





Consideration of potential PES markets for service generated by the SGNP.

- **READY** signifies ready for market development;
- **FURTHER DEVELOPMENT** indicates that further research or dialogue is necessary to explore potential PES arrangements;
- and
- **NO POTENTIAL** indicates no potential for development of PES arrangements.

Ecosystem services	Positive or negative considerations		Recommendation for development of PES arrangements
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<b>Tangible and monetisable services amenable to market development</b>			
<b>Provisioning: Fresh water</b>	SGNP is already used for transfer and storage of water, and outputs can be measured	-	READY: Quantify and identify all beneficiaries and explore charging mechanisms where they do not currently exist
<b>Provisioning: Ornamental resources</b>	People already take some items (feathers, etc.) from the park	Risk of over-exploitation so limitations are necessary	READY: Explore nominal 'license' or similar voluntary or imposed fee to maintain at a sustainable level
<b>Regulating: Global climate regulation</b>	The park sequesters carbon and international markets are in place	-	READY: Explore: (1) REDD+; and/or (2) carbon offset arrangements with local institutions or businesses
<b>Tangible services requiring more work to develop and/or hard to quantify</b>			
<b>Regulating: Air quality regulation</b>	Benefits certainly occur to Mumbai city, and particularly adjacent neighbourhoods	Linking to beneficiary end-points is complex	FURTHER DEVELOPMENT: Discuss quantification of benefits for different stakeholders with city planners, real estate enterprises and health professionals
<b>Regulating: Local microclimate (property values?)</b>	Benefits certainly occur to Mumbai city, and particularly adjacent neighbourhoods	Linking to beneficiary end-points is complex	FURTHER DEVELOPMENT: Discuss quantification of benefits for different stakeholders with city planners, real estate enterprises and health professionals
<b>Regulating: Water regulation – hydrological buffering</b>	The diverse habitats of SGNP buffer water flows, of substantial and tangible flood control and drought buffering to the adjacent city	Many beneficiaries may not be aware that they benefit from this service	FURTHER DEVELOPMENT: Open discussions with municipality officials, insurance companies and other institutions who receive or may see benefit in this service
<b>Regulating: Natural hazard regulation</b>	The diverse habitats of SGNP dissipate storm energy and in other ways buffer natural hazards benefitting adjacent buildings, occupants, crops and green spaces	Many beneficiaries may not be aware that they benefit from this service	FURTHER DEVELOPMENT: Open discussions with municipality officials, insurance companies and other institutions who receive or may see benefit in this service

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<b>Regulating: Pest regulation</b>	The diverse habitats of SGNP buffer host the predators of pest organisms (insects, birds, bats, reptiles, etc.)	Some disbenefits may arise if pests breed in the park (requiring evaluation), but the bigger obstacle is determining how this benefit is expressed outside the park	<b>FURTHER DEVELOPMENT:</b> Further research is required to explore the manifestation of this benefit beyond the park perimeter, and to identify the beneficiaries of the service
<b>Regulating: Erosion regulation</b>	Extensive green cover in the park avert erosion and builds soil structure	Many beneficiaries may not be aware that they benefit from this service	<b>FURTHER DEVELOPMENT:</b> Open discussions with those involved in desilting nullahs and drains, and other downstream dredging undertakers, to explore potential markets for this benefit
<b>Regulating: Pollination</b>	The diverse habitats of SGNP buffer host the pollinating organisms (insects, birds, bats, reptiles, etc.)	There is a lack of quantification at present of this benefit	<b>FURTHER DEVELOPMENT:</b> Further research is required to explore the manifestation of this benefit beyond the park perimeter, and to identify the beneficiaries of the service
<b>Regulating: Salinity regulation</b>	Buffered fresh water flows from SGNP maintain salinity regimes in surrounding mangroves and other intertidal areas	There is a lack of quantification and a wide under-appreciation at present of this benefit	<b>FURTHER DEVELOPMENT:</b> Open discussions with those involved in maintaining or otherwise benefitting from mangroves and other intertidal habitats (fisheries, conservation institutions, etc.)
<b>Regulating: Noise and visual buffering</b>	The diverse habitats of SGNP, particular trees and other large and complex vegetation, confer substantial noise and visual buffering services	There is a lack of quantification and a wide under-appreciation at present of this benefit	<b>FURTHER DEVELOPMENT:</b> Open discussions with municipality officials, real estate interests adjacent to the city, insurance companies and other institutions who receive or may see benefit in this service
<b>Tangible but technically illegal services that nonetheless are current utilised</b>			
<b>Provisioning: Food</b>	Tangible food resources (e.g. land crabs, fruits) are taken by occupants of padas within SGNP	This practice is technically illegal under current Park rules, albeit possibly in conflict with tribal rights of indigenous residents	<b>NO POTENTIAL:</b> Consider the risks of legitimizing technically illegal use in accordance with tribal rights, but probably not a viable service for market development
<b>Provisioning: Fuelwood</b>	Occupants of villages in the park are known to take dry wood for fuel	This practice is technically illegal under current Park rules, albeit possibly in conflict with tribal rights of indigenous residents	<b>NO POTENTIAL:</b> Consider the risks of legitimizing technically illegal use in accordance with tribal rights, but probably not a viable service for market development

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<b>Tangible but banned services for which highly controlled market expansion could be considered</b>			
<b>Provisioning: Genetic resources</b>	The biodiversity of SGNP contains a diversity of genetic resources of potential value to humanity	Extraction from SGNP is not currently permitted	<b>FURTHER DEVELOPMENT:</b> Sustainable levels of bioprospecting may be feasible, if tightly controlled and for research purposes only
<b>Provisioning: Biochemicals, natural medicines, pharmaceuticals</b>	The biodiversity of SGNP contains a diversity of chemical resources of potential value to humanity	Extraction from SGNP is not currently permitted	<b>FURTHER DEVELOPMENT:</b> Sustainable levels of bioprospecting may be feasible, if tightly controlled and for research purposes only
<b>Services for which there are already de facto PES or PES-like arrangements (the state recirculates taxpayer revenues for public good)</b>			
<b>Cultural services: Recreation and tourism</b>	Tangible benefits accrue from SGNP	-	<b>FURTHER DEVELOPMENT:</b> It could be fairly argued that state support for management and maintenance SGNP is already a form of PES scheme, recirculation taxpayer revenues for a largely unquantified 'basket' of publicly beneficial services.  Opportunities may exist to further quantify these benefits in making a case for a higher rate of public investment for clearly-articulated public benefits
<b>Cultural services: Cultural heritage (aesthetic, spiritual, artistic/crating inspiration, social relations)</b>	Tangible benefits accrue from SGNP	-	
<b>Cultural services: Education and research</b>	Tangible benefits accrue from SGNP	-	
<b>Supporting services: All services</b>	Tangible benefits accrue from SGNP	-	
<b>Services for which further research is required to understand benefits and possible PES or PES-like arrangements</b>			
<b>Regulating: Human health regulation</b>	Benefits through parasite/disease regulation are likely	There is no science to quantify this benefit	<b>FURTHER DEVELOPMENT:</b> Remain vigilant for more relevant research, though marketization would be difficult
<b>Regulating: Livestock health regulation</b>	Benefits through parasite/disease regulation are likely	There is no science to quantify this benefit, and there is no livestock within SGNP (though some is adjacent)	<b>FURTHER DEVELOPMENT:</b> Remain vigilant for more relevant research, though marketization would be difficult
<b>Services that are both banned and inappropriate</b>			
<b>Provisioning: Waste disposal</b>	-	No waste disposal is permitted in the park	<b>NO POTENTIAL:</b> Avoid. Development of this service would degrade the park ecosystem
<b>Provisioning: Aggregate extraction</b>	-	No clay, mineral or other aggregate extraction is permitted in SGNP	<b>NO POTENTIAL:</b> Avoid. Development of this service would degrade the SGNP ecosystem

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Provisioning: Energy harvesting from natural air and water flows	-	No hydropower or wind turbines are permitted in SGNP	NO POTENTIAL: Avoid. Development of this service would degrade the SGNP ecosystem
<b>Services that should not be marketed due to risk of double-counting</b>			
Regulating: Water purification	This service is a substantial output of the SGNP's ecosystems	In the absence of any wastewater treatment service, its outcomes contribute to the provisioning service of fresh water	NO POTENTIAL: Do not seek to market this service as it will double-count with the provisioning service of fresh water provision