Sustainable Finance for Sustainable Forestry: Is Cooperation Possible among Nations?

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Abstract: Countries in the world might be classified for discussion purposes at international meetings using definitions such as small island developing states, low forest cover countries, rich forest cover countries, forest product exporters, importers, donors, etc. that use their forestry characteristics. While some countries generate income from forests, some have to compensate deficit on revenue to sustain their forests. Nations have rights and responsibilities to cooperate in sustainable forest management at the country level and global scale. Some mechanisms, such as the Global Environmental Facility (GEF) and Reduced Emissions from Deforestation and Forest Degradation (REDD), were generated by international institutions to support various countries’ needs to solve local problems related to global concerns including sustainable forest management. The suitability of these mechanisms is under discussion at international meetings. Green economy and green accounting terms have also been discussed using mechanisms for payment for ecosystem services (PES). The aim of this study is to develop a method to compute the financial contribution levels for cooperation among countries with different characteristics regarding forestry activities and common forest values. Using general equilibrium models, a balance equation consisting of variables dealing with country rights and responsibilities for sustainable forests is offered as a method to hypothetically classify nations. This equation was tested using random hypothetical data. The results indicate the equation may be used to understand the relative classification of the countries.

Keywords: forestry finance, funds, international forestry, sustainable forest management, UNFF

1. Introduction

Common global problems such as climate change and biodiversity loss require creative, cooperative solutions. “In 1992, as nations gathered at the first Earth Summit in Rio de Janeiro, the need to find new ways to finance global environmental protection was clear (GEF, 2012).” Sustainable Forest Management (SFM) is an important component of global problems and solutions. Alternative sets of criteria and indicators of SFM are generated by different countries and international institutions. However, SFM depends on sustainable financial sources to implement forestry activities such as harvesting, timber stand improvement, protection, etc. For this reason, it is essential to have sustainable financial flows to forest management as a prerequisite for SFM. Financing SFM has proved to be a complex issue because of the dual nature of forest management. It can generate both global and national/local public goods and private profit at the same time (the former from forest-based services such as biodiversity or climate change mitigation and the latter from timber and non-timber forest products). This duality is both a challenge and an opportunity for financing SFM (Simula, 2008).

In addition to forest management, financing projects dealing with biodiversity or climate change issues is problem at the country and global levels. Using general equilibrium theory, economists can very often get a good idea of the welfare effect and qualitative results from a change in a given policy instrument (Conrad, 2001). In this context, Bovenberg and Goulder (1996) investigated the roles of environmental taxes including carbon taxes by using general equilibrium analysis. Finnoff and Tschirhart (2008) offer a general equilibrium bioeconomic model that deals with a second service. It accounts for how two services are affected by interactions within an eight-species ecosystem and within a regional economy. According to results of their model, regional welfare changes from reduced quotas show the tradeoff between consumptive and non-consumptive uses of the ecosystem (Finnoff and Tschirhart, 2008). General equilibrium models have also been used at the regional and global scale for environmental problems. The GREEN (GeneRal Equilibrium ENvironmental) Model was established by Burniaux et al. (1992) for OECD to quantify the economic effect of policies aimed at reducing emissions of carbon dioxide in the atmosphere. The interest of the OECD in these kinds of models has continued and Beghin et al. (1996) investigated the relation between trade and environment under a general equilibrium approach. The RICE model (Regional Integrated
model of Climate and the Economy) was developed by Nordhaus and Yang (1996) to integrate economic activity with the sources, emissions, and consequences of greenhouse-gas emissions and climate change and it was used to test market, cooperative and non-cooperative policies. In spite of these examples, models have not shown the positions of countries regarding their responsibilities and rights in sustainable forest management and nature conservation in forested areas. For that reason, these kinds of models are not suitable to compute the rights and responsibilities of countries in sustainable forestry.

Although some countries such as Turkey (Ok et al., 2013), Germany (Pistorius et al., 2012) or regions (Edwards and Kleinschmit, 2013) may have some mechanism or policies offered by different reports and studies on the financial structure of forestry, there are discussions on governance (Edwards and Giessen, 2014) and the financial sources of sustainable forestry in the world. While some mechanisms must be developed at the national level, the international aspect of the financial problem must be taken into account under United Nations rules. For this reason, the United Nations has been facilitating the United Nations Forestry Forum (UNFF) Collaborative Partnership on Forests (CPF) to discuss and develop mechanisms for finance and other common problems of forestry. Some international organizations, funds and donors (ITTO, UNDP, FAO, GEF, World Bank, IBRD, IFC, PROFOR etc.) are investigating SFM finance. In this context, the Collaborative Partnership on Forests has an Advisory Group on Finance (AGF). Forest finance has been a high priority issue for the Collaborative Partnership on Forests (CPF) for many years. The CPF Sourcebook on Funding for Sustainable Forest Management has proven to be a useful web-based tool to identify funding sources in forestry. Among others, CPF members have also supported countries in developing financing strategies for sustainable forest management and have provided relevant information through joint publications (AGF, 2012). After Simula’s report (2008) prepared under the management of AGF, UNFF established the Ad Hoc Expert Group on Forest Financing (AHEG) by preparing reports and designing a route to support the next round of UNFF meetings. AHEG had two meetings before UNFF10’s last meeting held in Istanbul on 8–19 April, 2013. Some recommendations related to forest finance prepared by second the AHEG meeting in Vienna are (AHEG, 2013):

- Recognize the opportunities for mobilizing new financing for forests through funds, strategies and programmes in various CPF member organizations as well as other relevant international and regional organizations,
- Invite Parties to the UNFCCC and the UNCCD, regional development banks and programmes to integrate financing sustainable forest management activities in their relevant funds and operational programmes including the Green Climate Fund, Adaptation Fund of the UNFCCC, as well as similar programmes of the UNCCD,
- Further invite Parties to the CBD to integrate financing SFM in their relevant programmes and strategies, including its Resource Mobilization Strategy,
- Further consider the establishment of a voluntary global fund to enhance the achievement of SFM by developing countries and countries with economies in transition,
- Consider other options to mobilize new and additional financing for forests including an umbrella framework to coordinate the existing forest related financing mechanisms, and “broker-ing” or intermediary institutions at various levels to improve access of countries to financing for forests.

According to these recommendations, discussions are focused on the establishment of a global forestry fund in UNFF10. Not only is forest finance discussed at UNFF meetings, but financing SFM is discussed in the Forest Europe Process too. The main targets of UNF or Forest Europe are to get signed agreements legally binding at the international level.

2. Justification of the Study

The structure of the discussion and final resolutions of UNFF10 prove that nations do not agree with each other on the establishment of a new forest fund to support SFM in a global manner. Differences among countries may affect the ability to reach an agreement. Indeed, countries have
been classified under different definitions regarding their characteristics on how they deal with forestry in UNFF10. Some countries called Small Island Developing States (SIDS) do not have enough land. But, they have forests to be managed in a sustainable manner. These countries try to develop other sectors besides forestry, and they have financial and organizational constraints for SFM. Countries known as Low Forest Cover Countries (LFCCs) may have huge land areas but low forest cover because of their climate. These have disadvantages in managing their forests and they prefer to focus on non-forestry sectors to develop their economy. In spite of the low economic importance of forests in these countries, their forests have ecological importance for nature, for them and for humankind. Although the countries defined as SIDS and LFCCs were mentioned in recent meetings (UNFF, 2013) new classes may be added for other characteristics such as Rich Forest Cover Countries, Low Forest Cover but Rich Forest Industry countries, Developed Forest Product Importers, Developed Forest Product Exporters, Developing Forest Product Importers, Developing Forest Product Exporters, Producing Countries of Ecosystem Services or Utilizing Countries of the Ecosystem Services.

Indeed, as shown Figures 1(a) and (b), while 24 countries obtain revenues from forests larger than their expenditures for SFM, 54 countries spend more money on their forests than their income (FAO, 2010). When the statistics on forest cover and the value of imported or exported forest based products are compared, although they may have smaller forest cover, some countries could generate important added values for their economies by establishing industrial plants in other countries or import and re-export mechanisms.

![Figure 1. (a) Forest revenue collection by country, 2005 (FAO, 2010); (b) Public expenditure on forestry by country, 2005 (FAO, 2010).](image)

In spite of these differences, another reason causing disagreement on the establishment of a new global forestry fund may be the lack of an explanatory model based on fair contributions and sharing of funds. In modelling studies and international discussions, data are needed on financial variables such as incomes, expenditures, aid, etc. for forestry. Data dealing with financial variables of nations are not comparable with each other. Nations collect data regarding their needs or regulations. In many cases, the data obtained from different countries is not suitable for comparative analysis or to test different policies. If the aim of the usage of any data in a model is clear, these data may be recorded at the global and national levels.

As seen from resolutions of recent UNFF10 meetings, while some countries seek establishment of a new voluntarily forestry fund, some countries, especially developed ones, do not support this idea, and participants have not achieved a consensus on SFM financing. Recent resolutions consist of many decisions about forestry finance at national or international levels. The last decision of UNFF10 declares that UNFF10, “Decides to consider, as an integral element of the overall review of the effectiveness of the international arrangement on forests 2015, as outlined in paragraphs OP5 to OP10 of this resolution and its annex, a full range of financing options and strategies, including the establishment of a voluntary global forest fund, in order to mobilize resources from all sources in support of sustainable forest management for all types of forests and trees outside forests” (UNFF, 2013). This resolution suggests that much knowledge on financing forestry must be developed. The
main motivation of this study is based on that decision. Using a general equilibrium understanding, a balance equation was developed as a model.

3. Aim and Principles of the Study

The aim of the study is to develop a model or approach to compute the financial contribution levels for cooperation among countries, which have different characteristics for dealing with forests and forestry activities regarding common forest values. Proponents of the new Global Forestry Fund generally use a “voluntarily” word before the fund in discussions. The mechanisms based on “voluntarily” may be better than mandatory applications seen in different countries such as Colombia (Keipi, 1997), Costa Rica (Malavasi and Kellenberg, 2014), and Indonesia (Pirard, 2012). However, if there is a difference between the parties that pay the cost of forest management and accept the benefits produced by forestry, then the voluntary or mandatory mechanisms must generate a balance among the parties. For that reason, computing the level of responsibilities and rights among the partners may be examined by using an accounting approach for the world. The total value of activities dealing with responsibilities for SFM must be equal to total amount of rights obtained from forest management at the country or global levels. The principles used to generate this kind of accounting approach are:

- The countries must generate their own financial resources based on SFM in their country. Revenues generated by forests first must be used for SFM in the same country.
- In spite of low forest cover, the countries that have a big share in the total value of international trade of forest products must increase their support for countries that have deficits from SFM.
- Cash or non-cash contributions from one country to another or international funds or institutions must be taken into account to compute the global responsibilities of any country.
- Nations must show their responsibility to the world by managing their own forests sustainably, improving degraded forests, increasing forest cover, serving forest values for other nations and supporting forestry activities of other nations.
- Nations have the right to obtain incomes from their own forests, accept cash or non-cash aid and import any forest goods from other countries.

From these principles, an equation consisting of indicators dealing with the responsibilities and rights of nations may be formulated in an accounting approach like computation of foreign trade deficits or surplus or a general equilibrium model in a free market. While one (left) side of the equation defines the national responsibilities for the world, the other (right) side reflects national rights. According to SFM rules, nations must realize basic forestry activities and pay the expenditures for them. In addition, management of normal forests, restoration, afforestation and conservation projects and activities must be conducted and budgets for it must be allocated by nations for sustainability. If nations tend to generate a green economy, they must use more timber products obtained from sustainable forests and support producers by using timber materials in domestic or international markets.

While some countries have natural advantages, others may have disadvantages and the mechanisms of cooperation among them must be established at the international level. Countries with natural advantages are perhaps better positioned to aid to others. For that reason, indicators of national responsibilities are the expenditures on SFM, rehabilitation of degraded forest areas, afforestation activities, cost of imported forest products, and the value of the contributions to other countries or funds. The expenditures for SFM and the total cost of restoration projects in forests of any country are paid by national budgets in general. While nations pay these costs to invest in their own future, they improve the ecosystems in the world and generate positive externalities for other countries. When any country imports forest products from any forest area managed by the rules of sustainability, the country encourages producers to apply the principles of SFM. If any country helps others by allocating monetary sources or giving equipment for forestry as a grant, the donor may enhance the value of positive externalities of forest management with its donations.

Each nation has a right to generate incomes from forest products and services in domestic or international markets. Countries with little forest resources may have to seek aid from others.
For that reason, indicators of national rights are the incomes generated by forests and forestry activities, revenues from exported forest products and services including carbon, the value of aid obtained from any country or organization abroad, and the total budget gained from international aid funds. Income consists of sales revenue from forest products and services, penalties dealing with forest management, rent for forest allocations for any usage, taxes paid to state and the like in any country. The source of this kind of income is domestic markets or other mechanisms. If a country can improve its capacity to produce forest products by using natural advantages or scientific capacity, others must accept its right to generate income from forest by trading abroad. When any country produces any values by managing forests for others, it may expect their contribution for SFM. A balanced equation for global accounting may be shown as:

\[
\text{Expenditure for SFM} + \text{Cost of rehabilitation and afforestation} + \text{Cost of the value of imported products} + \text{Total value given other countries} = \text{Domestic incomes from forests} + \text{Revenues from exported products} + \text{Total value of aid obtained from abroad}
\]

If the total value of the national responsibilities of Country A per one hectare forest area is larger than the total of national rights, it means that Country A does not need any contribution from any country or fund for forest management. On the other hand, if the total of the right side of the equation is bigger than total of the responsibilities, Country A should increase activities such as better forest management, consider more aid to other countries or have larger demand for forest products from producers to realize its global responsibilities. The equation may be computed for each country and finally may be applied globally. Deficits between the total of responsibilities and rights may be compensated by aid, trade agreements or national commitments.

4. A Hypothetical Example for International Accounting

In this study, hypothetical data are used to mask national concerns or potential actual differences among countries. The aim is not to discuss the position of any country. In this context, the world was assumed to consist of six different countries with characteristics explained below. Country A is a small island and developing country. It does not have any organization responsible for sustainable forest management. Its forests are under fire risk and must be protected. Country A cannot export any forest products and must supply its needs by importing. Country B has a huge forest area but weakness in SFM. Its SFM expenditure is very low, and it has no plan to enlarge the forested area or increase the productivity of current forest areas. While Country B could export many forest products, some countries might buy carbon credits to support its forestry activities. Country C is a developed, rich forest cover country. It can produce many forest products, but it needs to import to sustain its developed economy. Country C applies SFM principles mainly. In general, its forests have high productivity, but it needs to apply some rehabilitation projects in the country and support other countries by giving technical or equipment aid. Country D is a developing country. It has important forest cover compared to the world average. However, its forest cover includes many degraded forest areas because of historical reasons, and it is trying to increase regulated forest areas. Its developing economy needs many forest products and it has to import to supply them. As the country develops a capacity in forestry, it is supporting neighbor countries for some forestry activities such as firefighting, forestry education, planning, etc. Country E has large geographic area but a low forest cover for natural reasons. There are no professional forestry institutions and forestry activities are weak. It imports forest products in general and is not a significant forestry player at the global level. On the other hand, its forests have important ecological areas for option values. Country F is a developing country but has very low forest area compared to the world average. It could establish a strong forest industry. It can supply own its needs for forest products and export to other countries. Country F is member of some international funds as a donor.

The hypothetical data dealing with variables on the responsibility side of the balance equation are shown in Table 1. These data were produced by the authors based on the situations of each country as described above. Country A could obtain a little income from forest recreational uses and the export of non-wood forest products. One country had accepted a payment for ecosystem services to it and grants of equipment. Country A has not received any aid funds because of its weak forestry projects. While Country B can produce income from forest products sales both in the country and abroad, it could use funds from international institutions, and support projects to
define the values of its large forest areas. Country C has never applied to any organization for SFM funds but it could produce important incomes from forests. Country D has income mainly from domestic sales of forest products and exports of non-wood forest products. Country D could develop a project on biodiversity and it could use funding from international funds such as GEF. Although Country E has no capacity to generate income from forests, it could find a lot of opportunities from other countries by signing bilateral agreements and from international organization funding for forestry projects. In spite of low forest area, Country F has the first rank in the list of the leaders on trade of forest products in the world. As a result, it never seeks funds for forestry projects. The following hypothetical data deal with variables on right side of the balance equation as shown in Table 2. These data were produced by authors based on country explanations described above.

Table 1. Hypothetical data of variables on the responsibility side of the balance equation of the countries assumed.

<table>
<thead>
<tr>
<th>Countries</th>
<th>Total forest cover (1,000 ha)</th>
<th>National expenditure for SFM ($/ha)</th>
<th>Total national cost of rehabilitation of degraded forests (1,000 $)</th>
<th>National cost of afforestation (1,000 $)</th>
<th>Total value of imported forest products and services (1,000 $)</th>
<th>Total value of aid to other countries (1,000 $)</th>
<th>Total responsibilities (1,000 $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country A</td>
<td>0.1</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>420</td>
</tr>
<tr>
<td>Country B</td>
<td>150</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>1</td>
<td>300.021</td>
</tr>
<tr>
<td>Country C</td>
<td>50</td>
<td>9</td>
<td>1</td>
<td>2</td>
<td>20</td>
<td>10</td>
<td>450.033</td>
</tr>
<tr>
<td>Country D</td>
<td>20</td>
<td>8</td>
<td>5</td>
<td>10</td>
<td>60</td>
<td>20</td>
<td>160.095</td>
</tr>
<tr>
<td>Country E</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>75</td>
<td>0</td>
<td>3.076</td>
</tr>
<tr>
<td>Country F</td>
<td>0.2</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>90</td>
<td>10</td>
<td>2.100</td>
</tr>
</tbody>
</table>

Table 2. Hypothetical data of variables on the rights side of the balance equation of the countries assumed.

<table>
<thead>
<tr>
<th>Countries</th>
<th>Total Forest Cover (1,000 ha)</th>
<th>Incomes generated by forests in country ($/ha)</th>
<th>Revenues obtained from exported forest goods and services (1,000 $)</th>
<th>Total value of grants as aid (1,000 $)</th>
<th>Total budget obtained from international funds (1,000 $)</th>
<th>Total rights (1,000 $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country A</td>
<td>0.1</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>211</td>
</tr>
<tr>
<td>Country B</td>
<td>150</td>
<td>5</td>
<td>90</td>
<td>0</td>
<td>40</td>
<td>750.130</td>
</tr>
<tr>
<td>Country C</td>
<td>50</td>
<td>10</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>500.040</td>
</tr>
<tr>
<td>Country D</td>
<td>20</td>
<td>2.5</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>50.020</td>
</tr>
<tr>
<td>Country E</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>70</td>
<td>15.085</td>
</tr>
<tr>
<td>Country F</td>
<td>0.2</td>
<td>50</td>
<td>120</td>
<td>0</td>
<td>0</td>
<td>10.120</td>
</tr>
</tbody>
</table>

5. Results of Hypothetical Example

By applying the data in Table 1 and 2 to balance the equation for global accounting, the deficits between the responsibility and rights sides may be computed to define any country with a surplus or a shortfall in its forestry account as seen in the third column of the Table 3. The negative values in Table 3 show Countries A and D have a bigger total value for responsibilities than rights. While Countries A and D can be defined as surplus countries, Countries B, C, E and F can be called as shortfall countries with respect to their responsibilities and rights. The reasons for the deficit computed by the balance equation for global accounting may be analyzed by comparing the values of income and cost, the levels of imported and exported goods and services or amount of obtained or
donated aid. While these countries may not benefit from forests to improve their national welfare, they aid development of forest ecosystems in the world. As seen from Table 3, Countries A and D must be supported by Countries B, C, E and F. Countries B, C, E and F could receive more rights than total responsibilities by cutting their own forests or forests in another countries.

Table 3. Results of the hypothetical example.

<table>
<thead>
<tr>
<th>Countries</th>
<th>Total Forest (1,000 ha)</th>
<th>The share of allowable cut in total increment %</th>
<th>Balance (1,000 $)</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country A</td>
<td>0.1</td>
<td>0</td>
<td>-209</td>
<td>the country must be supported by others</td>
</tr>
<tr>
<td>Country B</td>
<td>150</td>
<td>42</td>
<td>470.109</td>
<td>Increase your support to global sustainability of forests</td>
</tr>
<tr>
<td>Country C</td>
<td>50</td>
<td>25</td>
<td>50.007</td>
<td>Increase your support to global sustainability of forests</td>
</tr>
<tr>
<td>Country D</td>
<td>20</td>
<td>20</td>
<td>-110.075</td>
<td>the country must be supported by others</td>
</tr>
<tr>
<td>Country E</td>
<td>3</td>
<td>30</td>
<td>12.009</td>
<td>Increase your support to global sustainability of forests</td>
</tr>
<tr>
<td>Country F</td>
<td>0.2</td>
<td>10</td>
<td>8.020</td>
<td>Increase your support to global sustainability of forests</td>
</tr>
</tbody>
</table>

6. Discussion and Conclusion

As seen from the components of the rights and responsibility sides of the balance equation for global accounting, each country may need global contributions because of the unbalanced relations between domestic income and costs, imports and exports, or allocated grants. According to Vatn (2010) PES are not all about moving from public policies to market allocations. Indeed, PES may be used to balance the countries. But the “rights (and responsibilities) must be defined and the commodity must be delineated (Vatn, 2010)” This generates some additional problems based on technical and philosophical background. In the short term, the solutions of these problems need to improve many valuation techniques and change ideological understanding on market mechanisms.

The “polluter pays principle” was accepted as a key feature of a global strategy for protecting and restoring natural resources such as deep seas (Barbier, 2014). But, this principle could not sustain financial sources for restoration projects and the proposed “Global Forest Finance Facility” could serve as model for a deep sea finance facility (Barbier, 2014). As reported by Kanak and Henderson (2012), REDD+ has some gaps and one of the alternatives for closing them is the Global Forest Finance Facility. However, some key questions on funding (what is the scale of funding required, etc.), governance (what are the most efficient and effective options for accounting and reporting, etc.) and delivery (how will funds be disbursed, etc.) must be answered clearly to implement the Global Forest finance Facility successfully (Kanak and Henderson, 2012). These concerns are a critical barrier to establishing a Global Forestry Fund.

The balance equation for global accounting offered in this study may help develop another mechanism without PES to support countries financially. With this kind of equation, some questions such as quantity of payments and identity of creditor or debtor parties may be clarified. As seen from the various components of the balance equation for global accounting, international trade is an important share in the rights and responsibility sides of the equation. Most favoured nation treatments have been used among nations to regulate international trade under geo-political concerns in the past. As another mechanism is a mutual aid agreement, which may be encouraged among shortfall and surplus countries defined by the balance equation for global accounting. If some shortfall countries realize some forestry application such as planning, firefighting, afforestation etc., or donate any forestry equipment to any surplus country, responsible institutions may follow them by using the balance equation for global accounting. The balance equation for global accounting may help examine the different sides and many variables in the forestry finance system. It may also help understand countries' needs including harmonization of data, transparency of international trade and aid, acceptance of accountability in the application of sustainable forestry and a consensus on a responsible institution or institutions in the governance structure.
References


