decide on the decommissioning of the four reactors and on-site facilities immediately after the severity of EJGET, in spite of their knowledge about the Three Mile Island (TMI) react0r accident in 1979 and the Chernobyl accident of 1986;

e) Failure of full, exact and speedy information disclosure on a series of accidents resulting from the exposure of nuclear fuel rods in the containers and the spent fuel rods in the storage pools that had been caused by the cut-off of external power supplies and the knock-out of the backup emergency generators after EJGET that had been caused by the cut-off of external power supplies and the knock-out of the backup emergency generators after EJGET that led to hydrogen explosions at No. 1 plant at 15:36 on 12 March and later at Nos. 2 and 3, plants, too;

f) Failure prior to the intended pouring-in of sea- and fresh-water into reactors and storage pools to equip with additional water tanks that could accommodate all the contaminated water overflowing from the reactors and the storage pools;

g) Failure to report to the public and those concerned organizations on the planned release of contaminated water to the Pacific Ocean in violation of the Nuclear Waste Disposal Law, with a simultaneous failure of sending warnings to the governments of nearby countries long before the action so that they could do all the necessary preparations for the safety and wellbeing of their respective people;

h) Failure to report every few hours on the changing levels of nuclear radiation exposure to the public at large and in particular to those evacuees and still living within 20-30 km and possibly beyond 30 km from around the crippled power plant facilities now found at exceedingly high levels of radioactive materials; this is especiallycritical as contaminated air and water are being released to prevent further explosions and disasters;

i) Failure until 18th April, long after the 3.11 incident to announce the roadmap to the public on a series of steps intended to be taken by TEPCO to minimize further damages to the NP reactors and facilities;

2. GoJ's major mismanagement

a) Lack of full understanding that nuclear power generation could be a weapon for mass destruction like any other nuclear and chemical

warheads, which has led to installation of as many as 54 NP plants all over the country, all near the ocean, Pacific or Japan (East) Sea;

b) In spite of the terribly tragic experiences of atomic bombing in Hiroshima and Nagasaki and the strong opposition of their painful survivors and their sympathetic supporters, GoJ went ahead in mid-60s and began to install the legal and institutional framework and year after year in the 1970s onward made budgetary allocation essential tonuclear power generation, partly listening to all those scientists, politicians and industrial and financial conglomerates in favour of the promotion of NP generation and partly in response to the two energy crises of 1973-74 and 1979-80 which altogether raised crude oil prices by 8 times as high as pre-73 prices. Later in the 1990s and 2000s, NP generation had further backing from GoJ and those concerned with climate change, as it was considered to represent a case for clean energy with minimal CO2 emissions;

c) In addition to liberal cash and in-kind contributions by power companies, GoJ under LDP regime has poured over ¥160 billion since 1967 when the first NP plant was installed by TEPCO in Fukushima Prefecture, to lure the poorer villagers and local governments buried deep under fiscal deficits into accepting such installation proposals, in spite or because of some strong opposition even in those villages and townships ;

d) Decades of public education at and off school that "nuclear power generation is safe and under full control," as pictured in school text-books for primary and lower secondary school children, and as advertized on television programmes by Japan Electric Power Industry Association;

e) Not sufficient lessons have been learnt from the horrible TMI and Chernobyl accidents by GoJ, TEPCO and possibly by other power companies in Japan , as they have continued to build more NP plants over the years all over the country, though under the slightly tightened regulatory framework;

f) In spite of the 3.11 disaster, GoJ did nothing to send inspection teams on that afternoon to discover the adverse impact on the TEPCO's NP plants, leaving it to the discretion of TEPCO itself;

g) When offered technical assistance by the U.S. Government on NP plant explosion on 12th March, GoJ is reported to have turned it down upon the TEPCO's recommendation based essentially on bottom-lineargument; Instead, GoJ, being responsible for the safety and health of the people and the protection of their assets, should have accepted the U.S. technical assistance of immediate decommissioning of those NP plants for eventual dismantling which would have prevented not only the

health risks of the workforce engaged every day in disaster impact minimization at the plant site as well as all other untold severe impact , material and psychological, on the people in Fukushima and neighbouring areas;

h) Delays in issuing the Emergency Evacuation Order to those living and working within 20 km diameter from the NPPD until 16th March, initially within 6 km and later within 10 km, and complemented on 20th March by the newly designated Stay-Put Zone of 20-30 km diameter from the NPPD site in response to the U.S. government evacuation recommendation to American people living within 80 km diameter from the NP plants, and then further complemented on 13th April by the newly designated Planned Evacuation Zone of 30-40km from the site, representing the long-held practice of GoJ policy announcement , DOUBLE TL, meaning "Too Little, Too Late," handed down from the days of LDP regime since late 1960s;

i) Continued use of microsievert per hour for the indicator of radiation level in towns of Fukushima and in other cities and areas of Japan , in spite of scientists' demand for the use of millisievert (1,000 microsievert) accumulated per week or per month, as people are being exposed to radiation not by hour but by week, month and even by year;

j) Delays in the GoJ announcement on the roadmap for those evacuees from the NPPD area on the future schedule of returning home and re-engage in their respective work on farms , workshops and stores;

k) Delays in government relief measures for those evacuees without jobs and income staying outside the restricted areas ;

l) Delays in government relief measures for those farmers and fishermen who se produces have been ordered out of market for exposure to a high level of radiation such as iodine 131 with over 300 bq. per kg and cesium 137 with over 500 bq. per kg contaminated possibly by NPPD in Fukushima and the subsequent release of radioactive materials into atmosphere and ocean;

m) Delays in the GoJ decisions on the review of the economic policy emphasizing income and export growth, the energy policy relying on NP generation , the farm policy detrimental to rural development, the immigration policy restricting inflows of skilled and professional manpower , the education policy in favour of business-as-usual (BAU) approach , the health and pension policy weakening self-reliance and the foreign aid policy not sufficiently addressing to global agenda;

3. People's old mindset

a) Primarily concerned with economic growth that permits stable employment and a steady income growth, people in Japan are still
pursuing an unsustainable life- style detrimental to resource efficiencyand security, nature conservation, environmental protection and community livelihood;
b) Primarily concerned with group solidarity and consensus-building, both public and private organizations have tended to restrain individual identity, innovative ideas and diversity of views among their members , thus punishing in effect a whistle blowing by their honest members against illegal and/or anti-social activities of organizations and retarding societal restructuring essential in the age of global transformation ;
c) Primarily concerned with protecting the vested interests of their own narrow sectors, professions and communities, politics of Japan has been astray like a captainless boat in the rough sea, unable to agree on a set of goals to be achieved, courses of action and measures to be taken and the burden of responsibilities to be shared among them, only to end up eventually at the bottom of the sea;

４. Findings: Lessons to be learnt from the EJGET and TEPCO's NPPD
1) Inadequate learning from the past experiences at home and overseas in terms of regional, town and village planning and local and central government responses to those catastrophic natural disasters : many great earthquakes and tsunami took place along Tohoku Pacific coast in Hoei Earthquake/Tsunami in 1707 (M8,6), in June 1896 (M8.2), in March 1933 (M8.1) and in June 1978 (M7.4) in addition to Tokachi Earthquake in March 1952 (M8.2), Hokkaido East Earthquake in October 1994 (6.2), Hanshin Great Earthquake in January 1995 (M7.3) and Tokachi Earthquake in September 2003 (M8.0) as well as similar experiences abroad (Chile Earthquake/Tsunami in May 1960 (M9.5), Peru Earthquake in June 2001 (M8.2), Indian Ocean Tsunami in Sumatra in December 2004 (M8.8) and in March 2005 (M8.4) , Sichuan Earthquake in May 2008 (M8.1)and Chile Earthquake in February 2010;
2) With respect to NPPD, equally inadequate learning from Three Mile Island Disaster (TMI) in 1974 and Chernobyl Disaster in 1986 where fuel rods melt down in the reactors, releasing an alarming scale of nuclear radiation into air , water and soil within several hundred kilometers;
3) Mistaken belief and notion that nuclear power generation is safe and that the preventive measures taken against earthquakes and tsunami and NPPD have been sound and sufficient;
4) Reminders: 4H's

A) Horizon: Necessity for having national and local visions of long-term development of all regions of the country, with a particular emphasis on the AAAs in the past; they may include the introduction of a scenario approach to natural and man-made disaster prevention and impact minimization on coast effective basis, and its substantive presentation regularly to the public in all the AAAs in the past for their consideration and recommendations;

B) **Head:** Immediate and early drafting by local governments, with assistance and support of central government, of immediate, short-,medium- and long-term measures to be taken by individuals, communities and all the other stakeholders, to prevent and minimize the adverse impact of all disasters, all of which requires the following:

i) strong political leadership at the top, ii) transparency of public information and accountability of local and central governments to all stakeholders, iii) closest possible cooperation and collaboration among all stakeholders; iv) clear definition of the responsibilities of all stakeholders, particularly the roles of local and national governments, v) cross-sectoral coordination and integration among sectors and government ministries and departments, e.g. agriculture, fishery, forestry, manufacturing, power, transportation , communication, finance, services, housing, health, education, welfare, security and armed forces, etc.

C) **Hands:** Mobilization of all up-to-date scientific and technological knowledge base and traditional knowledge and experiences through public participation for the prevention of natural and man-made disasters and for their impact minimization including NPPD ; they mayinclude among others, i) Installing early warning system and hazard maps, ii) human resources development at all levels of government, and iii) knowledge management programme to facilitate:

a) knowledge and information sharing among all stakeholders on disaster prevention and impact minimization , b) making use of traditional knowledge and wisdom of local communities, c) objective and scientific analysis of past experiences including cost-benefit analysis of possible policy options, d) baseline and up-to-date data collection, compilation and collation on weather, ocean and geological movement, and e) financing requirements and mechanisms to meet different scenarios and solutions;

D) **Hearts:** Involving all stakeholders in the decision-making processes related to disaster prevention and impact minimization through: i) basic education at school and in communities, ii) practical skill training and exercises at all levels, c) inculcating of the sense of ownership and participation among all citizens in local communities.