Budget restructuring toward utilization of carbon-based environmental services in National Parks

F Nurfatiani¹ and Iqbal¹

Center for Research and Development on Social, Economy, Policy and Climate Change, Bogor, 16118, Indonesia

email: nurfatiani@yahoo.com

Abstract. Role of National Parks (NPs) as carbon storage has still not been well appreciated in REDD+ concept. This is because the methodology for providing incentives for reducing emissions from land sector still uses an additional approach. However, REDD+ activities have also enhanced carbon stocks and implemented sustainable forest management. Technical efforts to improve carbon stocks in NPs can be carried out in the form of utilizing carbon-based environmental services that consist of three schemes, namely: a) emission reduction scheme, b) forest carbon stock conservation scheme, and c) forest carbon stocks enhancement scheme. This study aims to analyze the budget restructuring of NPs to support utilization of carbon-based environmental services in NPs. This study uses qualitative and quantitative approach with content and fiscal analysis. The results indicate that the proportion of budget related to the utilization of forest carbon services is still very small compared to the total NP’s budget (15%) in four National Parks. For this reason, restructuring budget is needed and should be based on the use of carbon-based environmental services. This will further illustrate how resource allocation must be optimized and used as a basis for providing incentives for NPs.

1. Introduction

Conservation areas have an irreplaceable role as an area for protection of species and biodiversity conservation efforts. Indonesia currently has a conservation forest area of ± 27.4 million hectares, almost 60% of that area is an area of national park area i.e covering ± 16.26 million hectares [8]. National parks have a function to preserve sustainability of flora and fauna biodiversity, availability of water environmental services including protection of watershed management, beauty and natural phenomena (natural tourism) and as an area that maintains, stores and increases carbon stocks at the same time. However, in the framework of reducing deforestation and forest degradation emissions (REDD+), the role of conservation forests as a carbon storage has still not been well appreciated.

There are several problems faced in the management of conservation areas in general condition in Indonesia. One of the problems encountered is the lack of available resources to manage conservation areas and inaccuracies in allocating resources. For this reason, alternative funding is needed for conservation areas, especially national parks so that the resources needed would be more optimum and could achieve the national park management objectives that have been set up. This is very important considering that national park has biodiversity potentials and other environmental services that can be utilized by the managers to support its sustainability. Thus, carbon-based ecological functions produced by national parks should be appreciated by various parties and this can be used as an
instrument to capture opportunities for public funding as an alternative source of funding for national parks. Technical efforts to improve carbon stocks in national park can be carried out in the form of utilizing carbon-based environmental services that consist of three schemes, namely: a) emission reduction scheme, b) forest carbon stock conservation scheme, and c) forest carbon stocks enhancement scheme. Currently, the structure of state budget consist of goods, capital and employee expenditures. Therefore, the structure of national park budget should be restructured in order to support the enhancement of national park’s role in providing carbon-based environmental services. Restructuring the budget is needed and should be based on the use of carbon-based environmental services. This will further illustrate how resource allocation must be optimized and as a basis for providing incentives for national park.

2. Materials and methods
2.1. Materials
The funding scheme study is carried out in 4 (four) national park areas, namely Meru Betiri National Park (TNMB), Gunung Halimun Salak National Park (TNGHS), Gunung Palung National Park (TNGP) and Sebangau National Park (TNS). The compiled data in this research include data and information on the national park budget implementation list (DIPA) and non-tax state revenues (PNBP), environmental services, laws, environmental and forestry regulations, carbon prices, etc.

2.2. Methods
Data collection carried out in this study is through literature studies, focus group discussions (FGD) and in-depth interviews with relevant stakeholders. Data are analyzed by qualitative and quantitative approaches using content analysis and fiscal analysis which analyze the components of national park revenues and expenditures. To find out alternative funding mechanism for the use of carbon services in the national park area, analysis of identification of ongoing national park funding mechanism, and the potential funding of carbon service utilization in the national park area from various sources are analized by mapping the funding mechanism.

3. Results and discussion
3.1. Profile of revenue, expenditure allocation and economic value of national park environmental services
Based on the results of the analysis of non-tax state revenues (PNBP) and national park expenditures, it is known that PNBP received by national parks is very low and cannot fulfil the needs of national parks; the gap between national park revenues and national park expenditure allocations is very high. However, from the results of the study [7], regarding the economic value of environmental services in the same four national parks, the results show that the economic value of environmental services produced by national parks is very high. This value describes the perceptions and appreciation of community or individuals for the benefits of environmental services produced by the national park. Thus, even though the management of the national park is cost oriented, compared to the economic value of the environmental services, it can be seen that it is necessary to appreciate the benefits of the environmental services of the park because it has high potential economic value. The following is the profile of revenues, expenditure allocations, and economic value of environmental services in the four national parks presented in Table 1.

Table 1. Profile of revenues, expenditure allocations, and economic value of environmental services in four national parks (2013-2017).

| National park | Non-tax revenue (IDR million) | Expenditure allocation (IDR million) | Ecotourism value (IDR million) | Water value (IDR million) | Biodiversity value (IDR million) |
|---------------|-------------------------------|-------------------------------------|-------------------------------|--------------------------|---------------------------------|
| TNS           | 43                            | 9,673                               | 4,960                         | 306,700                  | 34,591,100                     |
| TNGHS         | 1,304                         | 16,369                              | 117,500                       | 127,440                  | 1,195,100                      |
Table 1 shows that the economic value of environmental services (ecotourism value, water value, biodiversity value) is a thousand times greater than the allocation of average expenditure in the four national parks. This illustrates that the perception (usefulness, satisfaction, or pleasure) of individuals / communities for the benefits of environmental services produced by national parks is very high.

If we calculate the revenues, expenditure allocations, and economic value of environmental services in the four national parks per hectare, we can find figure as it is depicted in Table 2.

Table 2. Profile of revenues, expenditure allocations, and economic value of environmental services in four national parks (2013-2017) per hectare.

| National park | Area (ha) | Non-tax revenue (IDR million) | Expenditure allocation (IDR million) | Ecotourism value (IDR million) | Water value (IDR million) | Biodiversity value (IDR million) |
|---------------|-----------|-------------------------------|-------------------------------------|------------------------------|--------------------------|-------------------------------|
| TNS           | 542,141   | 0.08                          | 0.02                                | 0.01                         | 0.57                     | 63.805                        |
| TNGHS         | 87,699    | 0.01                          | 0.19                                | 1.34                         | 1.45                     | 13.627                        |
| TNGP          | 108,044   | 1.25                          | 0.09                                | 3.70                         | 0.34                     | 35.971                        |
| TNMB          | 52,626    | 12.81                         | 0.21                                | 3.49                         | 2.00                     | 16                             |

The very high appreciation of community for the value of environmental services can be explained by the existence of the benefits of flora and fauna, natural tourism, and hydrological national parks. For example, the use of hydrological services in TNGHS are in the form of: 1) non-commercial needs for water sources for community households, Regional Water Utility Company’s (PDAM), and government institutions; 2) commercial water sources for companies, although levies and contributions have not yet been applied for commercial water use. As it is also for the utilization of water energy for mini hydro power plants (energy of 1-10 MW) and micro hydro (energy of less than 1 MW). Utilization of water sources for bottled water companies is currently taking place outside the region so that they are not subject to water utilization fees and levies, but they are included in management cooperation with partners so that it is not commercial use; 3) The utilization of flora and fauna services; in Gunung Palung NP, there is a research station named Panti that focuses on research on orangutan behavior. The research also involves various universities in the world such as Harvard University, Yale University, University of California, and the University of Michigan; 4) The utilization of natural tourism services; in TNMB, there is a very strategic tourism potential to be developed in Banyuwangi Regency area, namely Sukamade Beach, Rajegwesi Beach, Green Bay, Damai Bay and Batu Beach. In Jember Regency, there are Permisan Beach, Meru Beach, Nanggelan Beach and Bandealit Beach. Today, Rajegwesi Beach has been developed into a marine tourism destination known as Rajegwesi Bahari Tourist Conservation Village. In addition, Meru Betiri National Park along with Alas Purwo National Park, Baluran National Park, and Ijen Crater Nature Reserve are established by UNESCO (The United Nations Educational, Scientific and Cultural Organization) to become the site of Biosphere Reserves.

3.2. National park budget structure based on carbon services utilization

Climate change mitigation actions through REDD+ activities have also included the enhancement of carbon stocks and have implemented sustainable forest management. In term of activity to increase carbon stocks, this mitigation actions through REDD+ activities are possible to be implemented in
conservation areas, in this case in national parks. There are three alternative schemes in utilizing carbon-based national park environmental services, namely (1) Emission reduction schemes; (2) Forest carbon stock conservation scheme; and (3) Forest carbon stocks enhancement scheme [5]. To support the three schemes for the use of carbon-based environmental services in national parks, an analysis of budget structure of the use of carbon-based environmental services have been conducted based on the national park budget plan (RKAKL) [1], [2], [3], [4]. Analysis carried out on the budget that supports the above three schemes in 5 to 6 year period obtains a proportion of the average budget related to the utilization of national park carbon services. The following table, i.e. table 3, illustrates the percentage of the budget for the use of carbon services and the funding schemes for each national park.

**Table 3.** The proportion of budget and funding scheme for utilizing carbon services in four national parks in the period of 2013-2017.

| National park | Budget proportion (%) | Emission reduction scheme (%) | Forest carbon stocks enhancement scheme (%) | Forest carbon stock conservation scheme (%) |
|---------------|------------------------|-------------------------------|--------------------------------------------|---------------------------------------------|
| TNS           | 14                     | 79                            | 2                                          | 19                                          |
| TNGHS         | 14.2                   | 32                            | 19                                         | 49                                          |
| TNGP          | 14.6                   | 67                            | 5                                          | 28                                          |
| TNMB          | 18.3                   | 36                            | 13                                         | 51                                          |
| Average       | 14                     | 53.5                          | 9.75                                       | 36.75                                       |

In Table 3, it can be seen that the proportion of the average budget for each national park for utilizing carbon services is almost the same at 14%, with the highest proportion of the budget in Meru Betiri National Park (TNMB) of 18.3%. The average value of the national park budget proportion of 14% shows that the proportion of the budget for the use of carbon services in the four national parks is still relatively low. The low percentage is due to the large budget allocation to meet national park spending needs, namely goods expenditure, capital expenditure, and personnel expenditure. The component of national park expenditure is still dominated by personnel expenditure except in TNS, where there are far fewer employees, even though the area is larger than other national parks (see Figure 1). This shows that the expenditure component for employee salaries is still the largest expenditure component. Shopping for goods consists of expenses for travel, materials and office operational equipment. The composition of expenditure on goods expenditure is the second largest expenditure component after personnel expenditure except in TNS. While capital expenditure consisting of expenditure for facilities and infrastructure, and equipment is the smallest shopping component compared to other expenditures.

The highest scheme of utilization of carbon services in the four national parks is the emission reduction scheme with an average percentage of 53.5% (Table 2). The carbon emission reduction scheme is a scheme that aims at protecting the ecosystem of the national park area. At present, the main problems of the fourth ecosystem of the national park are threats of forest encroachment. Based on the results of research on the four national parks, it is known that the proportion of the national park activity budget generally is on protection efforts from the threat of forest encroachment which reaches a percentage of ± 50% (Figure 2), followed by other activities including efforts on increasing the socio-economic conditions of the community, on activities of protection from threats fire, of protection from threats of illegal logging and of protection of biodiversity from threats of extinction.
Figure 1. Average expenditure component in four national parks.

Forest carbon stock conservation scheme is focused on biodiversity as a non-carbon benefit and also the use of ecotourism environmental services, such as it is in Sebangau National Park (TNS) which makes efforts to increase biodiversity by 90% (Figure 3) in the form of monitoring and inventory of key animals and plants in national parks for the purpose of increasing population and preserve ecosystems. Whereas in Meru Betiri National Park (TNMB), forest carbon stock conservation scheme are carried out in an effort to develop ecosystem services for beauty/natural phenomena (49%) (Figure 3). The efforts are carried out in the form of site design development, maintenance of natural tourism objects, and building construction of facilities and supporting infrastructure for natural tourism.

Forest carbon stocks enhancement scheme in four national parks is focused on two ecosystem restoration activities, namely acceleration of natural mechanism processes and habitat development through planting and enrichment of endemic plant species, such as it is in Gunung Halimun Salak National Park (TNGHS) which attempts to accelerate natural mechanism processes (96%) and population development (4%) through the release of major/endemic wildlife. On the other hand, activities in Gunung Palung National Park (TNGP) is mostly in the form of habitat development through planting and enrichment of endemic plant species (39%) and eradication and control of pest types (36%), fostering populations by increasing the population of wild plants through planting endemic species (15% ), and acceleration of natural mechanism processes (10%). The presented following figure, i.e. Figure 4, is the proportion of the budget related to the activity of forest carbon stocks enhancement scheme in four national parks.
Figure 2. Proportion of budget related to activities of reducing emissions schemes in four national parks.

Figure 3. The proportion of the budget is related to forest carbon stock conservation scheme activities in four national parks.
3.3. Climate change mitigation funding mechanism in conservation areas

At present, the funding mechanism for mitigating Climate Change including for REDD + refers to legislation No. 46 of 2017 concerning Environmental Economic Instruments. The regulation stipulates that funds for climate change mitigation will be managed by Public Service Agency (BLU) named Environmental Fund Management Agency (BPDLH). BPDLH will manage: (1) funding for environmental pollution / damage prevention and (2) providing trust fund/conservation assistance. These two types of funds can be utilised for climate change mitigation activities in conservation areas [6]. In addition to funding through the BLU BPDLH, there are other funding sources for REDD+, namely Climate Change Trust Funds managed by ICCTF trust funds, village funds, international grants and domestic carbon markets. REDD + funding can be provided for result based payment activities for carbon and non-carbon and supporting activities.

National park is one of institutions as a REDD+ beneficiaries that has the right to receive REDD+ funds. However, due to the characteristics of conservation areas, which are mostly low in the history of deforestation and degradation, the additional obtain will be relatively small because they only maintain from existing conditions. For this reason, it is necessary to strengthen the function of the national park as a very high producer of non-carbon benefits so that REDD+ funding can be delivered to national parks for non-carbon benefits. This requires efforts to quantify non-carbon benefits which can later be used as verifiers in evaluating non-carbon benefits. Although non-carbon benefits can be given as incentives, the proportion is still smaller than the carbon benefits. Distribution of funds from BLU BPDLH to the national park could be in a grant mechanism.

3.4. Alternative funding schemes for utilizing carbon services in national parks

Important points of the alternative design scheme for the utilization of carbon services in national parks can be formulated as it follows:

a. The funding scheme must be innovative in the form of a combination of non-tax state revenue (PNBP) management and state budget (DIPA).
b. Management cost efficiency needs to be done by increasing partnerships in national park management. In addition, efficiency must also be carried out for non-operational activities.

c. It is necessary to optimize private funds through optimizing CSR activities.

d. Development of payment for environmental service (PES) schemes are designed specifically for the utilization of hydrological functions.

e. Improved fiscal transfer mechanism between central to regional government by developing a special allocation fund (DAK) for environmental services in regional governments that have good national park areas.

f. Development of carbon financing schemes could be implemented through REDD +, carbon markets and offset schemes.

g. There are needs of enhancing performance-based budget in the form of providing incentives for national parks whose performance is good in the form of increasing budgets, ease of budget management.

h. Alternative forms of national park funding can be in the form of: trust funds, conservation trust funds, environmental funds, and environmental services.

For the purpose of achieving national parks management that are oriented to the use of carbon-based environmental services, it is necessary to perform activities on:

a. Restructuring national park programs, activities and budgets. Restructuring could be performed by changing the budget structure that is based on the use of carbon-based environmental services through the scheme of:
   1) Increasing forest carbon stocks;
   2) Performing emission reduction;
   3) Implementing conservation of forest carbon stocks.

b. Obtaining alternative funding that can be accessed by national park managers. The high economic value of environmental services in national parks is an asset that national park managers can use to progressively capture alternative funding opportunities through optimizing funding sources from:
   1) Payment of environmental services (PES);
   2) REDD + scheme;
   3) public-private partnership / collaboration (PPP);
   4) LH damage prevention funds;
   5) Trust fund / conservation assistance;
   6) Grant.

c. Creating breakthrough in the form of improvement of policies related to PNBP for the utilization of environmental services (hydrological functions, natural tourism and biodiversity). Improving PNBP policy on the utilization of environmental services including the following (but not limited to):
   1) Rationalization of PNBP tariffs for utilization of environmental services and allocation of use of PNBP;
   2) Providing innovative funding mechanisms/schemes that come from a combination of independent PNBP management and DIPA;
   3) Earmarking PNBP revenues from the utilization of environmental services (water, tourism, biodiversity / TSL, and carbon) for the management of national parks, so that PNBP from the utilization of environmental services can be reused specifically for financing the management of national parks.

References
[1] Balai Taman Nasional Meru Betiri. (2017). RKAKL Balai Taman Nasional Meru Betiri 2013-2017 (unpublished).
[2] Balai Taman Nasional Sebangau. (2016). RKAKL Balai Taman Nasional Sebangau 2011-2016 (unpublished).
[3] Balai Taman Nasional Gunung Palung. (2017). *RKAKL Balai Taman Nasional Sebangau 2013-2017* (unpublished).

[4] Balai Taman Nasional Gunung Halimun Salak. (2017). *RKAKL Balai Taman Nasional Sebangau 2013-2017* (unpublished).

[5] Draft regulation of the Minister of Environment and Forestry on the Utilization of Forest Carbon Services in Conservation Forest Areas.

[6] Directorat of Sectoral and Regional Resource Mobilization. (2017). Instrument funding for REDD+. Presentation material was delivered at the FGD of the Financial Incentive Mechanism for REDD+ in Jakarta on November 9, 2017.

[7] Indartik. (2018). Economic value of carbon stocks in national parks. In Subarudi, A. Wibowo, F. Nurfatriani, A. Sugiharta, M.Z. Muttaqin (Eds.), *Strategies for using carbon-based environmental services in national park* (pp. 167-181). Bogor: IPB Press

[8] Ministry of Environmental and Forestry. (2017). *Statistic of Environmental and Forestry 2016*. Jakarta: Ministry of Environmental and Forestry.