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## Assessing nature's contributions to people

Sandra Díaz, Unai Pascual, Marie Stenseke, Berta Martín-López, Robert T. Watson, Zsolt Molnár, Rosemary Hill, Kai M. A. Chan, Ivar A. Baste, Kate A. Brauman, Stephen Polasky, Andrew Church, Mark..

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### RE: Ecosystem Services are Nature's Contributions to People

**Rudolf de Groot**, Associate Professor,  
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(27 February 2018)

By Rudolf de Groot, Robert Costanza, Leon Braat, Luke Brander, Benjamin Burkhard, Luis Carrasco, Neville Crossman, Benis Egoh, Davide Geneletti, Bernd Hansjuergens, Lars Hein, Sander Jacobs, Ida Kubiszewski, Beria Leimona, Bai-Lian Li, Junguo Liu, Sandra Luque, Joachim Maes, Christo Marais, Simone Maynard, Luca Montanarella, Simon Moolenaar, Carl Obst, Marcela Quintero, Osamu Saito, Fernando Santos-Martin, Paul Sutton, Pieter van Beukering, Martine van Weelden, Louise Willemen

In their article, Diaz et al present the concept of nature's contributions to people (NCP) as 'building on' but 'extending beyond' the concept of ecosystem services (ES). However, a hurried and top-down introduction of NCP as if it were a 'new' term risks plunging the large and diverse ES/NCP community into unnecessary paralysing debates and will confuse policy makers and practitioners. NCP is a political compromise and not a new scientific concept. It aligns with earlier definitions of ecosystem services to describe human dependence on nature (e.g. TEEB). To strengthen scientific cohesion and societal impact, the terms NCP and ES must be regarded as the synonyms they are, and used appropriately for different audiences and purposes.

IPBES builds on the thousands of ecosystem services papers and assessments that have been produced over the last decades which the Diaz et al. paper does not adequately acknowledge. Over 125 nations, many indigenous peoples, thousands of scientists, a...

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Competing Interests: None declared.

### Partnership models will increase indigenous people's contribution to science

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(20 February 2018)

Diaz et al. (1) outline the modified IPBES framework which addresses the need for cultural and diverse sources of knowledge. While this is an improvement on the original 'ecosystem services' model, a major drawback and consequence for both policy makers and indigenous communities contributing to such a framework, arises from inadequate resourcing and protection of indigenous people and their knowledge. We argue that for models like the new IPBES framework to be successful they must provide adequate resourcing in line with mainstream disciplines as well as provide adequate intellectual property protection for indigenous communities.

We highlight a recent example from New Zealand, which attempted to implement a bicultural management programme (2). It aimed to include and implement indigenous knowledge in research for the protection of a culturally iconic tree species, the New Zealand kauri (*Agathis australis*), from an introduced pathogen *Phytophthora agathidicida* (3, 4). A bicultural approach was sought as *A. australis* extinction could disestablish community cultural identity (5). Nevertheless, disproportionately less resourcing (6) has been given to elevate or implement indigenous knowledge in managing these forests from extinction. Additionally, there was a lack of formalized intellectual property protection to safeguard community knowledge from exploitation, which directly contravened UN rights for indigenous people (7, 8). This disparity of resourcing and adequat...

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Competing Interests: None declared.

## RE: Shifts, drifts and options- A response to Faith

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(16 February 2018)

Daniel Faith makes several very good points. We deal with only one of them in this short response, the role of biodiversity as a source of options for people now and in the future. We agree with Faith that biodiversity at all scales, from local to global, is critically important for humans in the face of the unknown, and for the future production of nature's contributions to people (NCP) (1). We also agree that NCP in the face of the unknown should include both those associated with particular components of biodiversity, and those related to the continued existence of the variety of life. One of our categories of NCP indeed addresses these two aspects. "Maintenance of options" (NCP 18 within the generalizing perspective, Table S1) refers to the capacity of ecosystems, habitats, species or genotypes to keep options open in order to support a good quality of life. This includes the future benefits or threats derived from particular genes, organisms, groups of organisms or ecosystems, be they still unknown or already known but their future uses as yet undiscovered. NCP 18 also includes the contributions of all species, populations and genotypes to processes for coping with environmental uncertainty, such as the resilience and resistance of ecosystems in the face of environmental change and variability. Finally, it recognises future benefits or threats that may be anticipated from ongoing biological evolution, including rapid contemporary evolution. Using the eloquent metaphor...

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Competing Interests: None declared.

## IPBES and paradigm drifts

**Daniel P Faith,** Research Scientist,

The Australian Museum

(14 February 2018)

Diaz et al. (1) observe that much of the follow-up work on the Millennium Ecosystem Assessment (MA) (2) has been narrowly focused on ecological production functions, neglecting cultural aspects. They argue that "nature's contributions to people" (NCP) (3), recognizes how culture "permeates"

through other NCP, overcoming the MA's treatment of culture in "an isolated category". However, this promotion of NCP as a "new approach" risks missing an opportunity for IPBES assessments to build on the MA's (4) similar messages that cultural services "cannot be treated independently", they permeate through the other services, and "social context" is important. Thus, the task now is not so much what Diaz et al. call "nurturing a paradigm shift", as "repairing a paradigm drift" where enthusiasm for ecological production functions is over-shadowing other aspects.

The MA (2) discussed many benefits of nature, including "option value" as a direct benefit of biodiversity (5). However, the follow-up work has even narrowly re-cast the MA as focused on ecosystem services from ecological production functions (e.g. 6). Here, "biodiversity" is interpreted as supporting ecological functions, supposedly giving it recognized anthropocentric value for the first time (5). This reveals another critical paradigm drift, neglecting the clear recognition by the MA, and other studies going back fifty years (5), of biotic diversity's global benefit to people through option value. This paradigm drift...

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Competing Interests: None declared.

### Contributions of the Sun must be considered in nature's contributions to people

Yoshiyasu Takefuji, Professor,  
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(22 January 2018)

Sandra Diaz et al. wrote an article entitled "Assessing nature's contributions to people" (1). Mother earth is not standalone. Nature's contributions must include contributions of the Sun while Sandra's paper did not take account of the Sun's contributions. The Sun not only provides energy to the earth but also a variety of benefits to people (2, 3). Sunshine is important in plant growth because the heat and the light required by all growing plants are supplied by solar radiation (4). Without the Sun's contributions, the term, "nature's contributions to people" (NCP) may mislead.

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Competing Interests: None declared.

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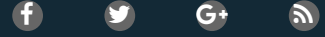
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