Part 1 Introduction

During the period from August 98 to August 99, the Working Group on Environmental Economics (WGEE) studied on the planned projects on the basis of the work done by the WG in the first phase and 1998. These projects are as follows:

• Green Taxation Reform in China: Preliminary Study
• Valuation of Environmental Damage in China
• Environmental Accounting
• Sustainable Agriculture and Environmental Cost of Rice Production
• Sustainable Use of Grasslands
• Biodiversity and Ecological Travel

The third session of the WG was held in Beijing in June 1999, discussing the research progress on above projects. The main advancements and working plans of studies on Green Taxation Reform in China and Valuation of Environmental Damage in China are outlined in part 2 and part 3 of this report.

Part 2 Study on Green Taxation Reform in China

From 1997 to 1998, the WGEE explored the theoretical foundations of environmental taxation, reviewed international experience on environmental taxation and its status and performance in China (including taxes that related to environment and natural resources, and the pollution charge system). Based on this research and the sector-by-sector pricing studies that formed the core of the first phase programmes, the WGEE focused on Green Taxation Reform in China in its research in 1999. The aim is to identify opportunities and assess the potential for expended environmental taxation in China, both at the micro level (optimal pricing to ensure efficient resource use) and at the macro level (fiscal reform to integrate environment and economy).

2.1 Objectives and Guidelines of the Reform

China is undergoing unprecedented reforms in at least three areas relevant to environmental taxation: institutional reform, fiscal reform, and environmental policy reform (especially of the levy system). Under the situation of serious pollution, low efficiency in the use of natural resources, and the demand for reforms on pollution levy system and taxation system, it is a proper opportunity to consider streamlining the current disparate systems of pollution charge and fees and environment-related taxes and integrating them into an internally consistent and economically efficient environmental taxation system.

2.11 Specific Objectives of Environmental Taxes

1. To replace of supplement some of environmental regulations and pollution charges and fees in order to increase the efficiency of pollution control.
2. To decrease the consumption of polluted products to a sustainable level.
3. Some environmental taxes have as its main goal raising funds, which can be used for environmental investment or general purpose.

At present, objective 1 should be put at first place in order to address the serious water and air pollution problems in China, and objective 2 and 3 may serve as supplementary. As the reform deepens, the focus may be changed.

2.1.2 Guidelines to Reconcile Environmental Taxes with Fiscal Reform

Despite the apparent appeal integrating environmental taxes into the fiscal system, environmental taxes are not necessarily compatible with fiscal reforms that aimed to simplify the tax system by reducing the number of taxes and tax rates. In order to reconcile environmental taxes with fiscal reform, the following guidelines need to be observed:

1. Avoid designing sophisticated environmental taxes that reflect closely environmental damages (use very broad measures of damage).
2. Limit the number of new taxes to a minimum by balancing administrative efficiency against economic efficiency.
3. Recycle the revenues from environmental taxes to reduce the tax rates of existing distortionary taxes such as taxes on labour and capital.

2.2 Some of the Main Environmental Taxes Measures

2.2.1 Environmental taxes on energy products and vehicle use

- SO2 tax on coal

  1) Tax rate: based on the work done by the WGEE in the first phase, a preliminary suggestion is 865 yuan/ton SO2 (WGEE, 1977), and it is four times as high as that charged at present.
  2) Levy methods: for large users - emission tax, for small ones - product (consumption) tax based on its content of sulphur (at present, the scope of the product tax may be limited in users lived in city and town regions).

- Resource tax on coal

  Based on the research done by the WGEE in the first phase, the resource taxes mainly aim at adjusting differences in natural quality of coal between different resource developers, and do not reflect the value of resource. For example, for most coal firms in China, the rate of resource tax on coal is less than 0.5 yuan/ton, but the real value (user value) is about 6 yuan/ton. The increase of resource tax rate on coal will increase fiscal income, and decrease the air pollution with coal consumption (WGEE, 1997).

- Consumption Taxes on Gasoline and Diesel Oil

  The taxes burden (in terms of percentage of tax to price) on gasoline and diesel oil are lower than that in OECD countries, so there is potential for increasing the rate. At present, in cities with serious air pollution, extra consumption taxes on gasoline and
diesel oil may be added aiming at controlling air pollution. For example, in cities with serious air pollution from vehicle tail gas, standard cleaning equipment on vehicle should be required, and the tax rates on gasoline and diesel oil should be increased as well.

2.2.2 Water pollution and environmental taxes

- Treatment charge on domestic sewage: in cities, domestic sewage charge (or tax) should be levied in order to raise funds for the construction and operation of central disposing factory of waste water.

- Taxes on water pollution: for large and middle enterprises -- effluent and emission taxes should be levied; for small ones -- output taxes based on their output and the standard emission rates should be levied.

2.2.3 Environmental taxes on agricultural inputs and other products

- In regions with major rivers and lakes, taxes on pesticide and chemical fertiliser may be levied in order to reduce water pollution and other pollution caused by chemical fertiliser and pesticide. A preliminary suggestion is to levy a 10% ad Valorem tax on nitrogen fertiliser to encourage more balanced fertiliser use and limit the negative environmental effects of its overuse (see Study on Environmental Costs of Rice Production in Hunan and Hubei, 1999).

- In some major cities, it is proper to consider taxing on plastic bags in order to reduce its overuse or promote its recycle.

2.2.4 Investment tax incentives

- Taxes remit or accelerated discounting on environmental investments may be put into practice.

2.3 Implementation

- To accommodate to the reality during the period of China’s transition from planning economy to market economy and the primary phase of development, the reform of environmental taxation should be implemented gradually, especially when the tax rates are supposed to increase significantly. One proper method is to announce the introduction of a tax long before it is actually introduced; to introduce it at a level well below the desired final level, and to increase it gradually. The adjustment may take a period of 3-5 years, however, the direction of reform should be clear and the adjustment should be carried out firmly.

- Environmental taxes have significant distribution impacts, which depend on local circumstances, location, time horizon and how the revenues from environmental taxes are spent. These impacts may be addressed through (a) differential taxation (lower taxes on necessities), (b) retraining, compensation of impacts and gradual
implementation and (c) revenue neutrality, i.e. commensurate reduction of other taxes with high incidence on the poor and (d) increased progressively elsewhere in the tax system.

- To promote the reform of environmental taxation, some other measures should be carried out: 1) to reduce opposition from industrial sectors by tax exemptions and reinforce supports by the use of revenues from environmental taxes; 2) reforms on the use of funds raised by the pollution levy system; a) non-free use of the funds; b) reform the funds allocating mechanism and management system. 3) Establish the legislation basis of environmental taxation.

2.4 Workplan for Next Year

In order to quantify the economic, social and environmental effect of environmental taxes or tax substitutions, it is necessary to develop general equilibrium macroeconomic models of the Chinese economy and simulate these and other green taxes and different tax rates and explore not only the opportunities for “double dividends” but also to quantify the effects on GDP, investment, consumption, exports, government revenues, sectoral outputs, energy use, emissions and other direct and indirect ripple effects.

Based upon the foregoing, a number of specific tasks will be conducted under the green taxation study over the next two years. These are as follows:

1. Establishment of macroeconomic models for China. It involves: 1) review of green taxation models; 2) selection of prototype model for China; 3) modification/extension of prototype model; 4) data collection and processing and 5) model calibration for China.

2. Development of scenarios. It involves the determinant of all potential environmental taxes, the alternative level of tax rate or its adjustment plans, etc.

3. Preliminary policy simulation. The simulations will focus on the effects of SO2 tax, CO2 taxes or energy taxes, and other product taxes. Through these simulations, basic data on the effects of such environment taxes would be got.

4. Re-simulations and policy recommendations. It involves the adjustment of policy scenarios, the re-simulation of each tax measure, and formation of policy reform recommendations.

In above, task 1, 2 and 3 will be finished in the first year, and the rest will be finished in the second year.

Part 3 Valuation of Environmental Damage in China

The objective of this study is duplex: 1) As a response to the question raised by high level officials of China government, the study will address the need for more accurate, theoretically more correct and empirically more defensible estimates of environmental
damage in China. 2) To provide a basis for China’s environmental investment and environmental policy planning at macro level.

3.1 Research Progress Achieved

The WGEE has achieved progress in following aspects:

1. Review of existing damage estimates studies. It involves the researchers, the damage type included, the valuation methods, identification of valuation errors and gaps, and the strength and weakness, etc.

2. Determining valuation framework and main valuation methods. It involves the damage types that will be included in the study, and the main valuation methods will be used.

3. The case study results on main natural resources and related environmental costs with them (water, energy, timber and agriculture).

3.2 Workplan for Next Year

1. The estimates of damage costs with major pollution and environmental degeneration. It involves:

   - To establish physical impacts/dose-response functions with air and water pollution and other environmental degeneration.

   - Use of shadow pricing to convert market and administered prices into economically efficient prices reflecting the true social opportunity cost of resources lost to environmental damage.

   - Valuation would be based on theoretically valid preference-based measures of willingness to pay, so that values can be consistently aggregated.

   - Estimates of damages would be given in terms of ranges (low, mid, high) avoiding a false sense of accuracy beyond what is justified by the quality of the data and the methods used, etc.

2. Crosscheck of values and validation, aggregation of estimates and its comparisons. It involves:

   - Any assumptions made would be stated explicitly and their reasonableness would be documented with available evidence or expert opinion (through consultations with Chinese and foreign experts such as medical doctors, epidemiologists, engineers, and hydrologists).

   - The sensitivity of the results to assumptions would be tested by varying assumed parameters around their base values.
- Effort would be made to use more than one valuation technique for each estimate in order to reduce the range of the estimate or increase confidence in the results.

- The damage estimates obtained would be: (a) expressed as a percentage of GDP, and annual economic growth; (b) compared to expenditures on environmental protection; (c) compared to earlier estimates obtained in China; and (d) compared to estimates obtained in other countries at comparable levels of economic development and in OECD countries.

3. Damage projections: different scenarios.

- Ideally, the damage estimates would be projected forward based on alternative scenarios about the rate of population change, economic growth and structural change, energy use (fuel mix and efficiency), urbanisation, and environmental policy.

In above, tasks 1 and 2 will be finished in the first year and the rest will be finished in the second year.

Part 4 Other Projects and Policy Recommendations

- Environmental Costs of Rice Production in Hunan and Hubei
  The WGEE used MOC Pricing framework to analyse the full cost of rice production in Hunan and Hubei provinces. It is found that there are five main environmental penalties with rice production: 1) Flood damage arising from the reclamation of wetlands for rice production, which has greatly reduced the storage capacity of lakes. 2) Pollution from the factories and energy intensive processes involved in the manufacture of mineral fertilisers and pesticide and its impact on human health and contribution to acid rain. 3) Damage to the health of farmers using pesticides. 4) Eutrophication and pesticide contamination of the water in mixed rice-fish production systems and of the lakes and waterways draining rice lands. 5) Contamination of drinking water supplies by fertiliser and pesticide residues. The economic costs of the five environmental penalties are high. For these two provinces they have been estimated to be 2.5 to 10.7 billion yuan in 1995, that is, 1.0 to 4.5% of the agricultural GDP. It follows that these environmental costs should play a greater role in the policy decision process and in price setting for agricultural inputs and rice, for example, it is proper to levy an environmental tax on fertiliser.

- National Income Accounting Study
  Work already started in the first phase on incorporating environment into national income accounts will continue; however, primary attention will continue to be on developing the “building blocks” necessary for this to be a practical policy tool. As WGEE has previously observed, recommendations for policy reform in this area should continue to be a longer term objective.

- Sustainable Use of Grasslands
  This study will be a complement to the on-going study on sustainable rice production, and, as in that study, also be based upon the use of MOC pricing analysis.
- Ecological Travel Study
The WGEE worked with Professor Swanson from University College London on the study of Panda Protection and Ecological Travel in Wolong District of Sichuan Province. Based on investigation on the spot in Sichuan and a questionnaire survey of travellers in Beijing (esp. foreign travellers), the study calculated the proper price standards for services in Wolong Panda Protection District of Sichuan, and made policy suggestions on development of ecological travel and promoting ecological protection.

- Support to Other Working Groups
Support will primarily take the form of participation in meetings of the working groups concerned, possible participation in actual studies, and reviewing and commenting on reports. New groups, i.e. those concerned with transport and integration of environment into economic planning, will receive special attention, with participation in two of their meetings in the first year being expected.

- High Level Seminars
It is proposed to take advantage of the high profile of the China Council by conducting seminars for senior officials from state, provincial and city level on the topics that have been addressed by the WGEE, i.e. basically revolving around pricing and valuation issues as they relate to environmental policy. Two seminars each year are suggested, primarily aimed at raising the awareness of participants from ministries and other (non-environmental) government agencies about the actual and potential linkages between their economic and financial policies and the environment.