

Executive Summary

Payments for ecosystem services (PES) is a voluntary transaction for an environmental service (or a land use likely to secure that service), purchased by at least one environmental service buyer from at least one environmental service provider, if and only if the environmental service provider meets the conditions of the contract and secures the environmental service provision (Wunder, 2005). The basic idea behind PES is that those who provide ecosystem services – like any service – should be paid for doing so. PES therefore provides an opportunity to put a price on previously un-priced ecosystem services like climate regulation, water quality and flood regulation, and the provision of habitat for wildlife. In so doing, a PES market brings these formerly overlooked services into the wider economy. Neoclassical economics argues that if those responsible for managing provision of ecosystem services also benefit directly from them, the market should be able to protect and sustain these services (e.g. provisioning services, such as food and fibre; Engel et al., 2008). However, when benefits mainly accrue to others in society (e.g. downstream flood protection), markets often fail to reward service managers (e.g. upstream farmers or foresters). Conversely, some land uses and management activities provide benefits for landowners and managers at a particular location and time, at the expense of wider society. In response to this “social dilemma” (as it is characterised by Muradian et al., 2013), the concept of PES is gaining increasing attention as a way to pay for, or at the very least to make visible, the societal benefits of sustainable land management (Braat and de Groot, 2008).

The novelty of PES arises from its focus on the ‘beneficiary pays principle’, as opposed to the ‘polluter pays principle’. The dominant theory for PES is based on the assumption that the undersupply of ecosystem services is the result of market failures, and therefore valuing and paying for such services will help to solve these environmental externalities (Engel *et al.* 2008). It is also argued that where providers of ecosystem services are poor landholders or disadvantaged communities, such payments can contribute to poverty alleviation (Pagiola *et al.* 2005). The possibilities of “winwin” scenarios are part of the reasons why PES have become so attractive, particularly among conservation practitioners and policy-makers in developing countries. In a PES transaction, the beneficiary from the ecosystem service makes a payment or provides another form of reward to the land owner or person who has the rights to use the ecosystem (land or freshwater, marine), as a reward for managing the ecosystem a way that secures an ecosystem service. This payment or reward should be conditional upon the delivery of the service. In practise it may be difficult to fulfil all the conditions of PES, but it may not be necessary or appropriate to do so in some cases.

For a PES scheme to work, it must represent a win for both buyers and sellers. PES may be positive from a buyer’s perspective if the payments are less than those associated with any alternative means of securing the desired service. For example, it may be less expensive for a water utility to pay land owners for improved catchment management than to pay for additional water treatment of more polluted water (Everard, 2013). PES schemes may be

positive from a seller's perspective if the level of payment received at least covers the value of any returns foregone as a result of implementing the agreed interventions. For example, a farmer may be willing to create ponds for enhanced water storage if the payments received at least cover the costs of doing so, including the costs associated with any lost agricultural production. PES is a rather elegant approach, in principle, but in practice, developing and implementing PES projects can be very challenging. While PES can certainly contribute to poverty reduction, the resources allocated are unlikely to be sufficient to solve long-standing deprivation problems or the structural lack of economic and employment opportunities. Moreover, in certain instances, environmental compensation schemes can reinforce rather than reduce inequalities. This is more evident in regions where land ownership is concentrated and impoverished communities are excluded from accessing natural resources. A resource plan to account for sellers' and communities' access to forest resources remains essential for ensuring that there is no loss of economic rights by vulnerable groups.

Urban areas are facing excessive rise in population along with the pressure of unplanned economic development, industrialization and vehicular emissions, which in turn affect air, water and land quality. Air pollution has increased rapidly in many cities and metropolises, especially due to vehicular traffic and industrial emissions and due to insufficient green belt areas in the city, which can aid in absorbing these noxious or toxic gases. The rising population in Mumbai has led to a decrease in open spaces, further depleting climate and air quality regulation services within the built environment.

The importance of the SGNP for the survival of the cities of Mumbai and Thane cannot be over-emphasized. The Park's contribution to the city's water resources is highly significant as two of the lakes that supply water to Mumbai and Thane – Vihar Lake and Tulsi Lake – are located within the SGNP. The catchment areas of both these lakes also lie within the SGNP, thus ensuring that the quality of water supplied by both these lakes is among the best in the country. The fact that it is supplied nearly free of cost is another great bonus for the citizens of Mumbai and Thane. Another substantially underappreciated benefit is the vital role played by the forests of SGNP in reducing the atmospheric pollution caused by anthropogenic activities in Mumbai and Thane. The vegetation in SGNP absorbs or helps break down aerial pollutants, settling fine particulate matter, significantly improving the air quality of surrounding urban areas. The SGNP's forests also play important roles in temperature control, both within the Park (visitors immediately notice the drop in temperature when they walk into the SGNP) and in breaking down 'heat island' effects in surrounding urban areas. At most times of the year, the temperature within SGNP is lower by 3-5 degrees Celsius than the temperature outside the Park. The forests of SGNP thereby literally act as a natural air conditioner for the cities of Mumbai and Thane, and significantly help in reduction of the electricity consumed by those residents residing along the periphery of the SGNP Division.

Four rivers of Mumbai – the Mithi River, the Poisar River, the Oshiwara River and the Dahisar River – originate from the SGNP, their flows and quality dependent upon ecosystem

processes in the Park. Finally, in this era of climate change, we cannot but be conscious of the huge amounts of carbon that have been sequestered by these City Forests of SGNP.

The annual influx of tourist as per the data of 2010-11 was 48.28 lakhs (Management Plan SGNP). The park provides various ecosystem services not only to the tourists visiting the Park and to the entire city of Mumbai and Thane, but also some that have national and international benefit. However, despite the diversity and value of these ecosystem services, almost all are ignored. Traditionally, ecosystem services have been considered as free services provided by nature, leading to the economic values of these services being ignored or underestimated when forests are used or converted, with an alarming rate of global forest depletion, degradation and loss. Conservation and effective management of ecosystems for sustaining services requires innovative approaches and enabling policies. PES offers an approach that can be considered for the management of the Park. The very existence of the SGNP is under threat. However, this can be curbed by making people aware of its diverse values, both economic and non-monetary. One means to raise awareness of the value of these services is to represent them as marketable values, or ideally to create markets for them. These markets can also potentially increase the economic value of forest ecosystems in the park.

In order to assess potential services for which markets may be identified under PES arrangements, the ecosystem services flowing from SGNP were first reviewed. This review was based on the Millennium Ecosystem Assessment (2005) framework of provisioning, regulating, cultural and supporting services, with a number of commonly applied addenda.

The assessment framework was adapted from the Ramsar Commission-adopted RAWES (Rapid Assessment of Wetland Ecosystem Services) approach (Ramsar Convention, 2018; RRC-EA, in press). RAWES was developed to support ecosystem service assessment of wetlands recognizing practical time and resource limitations faced by operational staff, providing a simple, user-friendly, cost-effective approach supporting systemic assessment of the full range of wetland ecosystem services (McInnes and Everard, 2017). Though RAWES specifically was developed for wetland assessment, it is in essence adapted from a wider approach already used extensively in a range of habitat types (for example by Everard, 2009; Everard and Waters, 2012). RAWES makes a semi-quantitative judgement of the significance of each ecosystem service, as well as the geographical range over which the benefit is realised. Another of the key facets of RAWES is that it integrates different available and observable forms of knowledge – quantitative, qualitative, interviews with local stakeholders, expert judgement, etc. – recording the evidence base upon which assessment of service provision is based.

This study has looked at the ecosystem services generated by SGNP using the lens of the Millennium Ecosystem Assessment (2005) framework of provisioning, regulating, cultural and supporting services, including a number of commonly applied addenda, further

considering the significance of these benefits and the geographical scales at which they manifest using the RAWES (Rapid Assessment of Wetland Ecosystem Services) approach.

From this analysis, a range of services are identified and stratified into those that:

- Are closer to market identification and development;
- Require further research or dialogue to explore potential markets; or
- Have no potential for market development.

That the Sanjay Gandhi National Park confers very substantial benefits locally, to the surrounding city, nationally and internationally is beyond doubt. Generating recognition of that fact beyond the scientific and nature conservation community remains challenging, but its clear exposition using the language of ecosystem services is greatly helpful. Demonstration, and ideally further market development, of the economic importance of this interconnected set of ecosystem services serves as an additional lever towards wider recognition and investment in the many benefits provided by SGNP and other natural assets.

The impacts of encroachments on the ecosystem services of SGNP and their associated values are also addressed in this report, and should be considered in relation to the economic case for PES market development as well as wider park management decisions.

Wildlife & We Protection Foundation