The vast majority of nations have fallen far short of the Convention on Biological Diversity’s (CBD’s) 2010 target: to reduce the rate of loss of biodiversity (1, 2). This prompted the CBD to develop a new plan of action, supported by 20 “SMART” (specific, measurable, ambitious, realistic, and time-bound) targets for 2020 (3, 4). As the 10th Conference of the Parties (COP) of the CBD meets in Nagoya, Japan, to negotiate both plan and targets, it is critical that targets also be grounded in the real interests that people have in benefits provided by biodiversity. To evaluate targets on this basis, we use the ecosystem services framework developed by the Millennium Ecosystem Assessment (MA) (5). This framework balances resource conservation and use according to how societies value consumptive (e.g., food and fuel) and nonconsumptive (e.g., health and aesthetics) services provided by ecosystems.

The ecosystem services framework has four main consequences for target setting. First, what and how much biodiversity should be targeted for conservation depends on what services are important to maintain and with what reliability. Second, the temporal and spatial scale of targets should be based on the changing temporal and spatial distribution, and risk profiles, of ecosystem services. Third, target development and implementation should include all agencies involved with management of biodiversity and the ecosystem services they support. Fourth, interdependence among ecosystem services, the benefits they provide, and the value placed on those benefits implies that targets must be conditional. Implementation of one target may be affected by implementation of another.

The CBD 2020 Targets
The 2020 targets, color-coded according to (6), are highlighted in the figure. Red refers to imminent biosecurity threats due either to collapse of ecosystems or populations or to the rapid increase of pests or pathogens. Green addresses society’s conservation goals. Blue addresses longer-term scientific, socio-economic, and institutional conditions required to meet and sustain red and green targets. Red targets are typically “short term” (2 to 5 years). Green and blue targets are typically “longer term” (10+ years). Although none of the targets are presented as short term, we red-coded three because they address imminent threats.

Several 2020 targets refer to ecosystem services, including carbon sequestration and resilience (target 15), foods, fuels, and fibers (targets 6, 7, and 13). Target 14 addresses “ecosystems that provide essential services.” But aside from capture fisheries (target 6), there is no clear correspondence between ecosystem services referred to in the targets and services identified as at risk in the MA (5) and subsequent studies (1). This is especially marked for marine systems, in part because targets tend to be biased toward terrestrial systems.

All targets have, in principle, the same time horizon—2020—and apply everywhere. The spatial and temporal distribution of services and variation in rates of change in the processes involved are not considered. Targets addressing imminent threats (e.g., 6, 8, and 9) should be sensitive to the time available to act and more closely related to the threat to human well-being. Similarly, some targets (e.g., 1, 2, and 3) may only be met over time scales longer than 10 years, but their implementation requires action now.

What is Missing?
Although some 2020 targets are congruent with an ecosystem-services approach, four main things are missing:

1) Functional diversity. Ecosystem services derive from ecosystem functions and the species that perform those functions. In some cases, individual species play a disproportionately large role in the provision of services, but in most cases, targets should focus on conserving critical functional diversity.

2) Environmental uncertainty and target adjustment. How much diversity it is critical to maintain depends on the range of environmental conditions expected. The greater the expected variation in environmental conditions, the greater the required diversity within groups providing particular functions. Ecological functioning may change as environmental conditions change (11, 12).

3) Interactions between targets. Target 3 explicitly recognizes harmful environmental
## Strategic Goals

### Address underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.
1. All people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.
2. The values of biodiversity are integrated into [national accounts], national and local development, and poverty reduction strategies.
3. Incentives [including subsidies] harmful to biodiversity are eliminated, phased out, or reformed in order to minimize negative impacts.
4. Governments, business, and stakeholders ... have taken steps to achieve or have implemented plans for sustainable production.

### Reduce direct pressures on biodiversity and promote sustainable use.
5. The rate of loss and degradation, and fragmentation, of natural habitats [including forests] is [at least halved] [brought close to zero].
6. Overfishing is ended, destructive fishing practices are eliminated, and all fisheries are managed sustainably.
7. Pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.
8. Invasive alien species are identified, prioritized, and controlled or eradicated, and measures are in place to control pathways.
9. To have minimized the multiple pressures on coral reefs and other vulnerable ecosystems affected by climate change.

### Improve status of biodiversity by safeguarding ecosystems, species, and genetic diversity.
10. At least [15%][20%] of terrestrial, inland-water, and [X%] of coastal and marine areas are conserved.
11. The extinction and decline of known threatened species has been prevented.
12. The loss of genetic diversity of cultivated plants and domestic farm animals in agricultural ecosystems and of wild relatives is halted.

### Enhance benefits to all from biodiversity and ecosystem services.
13. Ecosystems that provide essential services and contribute to health, livelihoods, and well-being, are safeguarded.
14. Ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration.
15. Access to genetic resources is [promoted] [facilitated] [enhanced], and benefits are shared.
16. Each party has developed, adopted, ... and implemented, an effective, participatory, and updated national biodiversity strategy and action plan.
17. [Have [our generic legal] systems in place to protect] traditional knowledge, innovations, and practices relevant to biodiversity ...
18. Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status, and trends, are improved.
19. Capacity (human resources and financing) for implementing the convention has increased [10-fold].

### Enhance implementation through participatory planning, knowledge management, and capacity building.
20. Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status, and trends, are improved.
21. The values of biodiversity are integrated into [national accounts], national and local development, and poverty reduction strategies.

### Supporting Online Material

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**References and Notes**

22. The authors are associated with the ecoSERVICES and bioSUSTAINABILITY projects of DIVERSITAS.