

## **Green Fiscal Policy and Climate Mitigation in Indonesia**

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### **Abstract**

In common with other archipelagic countries, Indonesia is vulnerable to such impacts of climate change as prolonged droughts, increased frequency in extreme weather events, and heavy rainfall resulting in floods. These threats, coupled with the fact that Indonesia has been declared one of the three biggest greenhouse gases emitters, has induced the Indonesian government to place a high priority on climate change issues. In particular, the government considers its fiscal policy to be a key instrument in both mitigating against and adapting to climate change. This paper reviews Indonesia's implementation of green fiscal policies and discusses recent Indonesian fiscal policy responses to its commitment to reduce its emissions by 2020. In general, one can conclude that although progress has been made in the area of green fiscal policy in Indonesia, a more vigorous approach is needed to protect Indonesia's environment and to cope with the new challenges of controlling CO<sub>2</sub> emission in the era of climate change.

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## **Green Fiscal Policy and Climate Change Mitigation in Indonesia**

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### **Abstract**

*In common with other archipelagic countries, Indonesia is vulnerable to such impacts of climate change as prolonged droughts, increased frequency in extreme weather events, and heavy rainfall resulting in floods. These threats, coupled with the fact that Indonesia has been declared one of the three biggest greenhouse gases emitters, has induced the Indonesian government to place a high priority on climate change issues. In particular, the government considers its fiscal policy to be a key instrument in both mitigating against and adapting to climate change. This paper reviews Indonesia's implementation of green fiscal policies and discusses recent Indonesian fiscal policy responses to its commitment to reduce its emissions by 2020. In general, one can conclude that although progress has been made in the area of green fiscal policy in Indonesia, a more vigorous approach is needed to protect Indonesia's environment and to cope with the new challenges of controlling CO<sub>2</sub> emission in the era of climate change.*

Keywords: Fiscal policy, climate change and public economics

JEL: H30, H23, H61

# 1. Introduction

Most scientists these days agree that climate change is the most pressing global environmental issue (Stern, 2007). Whilst its impact threatens the sustainability of all life on the planet, any meaningful mitigating action to avoid catastrophe is difficult to achieve as it requires strong international coordination. Economists argue that climate change is a result of market failure; in which the free market mechanism fails to allocate resources optimally due to a negative externality problem,<sup>1</sup> caused by an omission to take into account the impact of activities that emit greenhouse gases in their cost and benefit accounting; i.e. the cost of this impact is not internalised in the price produced by these activities, and so these activities emit too much greenhouse gas (Krugman, 2010).

Market failure requires government intervention in many cases. One way of doing so is through fiscal policy (taxation and expenditure or fiscal stimulus policies). In the environmental context, literature has shown that government intervention through fiscal policy could play an important role in assuring sustainable use of natural resources and safeguarding the environment (Baumol and Oates, 1988; Hartwick and Olewiler, 1998). Well-designed tax and royalty systems could ensure that natural resources are not overexploited. In addition, government expenditure on bodies such as forestry management agencies directly supports optimal management of resources.

Fiscal policy is also regarded as a key instrument in both mitigating and adapting to climate change. In relation to mitigation, besides tradable permit systems, carbon taxes are an alternative option to reduce greenhouse gas emission through a pricing policy framework. Either method can provide strong and credible incentives for firms and households to reduce carbon emissions and develop alternative technology, as well as ensuring a fair distribution of the associated costs and benefits (Krugman, 2010). Meanwhile, public spending on certain sectors such as coastal protection, health and education can help to reduce a country's risk exposure and promote its resilience.

As an archipelagic country, Indonesia is very vulnerable to the impact of climate change. Prolonged droughts, increased frequency in extreme weather events, and heavy rainfall resulting in floods, are a few examples of climate change impacts. In turn, these may have a harmful effect on agriculture, resulting in threats to food security (Jotzo et al, 2009). These threatened impacts, coupled with the fact that Indonesia is one of the three largest greenhouse gases emitters globally, has led the Indonesian government to place a high priority on climate change issues and to aim to reduce emissions by 26 percent by 2020 and by 41 percent if enough international support is available (Resosudarmo and Yusuf, 2009; Ministry of Finance, 2009).

To achieve this emission reduction target, fiscal policy clearly has a key role in Indonesia not only as a means by which potential carbon tax systems or other relevant policy schemes can be introduced but also to eliminate environmentally unsustainable biases such as energy subsidies, forestry rents, and profit sharing schemes in the mining sector which have distorted price signals, leading to over consumption and exploitation.

The aim of this paper is first to review the existing regime of fiscal policy in Indonesia related to environmental management, from both revenue and expenditure perspectives. With regard to expenditure, broad structures and trends of budget allocation for green activities will be presented. Concerning revenue, various green taxes and levies that have been or once were implemented in Indonesia will be outlined. Second, this paper will discuss the structure of CO<sub>2</sub> emissions and challenges involved in their reduction. Third, this paper will present recent fiscal policies in response to Indonesia's commitment to reduce its emission by 2020. Final remarks concern the opportunities and challenges faced by Indonesia in achieving its emission reduction target.

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<sup>1</sup> Externality, in general, refers to a situation that occurs when the effect of any activity (production or consumption) imposes costs or benefits on others which are not reflected in the price charged for the goods and services being provided.

## 2. Key Green Fiscal Policies in Indonesia

This section summarises the key green fiscal policies has and shows how they have been progressively implemented through various mechanisms and government bodies in Indonesia.<sup>2</sup> However, this section does not aim to evaluate the effectiveness of these policies.

### 2.1. The Ministry of the Environment

In 1978 President Soeharto demonstrated Indonesia's concern for the environment when he appointed Emil Salim as the first Minister for the environment.<sup>3</sup> Since then, a fiscal budget has been allocated to this ministry to design regulations and programs to manage the country's environment. The first environmental law to be enacted was Law No. 4/1982 on Basic Provisions of Environmental Management (Koesnadi, 1989). Since then, various laws and regulations have been passed.

In 2010, the budget for the Ministry of the Environment was approximately Rp. 416 billion or approximately 0.06 percent of central government spending. This allocation, though very small, is certainly one of Indonesia's key green fiscal policies, enabling the Ministry to develop several, though not all, environmental management programs in the country. Some environmental budgetary allocations are made to other departments. In general the Ministry of the Environment only receives 5 percent of the total central government environmental budget. This situation reflects the relatively small influence of this ministry within the cabinet.

Examples of programs that have been developed by the Ministry of the Environment are as follows. The first serious attempt to control pollution was made in 1989 when then the Ministry of the Environment, through Government Regulation No. 29/1986, started to require all firms and development programs to submit a report on the expected impact of their activities on the environment, their proposed actions to avoid or minimise this impact, and what environmental impact monitoring activities they would undertake. This report — called an environmental impact assessment (*Analisa Mengenai Dampak Lingkungan* or AMDAL) — is assessed by whichever government agency has the authority to permit the activity. If the project is expected to have a serious environmental impact, the report needs to be assessed by an inter-sectoral team involving the Ministry of the Environment.

The next serious attempt to control pollution was the Clean River Program, also known as PROKASIH (*Program Kali Bersih*), which commenced in 1989 in response to the declining quality of rivers in Jakarta. It is based on a consensual approach to control wastewater effluents by targeting selected industrial polluters in priority river basins. The goal is to improve river quality by setting a specified standard for river water based on some parameters — usually biochemical oxygen demand (BOD) and total suspended solids (TSS) — established by the government (Resosudarmo et al., 1997; ADB, 1997). This program also attempts to strengthen human and institutional capabilities regarding the management of river water quality and of riverbanks (Resosudarmo, 2003).

In June 1990, through Presidential Decree No. 23, a national environmental impact management agency (*Badan Pengendalian Dampak Lingkungan* or BAPEDAL) was established (Hardjono, 1994). The main task of this agency is to implement various programs developed by the Ministry of the Environment.

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<sup>2</sup> Please see as well Resosudarmo and Irfhamni (2008) for a review of environmental policies in the manufacturing sector in Indonesia.

<sup>3</sup> Initially this agency was the State Ministry of Development Supervision and the Environment. In 1983, it was renamed the State Ministry of Population and the Environment. In 1993, it became the State Ministry of the Environment. In this paper, we will refer to all of them as the Ministry of the Environment.

The PROPER program was established in June 1995 as an alternative environmental policy developed by the Ministry of the Environment. PROPER is basically an environmental rating program that acts as a simple form of environmental certification. Its main objectives are to increase compliance with environmental regulations, promote adoption of clean technologies, create incentives for polluters to strengthen their in-house environmental capabilities, and prepare companies in Indonesia for International Standards Organization (ISO) 14001 certification (Wheeler and Afsah, 1996; ADB, 1997).

Implementation of this program was conducted by BAPEDAL. Each year BAPEDAL evaluated companies participating in this program regarding their environmental abatement activities. Based on their success in reducing waste discharge, mainly water effluent — hence the program was also called PROPER PROKASIH — these companies were given one of five different colour scores (ADB, 1997). The results were published in newspapers and other media to make them known publicly.

In 2002 the Ministry of the Environment developed a new PROPER program with the more comprehensive goal of multi media management, aiming not only to control water, air, and toxic waste discharge, but also to be involved in environmental impact assessment (AMDAL). It is also equipped with new regulations such as Government Regulation No. 27/1999 on environmental impact assessment (AMDAL), Regulation No. 18/1999 on toxic waste management, Regulation No. 82/2001 on air and water pollution, Ministerial Decree No. 113/2003 on waste water discharge and Ministerial Decree No. 129/2003 on emission (Ardiputra, 2004).

Other than PROPER, there are few monitoring activities conducted for hazardous waste disposal. Only a small number of industries dispose of their hazardous waste at the existing treatment facilities and the number of hazardous waste treatment plants and facilities available in a treatment plant are limited. In fact, the Cileungsi Hazardous Waste Treatment Plant near Jakarta (operational in 1994) is the only treatment facility capable of processing this waste and providing a secure storage area and a lined landfill for the disposal of stabilised and low level toxins (World Bank, 2003).

## **2.2. Central Government Environmental Expenditure**

In Indonesia, government spending is conducted by both central and regional governments. The central government spending or budget is the amount that is spent by the central government, typically through sectoral ministries, and is generally approximately 70 percent of the total government budget. The rest is spent by regional governments and is called regional spending.

As mentioned before, besides funds allocated to the Ministry of Environment the Indonesian central government does provide funding for other programs related to the environment. This could be funding for reforestation, allocated to the Ministry of Forestry or for building dams, allocated to the Ministry of Public Work. The total central government budget for environment related activities, excluding the regional government budget, can be seen in Table 1. This total is much higher than what is allocated through the Ministry of Environment, as it only controls 5 percent of this environmental budget.

It can be seen from Table 1 that, though relatively small, the amount— and also its share— of the government budget for environmentally related programs has increased. This is an indication that the Indonesia government is becoming more concerned about the country's environmental status, though it is still not a top government priority. By comparison, the education budget is approximately 20 percent of the total government budget.

Table 2 represents the distribution of central government environmental spending. The four categories are waste management, pollution mitigation, natural resource conservation, and land use management. Most funding is allocated to natural resource conservation, in particular flood control

and coastal protection, with the majority of the funding going to flood control. Hence, it can be observed that the two main environmental priorities are flood control and land use management. This is probably a good strategy since these issues are problematic and at the same time affect many people, particularly in Java.

### **2.3. Decentralised environmental funds**

Regional governments also spend some of their budget on environmental programs. As with the central government, this spending can be for building dams, improving waste management or water treatment works, among other things. The central government transfers certain funds to regional governments designated to be spent only on specific programs, namely special allocation funds (*Dana Alokasi Khusus* or DAK). So far, there are two types of DAK that relate to the environment: environmental DAK and forestry DAK (Table 3). Environmental DAK supports activities like water treatment, air pollution control and waste management. This DAK is particularly allocated to regions that face significant environmental problems and have been left behind. Distribution among regions in Indonesia can therefore be on the basis of environmental problems as well as whether a region lags behind e.g. Java-Bali has received large amounts of environmental DAK funding, reflecting its significant need for clean water, waste and air pollution management. Sumatra and Eastern Indonesia have received relatively large amounts due to their high number of regions that lag behind.

Forestry DAK supports reforestation in particular. Distribution of these funds among regions in Indonesia reflects not only the need but also the ability of regional governments to reforest their forest areas. Kalimantan, for example, should have a high DAK since the rate of deforestation in the area is relatively faster than in other areas. However, it does not receive a large amount of DAK due to the fact that revenues of regional governments in Kalimantan are relatively high. In general, the total amount of DAK for the environment and forestry is relatively less than 1 percent of total regional government budgets.

Regional governments also develop their own environmental programs and fund these activities. Table 4 represents the amount of funding spent on these activities. In general the amount is approximately 3-6 percent of their development budget, but still less than 1 percent of their total budget. In Java-Bali, a significant portion of this amount is for water management, such as flood control and water distribution. In Sumatra and Kalimantan, it is for activities related to forest management, including reforestation.

In general, it can be seen that budget allocations to environmental programs by regional governments are increasing. However the amounts are still relatively small. Environmental management is not yet a top priority for regional governments.

### **2.4. Taxes and charges**

Several user charges have been levied throughout Indonesia. These are particularly related to municipal services such as drinking water, wastewater treatment, solid waste collection and disposal, and to road/transportation services (ADB, 1997; Rock, 2000). Several examples related to industrial pollutants are as follows.

Regarding water management, in most provinces a surface or raw water use licence is required for withdrawing surface water, with the license fee starting at US\$43 in 1996. For six main classes of customers, a volume based fee is added, ranging from zero for households to Rp 150/m<sup>3</sup> for industrial users (ADB, 1997; Rock, 2000). These prices are considered low, particularly for industrial users, and hence it is anticipated that these prices do not really affect personal and industrial water use behaviour.

Furthermore, there are around 300 PDAMs (state-owned municipal water companies) providing access to treated pipe water for around 36 percent of the urban population throughout the country, with fees averaging from Rp 350–2,000 per m<sup>3</sup>. These prices are considered too low, and so many of these PDAMs are in financial difficulty. In 2004, the government enacted a new law allowing private enterprises to manage the water supply in various regions across the country (PERPAMSI, 2004).

Regarding sewage disposal, in 1989 the Ministry of Public Works decided to apply a levy for sewage disposal. This levy covers five categories of users and in 1997 was determined according to the floor space of a building, office or house. The rate in 1990 was from Rp 28 per m<sup>2</sup> for households to Rp 182 per m<sup>2</sup> for commercial high-rise buildings (ADB, 1997; Rock, 2000). Local governments are responsible for the management of sewage disposal collection, which is generally conducted either by contractors or residents themselves. Only a miniscule portion of the solid waste is recycled and this is mostly conducted by the informal private sector (e.g. scavengers) in many large cities in Indonesia (World Bank, 2003).

The user charge was less effective for solid wastes than it was for water management, mainly because the agency that managed the solid waste did not collect the charge. Solid waste management was funded through a Presidential Instruction Decree (Inpres) by provincial governments, while local/district financial offices or *Dinas Pendapatan Daerah* (Dispenda) collected the fees (Rock, 2000) and there was a failure of collaboration between the two bodies. Due to the lack of an effective user charge system, solid waste collection in urban areas ranges from 40 to 85 percent of total wastes, including the share attributable to scavengers (ADB, 1997; Rock, 2000). In several areas though, due to financial strain, the government privatised some collection services and most of these were considered to be more successful (Rock, 2000).

Since the 1980s, a fuel tax of as much as 5 percent has been in place in Indonesia in addition to a 10 percent sales tax. The main goal, though, was to raise the revenue of local governments. 10 per cent of the total fuel tax revenue goes to the central government, and the rest is distributed to provincial, district and municipal governments. Since 1997, however, the government has subsidised domestic fuel prices by much more than 5 percent, so this fuel tax has not been effective in controlling its use.

Table 5 shows fuel pricing and its tax component for 2009. The Ministry of Finance (MoF) calculated the benchmark price representing the costs incurred by the National Oil Company (PERTAMINA) in producing and distributing fuel. In doing so, the MoF bases the benchmark price on the MOPS (Mid Oil Platts Singapore) plus alpha magnitude (parameter of distribution cost). The pre-tax price is the difference between the benchmark price and the subsidy. GST and local fuel tax amounts are based on this pre-tax price. Retail price is the sum of the pre-tax price, GST and local fuel tax. It can be seen that, due to the subsidy, the retail price, even including taxes, is lower than the benchmark price, meaning that taxes are not effective. It can also be seen that, were there no subsidy, under the existing tax arrangement the price should be as stated in the market price column.

Table 6 shows the size of the fuel and electricity subsidy over several years. It can be seen that, though declining, the total subsidy allocated to fuel and electricity has been relatively high, since prices of electricity and domestic fuel are controlled by the government and do not relate to world prices. The size of government subsidies has fluctuated over the years depending on the price of world crude oil<sup>4</sup>. These subsidies have distorted the economy and are bad for the environment. It reduces the incentive to develop and use renewable energy and encourages higher levels of emission.

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<sup>4</sup> Note energy sources for electric generators in Indonesia are still oil products.



The government has imposed various taxes and fees relating to the extraction of natural resources. These include oil, gas, geothermal, mineral, fish and forest extraction activities. Each has different tax and fee systems. Table 7 illustrates the size of these taxes and fees related to natural resource extraction activities. It can be seen that revenues from oil and gas have been the most significant of the natural resource revenues. Mining has become more significant since the mid 2000s. Forestry revenues have declined, indicating the declining size of the forest area in Indonesia.

In total, the revenue from natural resource extraction activities is significant for the government, amounting to around 20-30 percent of its total revenue. The government should impose a higher rate of taxes and fees to reduce the rate of resource extraction in the country.

However, as long as illegal extraction of natural resources is rampant, a higher rate would mean a lower level of complacency and would stimulate even more illegal activities, leading to an even higher rate of resource extraction and less income for the government. Another important consideration is that a considerable number of Indonesians are employed in natural resource extraction activities. A reduction in activities would mean fewer available jobs.

## **2.5. Subsidy**

There is not much in the way of government subsidies to support the improvement of the environment. One such subsidised scheme was announced in 2007 to support the development of renewable and geothermal energy. Implementation of this scheme has been limited so far and information as to its success is not yet available.

## **3. Greenhouse Gas Emission in Indonesia<sup>5</sup>**

During the 1970s, 1980s, and 1990s, the Indonesian economy, measured by its gross domestic product (GDP), grew at an average annual rate of above 7 percent, which was relatively fast compared to many other countries. The country's economy had also been transformed from an agriculturally dominated economy to a more industrially dominated one (Hill, 2000; Resosudarmo and Kuncoro, 2006; Resosudarmo and Vidyattama, 2007). These factors made for an increased amount of CO<sub>2</sub> emitted by fossil fuel combustion.<sup>6</sup> Consequently, there are three important facts related to Indonesia's CO<sub>2</sub> emission from fossil fuel combustion.

First, Indonesia is one of the highest CO<sub>2</sub> emitter countries in the world (IEA, 2006). Since 2004, Indonesia is among the top 25 CO<sub>2</sub> emitters — ranked 16<sup>th</sup> when counting the EU as one country — due to fossil fuel combustion (Figure 1). The exact ranking is somewhat sensitive; i.e. it could easily change, as there are many countries that have only a slightly lower level of emissions than Indonesia. If CO<sub>2</sub> emission due to deforestation and land use change is included, Indonesia is one of the top 3-5 emitters (Sari et al., 2007). It is important to note, however, that the reliability of CO<sub>2</sub> emission data from deforestation and land use change is questionable.

Second, in terms of CO<sub>2</sub> emission per capita from fossil fuel combustion, Indonesia's emission per capita is still low in comparison with other countries (IEA, 2006); however, as can be seen in Figure 2, it is growing relatively fast. Between 1994 and 2004, Indonesia's CO<sub>2</sub> emission per capita from fossil fuel combustion grew faster than China's and India's.

Third, in the long run, CO<sub>2</sub> emission from fossil fuel combustion will most likely be much more important than that caused by deforestation and land use change, although the reverse is true at present. In future, if Indonesia does nothing or if it is business as usual (BAU), there should be a

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<sup>5</sup> See as well the work by Resosudarmo et al. (2008) presented in the ISEAS Workshop on 21st Century Indonesia: Challenges Ahead, Singapore, 13-14 November 2008.

<sup>6</sup> In the case of Indonesia, CO<sub>2</sub> is the most important greenhouse gas.

tendency for lower deforestation emissions as the rate of deforestation will be slower due to a decrease in available forest areas; whereas energy use and fossil fuel emissions will keep growing as GDP grows unless mitigating actions are taken.

As a consequence of the three facts related to CO<sub>2</sub> emission from fossil fuel combustion mentioned above, in order to maintain a low-carbon growth in Indonesia, a two-pronged strategy must be implemented: reduce deforestation and lower the trajectory of fossil fuel emission. Immediately effective action to reduce deforestation, such as through the Reduce Emission through Deforestation and Degradation (REDD) program, could significantly reduce the country's level of CO<sub>2</sub> emission and preserve the forests. With regard to fossil fuel combustion, it is crucial to bear in mind that investments in the energy sector have long lifetimes, often more than 35 years. Investments made now are locked in a carbon emission trajectory for a long time (IEA, 2003). Starting soon, hence, will make a big difference over time.

The literature typically identifies the drivers of deforestation in Indonesia as: (1) land use change due to plantation and mining activities as well as population growth; (2) intensive illegal logging due to high domestic and international demand for timber, weak law enforcement and the existence of poverty and social issues among forest communities; (3) forest fires due to land clearing activities mostly for plantations and due to natural forces such as long dry seasons and peat forest; (4) limited practice of selective cutting due to no enforcement as well as it being difficult and costly to implement; (5) limited implementation of forest plantation due to ease of access to natural forests (Sunderlin and Resosudarmo, 1996; Barber et al., 2002). The debate has been over who causes how much deforestation. Exact data available to resolve this debate is limited.

Figure 3 illustrates the drivers of CO<sub>2</sub> emission from fossil fuel combustion. It shows that the growth rate of emission intensity in many countries, including developing countries, has been negative in the last decade, whereas Indonesia's, though declining, is still positive; meaning emission growth is faster than economic growth. Emission intensity can be decomposed into energy intensity and carbon intensity, also shown in Figure 3. It can be seen that both energy and carbon intensities increased between 1994 and 2004. The good news is that both their growth rates declined during 1994–2004. Figure 3 also shows that the growth rates of carbon intensity from 1994 to 1999 and from 1999 to 2004 were always higher than those of energy intensity. This indicates that increasing the carbon intensity of energy supply is the more important driver for the increase in emission intensity in Indonesia.

To understand why carbon intensity in Indonesia has increased significantly, we need to observe the level of emissions for the combustion of each type of fossil fuel (or energy source) used in the country. Figure 4 shows the share of CO<sub>2</sub> emission by type of energy use in 1984 and 2004. It can be seen from this figure that the contribution from oil combustion has declined from 85 percent of total CO<sub>2</sub> emissions in 1984 to 53 percent in 2004. Meanwhile, the contribution of gas increased from 14 percent in 1984 to 21 percent in 2004, and that of coal from 1 percent in 1984 to 26 percent in 2004.

The broad trend in Indonesia's energy system is that although oil is still the main contributor of CO<sub>2</sub> emissions, its share has been decreasing. Most oil product use is in the transportation sector, with oil use in electricity generation declining strongly. The share of gas roughly remains constant, with expanding gas production directed to a large degree at exports. In the meantime, the share of coal has been increasing and takes up the role of oil in the stationary energy sector; i.e. in electric power generators.

#### **4. Fiscal Policy Response to Climate Change in Indonesia**

At the 2009 G20 meeting in Pittsburgh, President Susilo Bambang Yudhoyono announced that Indonesia had committed to a national climate change action plan that 'will reduce our emissions by

26 per cent by 2020 from BAU (Business As Usual)', and that with international support Indonesia 'could reduce emissions by as much as 41 per cent' (Resosudarmo and Yusuf, 2009; Ministry of Finance, 2009). Much of the potential for reduction (more than 80%) relates to forestry, peat-land and agriculture, where Indonesia makes its greatest contribution to global warming. This commitment to reduce greenhouse gas emissions means Indonesia now engages with climate change policy at a new level, so that it is now part of the national policy framework, including the national economic policy framework.

Within the national economic policy framework, a sound set of economic policies is the key to mitigating CO<sub>2</sub> emission; in particular appropriate pricing of CO<sub>2</sub> and fiscal policy plays a central role in shaping Indonesia's response to climate change challenges. The broad plan regarding fiscal policies as stated in the Ministry of Finance Green Paper report is as follows (Ministry of Finance, 2009):<sup>7</sup>

- Energy Sector:
  - a. Work towards the implementation of a carbon tax/levy on fossil fuel combustion, in parallel with a removal over time of the energy subsidy
  - b. Introduce complementary measures to incentivise energy efficiency and deployment of low-emissions technology, exemplified by a specific geothermal policy strategy
  - c. Access to international carbon markets
- Land-use change and forestry sector:
  - a. Support and incentivise carbon abatement measures by regional governments through the intergovernmental fiscal transfer system, working toward the creation of a Regional Incentive Mechanism (RIM) for climate change
  - b. Work with the appropriate ministries to bring existing fiscal policy settings into line with carbon reduction objectives
- International Carbon Finance:
  - a. Support the creation of new, broad-based carbon market mechanisms like sectoral targets and crediting
  - b. Support new and additional sources of international public financing
  - c. Ensure adequate returns for Indonesia's emissions reductions
- Institutional Development:
  - a. Strengthen the capacity for climate policy analysis at the Ministry of Finance
  - b. Support policy coordination across government especially among the economic ministries
  - c. Advocate a review of the broader regulatory framework that relates to climate change policy

In implementing the above strategy the Ministry of Finance (MoF) will collaborate with other relevant ministries. For example, in the energy sector, the MOF together with other economic ministries and the Ministry of Energy and Mineral Resources (the MEMR) has launched a Roadmap of Fuel and Electricity Subsidy Reduction. The fuel subsidy is expected to be eliminated completely in 2014 and transformed into a direct subsidy for the most needy group. Meanwhile, the electricity subsidy will gradually move towards only targeting consumers between 450VA and 1,300VA. In addition, a number of policies have been launched to accelerate renewable energy development in Indonesia, in particular geothermal. There are several fiscal incentives, one of which is a plan to

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<sup>7</sup> A more detailed discussion of these climate change mitigation policy plans is available in the Ministry of Finance Green Paper report (Ministry of Finance, 2009).

allocate a revolving fund in the 2011 budget to help investors in the exploration stage. In institutional development, a working group team has been set up within the Ministry of Finance which has been in communication with other ministers to discuss policies on climate change related issues. A proposal has been submitted to the Ministry of State Apparatus Empowerment to legalise it as a formal structural unit within the Ministry of Finance at echelon II level.

There are certainly challenges in implementing the strategies mentioned above. Some of the more difficult ones are as follows. With regard to the forestry sector, the incentives to convert natural forests which are rich in valuable biodiversity into mines and plantations have been so great that the rate of deforestation in Indonesia is currently among the highest. Meanwhile it takes time to set up a proper REDD program in which a strong fiscal policy is embedded. Ultimately, it is not yet clear how much of Indonesia's natural forest can be protected. In the long-run reforestation might work, but this will not replace the foregone biodiversity contained in natural forests. In the long-run, with an appropriate establishment of REDD there is a significant probability that CO<sub>2</sub> emitted by the forestry sector will be reduced. The debate concerns how much of the current existing natural forests can be saved before then.

In the energy sector, the more important challenges are as follows. First, so far the removal of the fuel subsidy is not a popular policy. Any announcement of a possible increase in the price of fuel creates street riots and social unrest. It is extremely challenging for the government to be able to develop a carbon tax and the elimination of the fuel subsidy by 2014. Second, currently there is a crash program to develop coal power electric plants with as much as an 11,000 MW capacity; most of them will be in Java. Whereas the direction of climate change policy is to reduce the use of coal, particularly for electric power generation, this program encourages Indonesia to use even more coal for its electricity. Since this is a crash program, it is doubtful that many of these power plants will rely on critical/high coal power plant technology. In addition, since the amount of coal needed for these power plants will be high, they will rely on low grade coal supplies.

## **5. Final Remarks**

The expected devastating impacts of climate change have revived discussion regarding the importance of green fiscal policy as a mechanism to tackle the environmental externality problem. In this case it is the externality of causing too much CO<sub>2</sub> to be emitted that ultimately has induced worldwide climate change. Indonesia, as one of the more significant emitters of CO<sub>2</sub>, is also taking part in this discussion. This paper has reviewed the existing regime of fiscal policy in Indonesia related to environmental management both from the revenue and expenditure aspects. It has presented the structure of CO<sub>2</sub> emissions and challenges for Indonesia in reducing its emissions, as well as recent fiscal policies in response to Indonesia's commitment to reduce its emissions by 2020.

Several observations can be drawn from this review. First, there have been green components in Indonesia fiscal policy for a long time. A significant milestone in supporting the development of green fiscal policy was the establishment of a ministerial level agency, the Ministry of the Environment, at the end of the 1970s.

Second, on the expenditure side, the size of the green fiscal budget has been progressively increasing, although up until now it has been relatively small. Both central and local governments have increased their expenditures to support environmental programs. Within the budget for environmental programs, the top priorities are for a flood control program by the Ministry of Public Works and a land-use management program by the Ministry of Forestry. A much smaller budget is allocated to the Ministry of Environment to develop their environmental programs.

Third, on the revenue side, user charges and fees for natural resource use and extraction have been in place for a long time. However, user charges are generally ineffectual in controlling and stimulating a more efficient use of resources. The situation is worse in the case of fuel and

electricity, because of government subsidies. Various fees related to natural resources have provided significant revenue for the government. The government's intention is to raise revenue however, rather than to effectively control the rate of extraction.

This paper has also reviewed the main sources of Indonesia's CO<sub>2</sub> emission; i.e. deforestation and the use of coal in the energy sector. Various ministries, including the Ministry of Finance have debated fiscal policies to mitigate CO<sub>2</sub> emission. The main fiscal policy proposals are to impose a carbon tax together with the elimination of the fuel and electricity subsidy, to create an energy mix favouring geothermal and renewable resources, and to support the development of the REDD program by creating incentives for regional governments to behave appropriately.

Considering that Indonesia has made progress in implementing green fiscal policies, there is cause for optimism regarding expansion of its fiscal policies to include CO<sub>2</sub> emission mitigation. Nevertheless, it is also understood that the challenges with regard to implementing these policies are considerable. Among others are, firstly, the perennial difficulty in finding disincentives to converting natural forests; secondly, an increase in energy prices typically induces social unrest; and thirdly there is the problem of the on-going crash program to develop coal based electric power plants. Hence, while it is possible that in the near future Indonesia will implement green fiscal policies to control its CO<sub>2</sub> emission, it remains uncertain as to how effective they will be.

## References

- Asian Development Bank (ADB) (1997), *Strategy for the Use of Market-Based Instruments in Indonesia's Environmental Management*, Asian Development Bank, Manila.
- Ardiputra, I.K. (2004), "PROPER: Program Penilaian Peringkat Kinerja Perusahaan", Presentation by Kementerian Lingkungan Hidup, Jakarta.
- Barber, C.V., E. Matthews, D. Brown, T.H. Brown, L. Curran, and C. Plume (2002), *The State of the Forest: Indonesia*, World Resources Institute, Washington, DC.
- Baumol, W.J. and W.E. Oates (1988), *The Theory of Environmental Policy*, Cambridge University Press, Cambridge.
- Hardjono, J. (1994), "Resource utilization and the environment", in: Hal Hill (ed), *Indonesia's New Order*, Allen and Unwin, Sydney, pp. 179-215.
- Hartwick, J.M. and N.D. Olewiler (1998), *The Economics of Natural Resource Use* (2nd edition), Addison-Wesley, Reading, MA.
- Hill, H. (2000), *The Indonesian Economy*, Cambridge University Press, Cambridge, U.K. (Second Edition).
- International Energy Agency (IEA) (2003), *World Energy Investment Outlook 2003*, International Energy Agency, Paris.
- International Energy Agency (IEA) (2006), *World Energy Outlook 2006*, International Energy Agency, Paris.
- Jotzo, F., I.A.P. Resosudarmo and D.A. Nurdianto (2009), "Climate Change and Development in Eastern Indonesia" in B.P. Resosudarmo and F. Jotzo, *Working with Nature against Poverty: Development, Resources and the Environment in Eastern Indonesia*, ISEAS, Singapore, pp. 248-267.
- Koesnadi, H. (1989), *Environmental Legislation in Indonesia*, Gajah Mada University Press, Yogyakarta.
- Krugman, P. (2010), "Building a Green Economy", *New York Times*, 5 April.

Ministry of Finance (2009), *Ministry of Finance Green Paper: Economic and Fiscal Policy Strategies for Climate Change Mitigation in Indonesia*, Ministry of Finance and Australia Indonesia Partnership, Jakarta.

Persatuan Perusahaan Air Minum Seluruh Indonesia (PERPAMSI) (2004), "Informasi Perbandingan Daftar Tarif Air dan Biaya Operasi Sistem Branching 2004", PERPAMSI, Jakarta.

Resosudarmo, B.P. (2003), "River Water Pollution in Indonesia: An Input-Output Analysis", *International Journal of Environment and Sustainable Development*, 2(1): 62-77.

Resosudarmo, B.P. and A. Kuncoro (2006), "The Political Economy of Indonesian Economic Reform: 1983-2000", *Oxford Development Studies*, 34(3): 341-355.

Resosudarmo, B.P., F. Jotzo, A.A. Yusuf and D.A. Nurdianto (2008), "Challenges in Mitigating CO<sub>2</sub> Emission: The Importance of Managing Fossil Fuel Combustion", Paper presented in the ISEAS Workshop on 21st Century Indonesia: Challenges Ahead, Singapore, 13-14 November.

Resosudarmo, B.P. and M. Irhamni (2008), "Indonesia's Industrial Policy Reforms and Their Environmental Impacts", *Journal of the Asia Pacific Economy*, 13(4):426-450.

Resosudarmo, B.P. and Y. Vidyattama (2007), "East Asian Experience: Indonesia", in A.M. Balisacan and H. Hill (eds.), *The Dynamics of Regional Development: The Philippines in East Asia*, Edward Elgar, Cheltenham Glos, pp. 123-153.

Resosudarmo, B.P. and A.A. Yusuf (2009), "Survey of Recent Developments", *Bulletin of Indonesian Economic Studies*, 45(3): 287-315.

Resosudarmo, I.A.P., B. P. Resosudarmo, and B. Isham (1997), "The Indonesian Clean River Program (PROKASIH) as Perceived by the People Residing Along the Rivers in Jakarta", *Indonesian Journal of Geography*, 29(74): 47-64.

Rock, M.T. (2000), "Using "Green Taxes" to Increase Revenues and Improve Environmental Management in Local Government Following Decentralization", EPIQ-USAID Internal Report.

Sari, A.P., M. Maulidya, R.N. Butarbutar, R.E. Sari, W. Rusmantoro (2007), Working Paper on Indonesia and Climate Change: Current Status and Policies. Pelangi Energi Abadi Citra Enviro (PEACE), Jakarta.

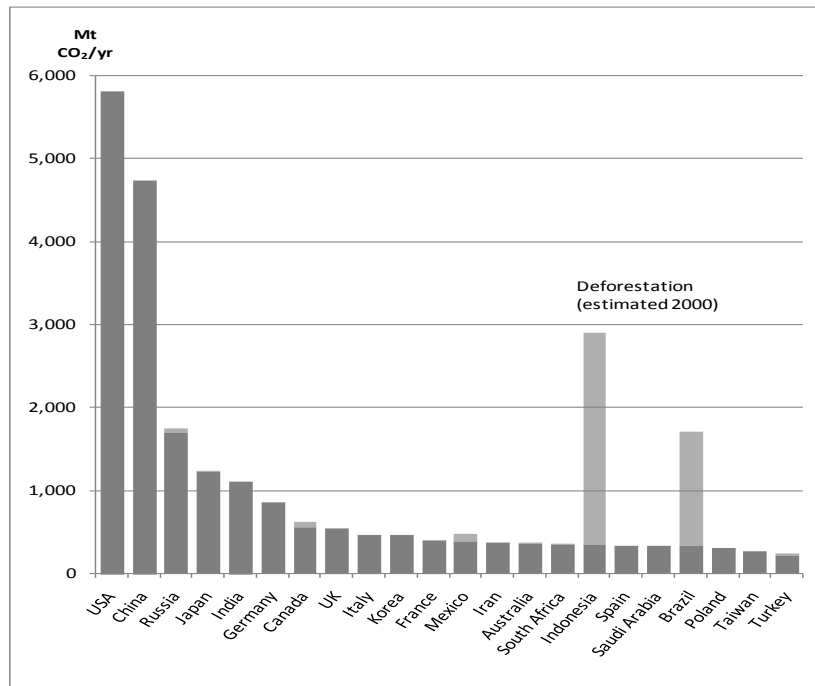
Stern, N.H. (2007), *The Economics of Climate Change: The Stern Review*, Cambridge University Press, Cambridge.

Sunderlin, W.D. and I.A.P. Resosudarmo (1996), "Rates and Causes of Deforestation in Indonesia: towards a Resolution of the Ambiguities", CIFOR Occasional Paper. No.9(E), Center for International Forestry Research, Bogor.

Wheeler, D. and S. Afsah (1996), "Going Public on Polluters in Indonesia: BAPEDAL's PROPER PROKASIH program", East Asian Executive Report, World Bank, Washington, D.C.

World Bank (2003), *Indonesia Environment Monitor 2003*, Special Focus: Reducing Pollution, World Bank, Washington D.C. and Jakarta.

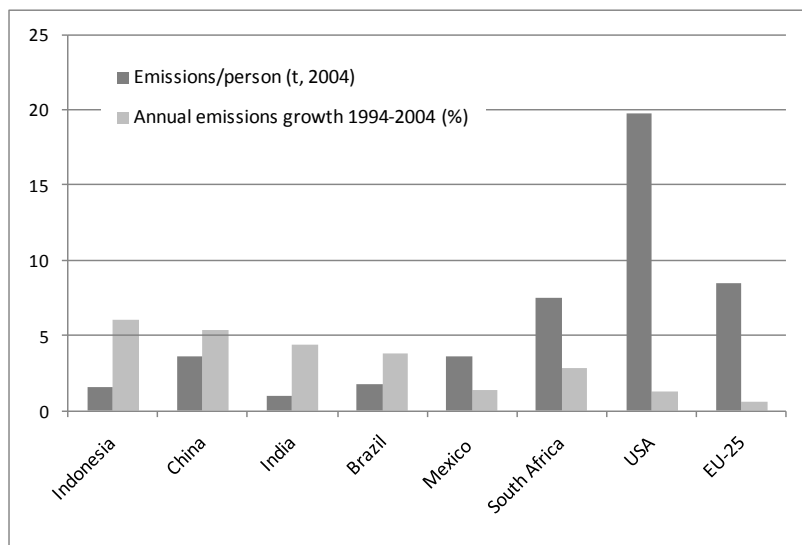
**Figure 1. Top 25 Global CO<sub>2</sub> Emitters in 2004**



Source:

- International Energy Agency (2007) [<http://www.iea.org/>] (fossil fuel emission)
- World Resource Institute (2007) [<http://www.wri.org/#>] (deforestation emission)
- See as well Resosudarmo et al. (2008)

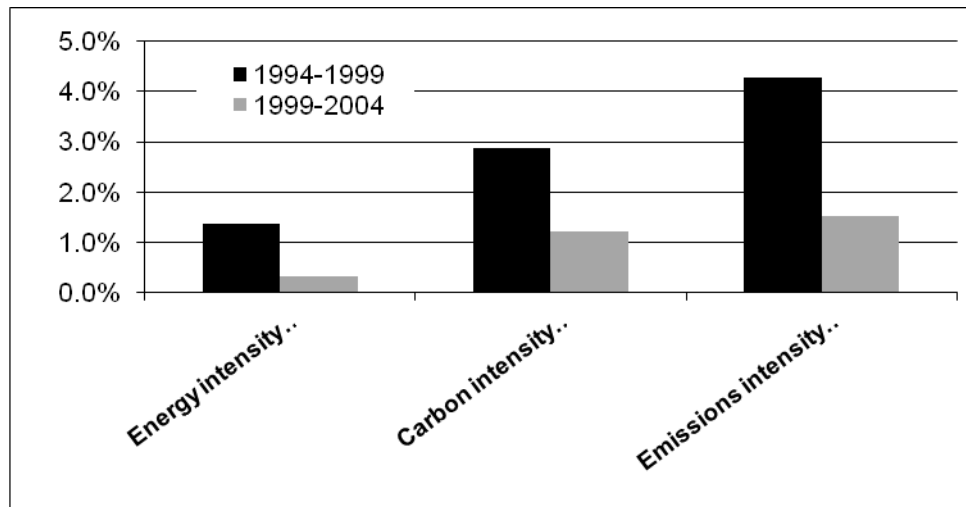
**Figure 2. Fossil Fuel CO<sub>2</sub> Emissions per Capita and Their Growth Rates**



Source: International Energy Agency (2007) [<http://www.iea.org/>] and see as well Resosudarmo et al. (2008)

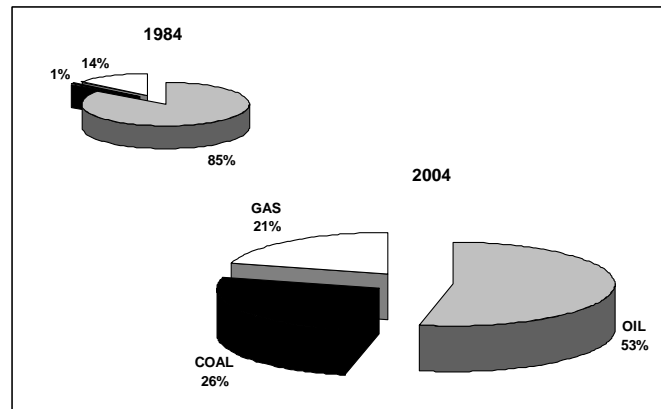


**Figure 3. Growth Rate of Emission Intensity and Its Decomposition**



Source: International Energy Agency (2007) [<http://www.iea.org/>] and see as well Resosudarmo et al. (2008)

**Figure 4. Share of Emissions by Types of Fossil Fuel Combustion**



Source: International Energy Agency (2007) [<http://www.iea.org/>] and see as well Resosudarmo et al. (2008)

**Table 1. Government Spending on the Environment (Rp Billion)**

<b>Year</b>	<b>Spending on Environment (Rp Billion)</b>	<b>Share of Total Central Government Spending (%)</b>
2005	1,334	0.37
2006	2,665	0.61
2007	4,953	0.98
2008	5,315	0.77
2009 <sup>1)</sup>	6,684	0.96
2010 <sup>2)</sup>	7,753	1.11

Source: Ministry of Finance

Notes: 1) Revised Budget of 2009 (APBN-P)

2) Budget 2010

**Table 2. Percentage Distribution of Government Environmental Spending**

(%)	2008	2009
1. Waste Management	8.4	7.5
2. Pollution Mitigation	3.5	2.5
3. Natural Resource Conservation		
- Conservation	6.9	5.9
- Rehabilitation	5.9	9.5
- Capacity Development	6.8	4.7
- Flood Control and Coastal Protection	37.5	36.9
4. Land Use Management	28.1	30.7
5. Other Environment	2.8	2.3
	100	100

Source: Ministry of Finance

**Table 3. Special Allocation Fund (DAK) for the Environment (Rp billion)**

Region	Environment				Forestry	
	2006	2007	2008	2009	2008	2009
Sumatera	29.7	101.9	101.9	96.0	29.8	39.4
Java & Bali	30.4	78.5	78.5	70.6	8.6	15.2
Kalimantan	12.4	40.1	40.1	40.6	11.5	3.9
Sulawesi	16.5	57.4	57.4	62.0	23.3	18.9
Nusa Tenggara, Maluku & Papua	23.8	73.8	73.8	82.3	26.8	22.7
Total	112.9	351.6	351.6	351.6	100.0	100.0

Source: Ministry of Finance

**Table 4. Regional Government Spending on the Environment**

Region	Environment Spending (Rp Billion)					Share to Tot. Development Expenditure (%)				
	1995	1997	1999	2001	2002	1995	1997	1999	2001	2002
Sumatera	41.8	72.5	132.7	180.3	327.7	2.28	2.93	4.00	2.05	2.35
Jawa & Bali	132.7	177.7	346.1	494.0	692.4	3.28	3.43	6.50	4.15	4.57
Kalimantan	31.9	28.7	61.0	130.9	467.6	3.49	2.52	3.95	2.81	7.89
Sulawesi	31.5	40.3	83.5	50.7	79.3	4.25	3.91	7.32	2.66	3.09
East Indonesia	22.3	31.7	75.7	72.8	112.7	2.96	3.89	6.08	2.63	2.59

Source: Ministry of Finance

**Table 5. Fuel Pricing Policy and Tax Component**

Fuel Type	Retail Price (Rp/ltr)	Pre-Tax Price (Rp/ltr)	Tax		Benchmark Price (Rp/ltr) <sup>1)</sup>	Subsidy (Rp/ltr) <sup>2)</sup>	Market Price (Rp/ltr) <sup>3)</sup>
			GST-10% (Rp/ltr)	Fuel Tax (PBBKB)-5% (Rp/ltr)			
Premium	4,500	3,913	391	196	4,711	798	5,417
Kerosene	2,500	2,273	227	-	4,925	2,652	5,663
Diesel Oil	4,500	3,913	391	196	4,854	941	5,582

Source: Ministry of Finance, author calculation

Notes:

- <sup>1)</sup> The benchmark price is the MOPS (Mid Oil Platts Singapore) plus Alpha magnitude (parameter of distribution cost)
- <sup>2)</sup> The subsidy is the difference between the benchmark and pre-tax prices
- <sup>3)</sup> The market price is the benchmark price plus tax (10% GST and 5% fuel tax). This is the price that should have prevailed without the subsidy
- <sup>4)</sup> All figures in the table are based on the 2009 government actual budget

**Table 6. Fuel and Electricity Subsidy 1998/1999 – 2009 (Rp Billion)**

Year	Fuel	Electricity	Tot. Energy	Share of Total Central Government Spending (%)
1998/1999	28.6	1.9	30.5	21.3
1999/2000	40.9	4.6	45.5	22.5
2000	53.8	3.9	57.7	30.6
2001	68.4	4.6	73.0	28.0
2002	31.2	4.1	35.3	15.8
2003	30.0	3.8	33.8	13.2
2004	69.0	2.3	71.3	24.0
2005	95.6	8.9	104.5	28.9
2006	64.2	30.4	94.6	21.5
2007	83.8	33.1	116.9	23.2
2008	139.1	83.9	223.0	32.2
2009	45.0	49.5	94.6	14.7

Source: Ministry of Finance

Notes: Up to April 2000, the fiscal year is from April in the current year to March the following year. Since April 2000, the fiscal year is from January to December (calendar year).



**Table 7. Government Revenue from Natural Resources**

Non Tax Revenue and Natural Resources (Rp Billion)

Items	2002	2004	2006	2008	2009
<b>Non-Tax Revenue (Rp Billion)</b>	<b>88,440</b>	<b>122,546</b>	<b>226,950</b>	<b>320,605</b>	<b>227,174</b>
Natural Resources	64,755	91,543	167,474	224,463	138,959
Oil & Gas	60,011	85,259	158,086	211,617	125,752
Oil	47,686	63,060	125,145	169,022	90,056
Gas	12,325	22,199	32,941	42,595	35,696
Non Oil & Gas	4,744	6,284	9,388	12,846	13,207
Mining & Quarrying	1,457	2,549	6,781	9,511	10,369
Charges	103	196	171	103	146
Royalty	1,354	2,352	6,610	9,408	10,223
Forestry	3,130	3,412	2,409	2,316	2,345
luran Hak Pengusahaan Hutan (IHPH)	28	90	112	68	74
Provisi Sumber Daya Hutan (PSDH)	800	907	575	620	677
Reforestation Fund	2,302	2,415	1,691	1,627	1,425
Other	-	-	31	-	170
Fishery	157	324	197	78	92
Geothermal				941	400
<b>Income Tax Revenue from Oil &amp; Gas (Rp Billion)</b>	<b>17,469</b>	<b>22,947</b>	<b>43,190</b>	<b>55,987</b>	<b>50,044</b>
<b>Share of Total Non Tax Revenue (%)</b>					
Natural Resources	73.2	74.7	73.8	70.0	61.2
Oil & gas	67.9	69.6	69.7	66.0	55.4
Non Oil & Gas	5.4	5.1	4.1	4.0	5.8
Mining & Quarrying	1.6	2.1	3.0	3.0	4.6
Forestry	3.5	2.8	1.1	0.7	1.0
Fishery	0.2	0.3	0.1	0.0	0.0
Other	26.8	25.3	26.2	30.0	38.8
<b>Share of Total Gov. Revenue (%)</b>					
Natural Resources (w/o oil & gas income tax)	21.7	22.7	26.3	22.9	16.0

Note: IHPH and PSDH are typically translated as forest royalties.

Source: Ministry of Finance