

Nature Futures Frameworkの基盤

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Nature Futures Frameworkの基盤的情報 (IPBES-9で審議、歓迎)

UNITED
NATIONS



Food and Agriculture
Organization of the
United Nations



BES

IPBES/9/10



Intergovernmental Science-Policy
Platform on Biodiversity and
Ecosystem Services

Distr.: General

9 April 2022

Original: English

Plenary of the Intergovernmental Science-Policy
Platform on Biodiversity and Ecosystem Services

Ninth session

Bonn, Germany, 3–9 July 2022

Item 8 of the provisional agenda*

Building capacity, strengthening knowledge
foundations and supporting policy

Work on building capacity, strengthening knowledge foundations and supporting policy

Note by the secretariat

Introduction

1. Section I of the present note provides background information for agenda item 8 (a), on work programme deliverables and task force workplans, while section II provides background information for agenda item 8 (b), on the nature futures framework prepared by the task force on scenarios and models.

I. Work programme deliverables and task force workplans

2. In decision IPBES-7/1, the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), at its seventh session, adopted the rolling work programme of IPBES for the period up to 2030. The six objectives of the work programme include objective 2, building capacity; objective 3, strengthening knowledge foundations, which comprises objectives 3 (a), advanced work on knowledge and data and 3 (b), enhanced recognition of and work with indigenous and local knowledge systems; and objective 4, supporting policy, which comprises objectives 4 (a), advanced work on policy instruments, policy support tools and methodologies, 4 (b), advanced work on scenarios and models of biodiversity and ecosystem functions and services and 4 (c), advanced work on multiple values.

3. In the same decision, the Plenary extended the mandates of the task force on capacity-building (section III of the decision) and the task forces on knowledge and data and on indigenous and local knowledge (section IV) and established task forces on policy tools and methodologies and on scenarios and models, for the implementation of the related objectives of the work programme (section V). It also requested the task forces to develop specific deliverables for each of the priority topics set out in paragraph 8 of the work programme¹ for consideration by the Plenary at its eighth session.

* IPBES/9/1.

¹ The three priority topics are: (a) understanding the importance of biodiversity in achieving the 2030 Agenda for Sustainable Development; (b) understanding the underlying causes of biodiversity loss and determinants of transformative change and options for achieving the 2050 Vision for Biodiversity; and (c) measuring business impact and dependence on biodiversity and nature's contributions to people.

IPBES/9/10

Annex VI

Foundations of the nature futures framework

I. Introduction: how scenarios are used in policy- and decision-making on biodiversity and ecosystem services

A. Use of scenarios and models

1. Scenarios and models of changes in biodiversity and ecosystem services are powerful tools for informing decision-makers and other stakeholders on potential future impacts of changes across scales on nature, nature's contributions to people and good quality of life.¹ In this context, and in line with the IPBES conceptual framework, scenarios are alternative pathways to possible futures for one or more key components in a system, particularly for drivers of change in nature and nature's contributions to people, including alternative policy or management options (IPBES, 2016a; Diaz et al., 2018).² Models are qualitative or quantitative representations of key components of a system and of relationships between those components, and can be used to translate scenarios of possible futures for drivers of change or policy interventions into projected consequences for nature and nature's contributions to people (IPBES, 2016a). In combination, scenarios and models can play important roles in relation to the major phases of the policy cycle, which are (i) agenda setting, (ii) policy design, (iii) policy implementation and (iv) policy review, as described in the *Methodological Assessment Report on Scenarios and Models* (IPBES, 2016b, figure SPM.2). "Exploratory scenarios" can contribute to problem identification and agenda setting by examining a range of plausible futures, while "intervention scenarios" can contribute to policy design and implementation by evaluating alternative policy or management options – through either "target-seeking" or "policy-screening" analysis (IPBES, 2016b, figure SPM.2). Scenarios and models have been used in the IPBES *Global Assessment Report on Biodiversity and Ecosystem Services* (IPBES, 2019a; 2019b) and regional assessments of biodiversity and ecosystem services (IPBES, 2018a; 2018b; 2018c; 2018d) to provide assessments of the current status of biodiversity and ecosystem services and to explore projections under different potential futures.

2. The *Global Assessment Report* indicates that the decline of biodiversity and ecosystem services is projected to continue or worsen in many future scenarios that consider rapid human population growth, unsustainable consumption and declining production (see, for example, figure SPM.8 of the *Global Assessment Report* (IPBES, 2019a; 2019b)). In contrast, scenarios with assumptions of low-to-moderate human population growth across scales, low carbon growth, a circular economy, and transformative changes will better support long-term sustainability and good quality of life (IPBES, 2019a, figure SPM.8; 2019b).

B. Limitations of current scenarios and models

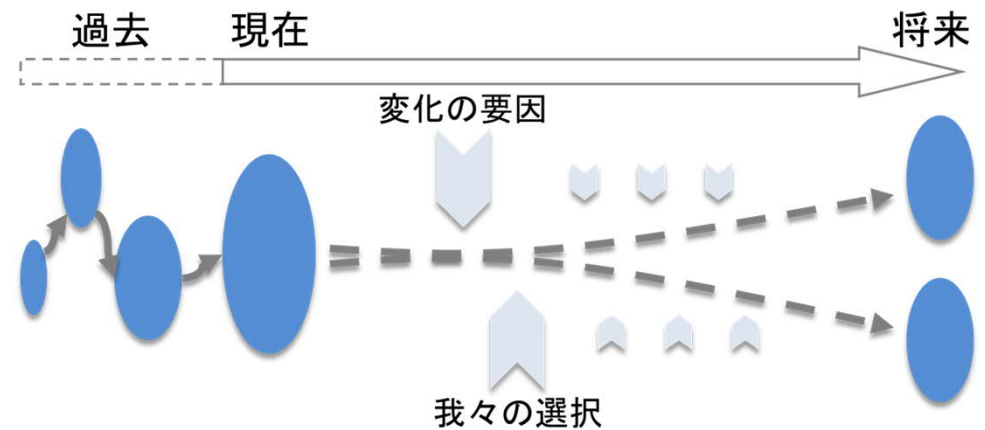
3. As is pointed out in the IPBES *Methodological Assessment Report on Scenarios and Models* (IPBES, 2016a), most existing scenario approaches for biodiversity and nature's contributions to people have a number of shortcomings. The obvious main limitation is the extent of knowledge about the properties of nature and of its components, and about the interactions and feedback processes associated with those components. Most existing scenario approaches, especially at the global and regional scales, have been developed to address climate change issues rather than biodiversity and ecosystem services issues per se, and are limited to assessing the impacts of drivers on states of nature and nature's contributions to people. They often consider biodiversity gains or losses as an endpoint, rather than recognizing the full range of interconnections and feedback between nature and people that are central to the IPBES conceptual framework (Seppelt et al., 2020). Existing scenario approaches are

¹ "Nature", "nature's contributions to people" and "good quality of life", as well as "instrumental values", "intrinsic values" and "relational values", are terms used in the IPBES conceptual framework, in the preliminary guide on values and throughout IPBES assessments and documents (see Diaz et al., 2015; Pascual et al., 2017; Diaz et al., 2018 for further details). "Nature" embodies different concepts for different people, including biodiversity, ecosystems, Mother Earth, systems of life and other analogous concepts. "Nature's contributions to people" broadly captures different concepts, such as ecosystem goods and services and nature's gifts. Both nature and nature's contributions to people are vital for human existence and good quality of life (human well-being, living in harmony with nature, living well in balance and harmony with Mother Earth, and other analogous concepts).

² For a full list of references, see document IPBES/9/TNF/16.

シナリオとは何か？

- 起こりうる未来を表現する
- 変化の要因/原因が、将来、自然や人間にどのような影響を与えるかを考慮するためのツール
- われわれの現在の選択やわれわれを取り巻く不確実性が、将来に与える影響を評価することを助ける。これには政策や管理方策などを含む
- シナリオは定量的(数値や数学的モデル)または定性的(未来についてのストーリーや物語)、あるいはその両方を用いて表現される

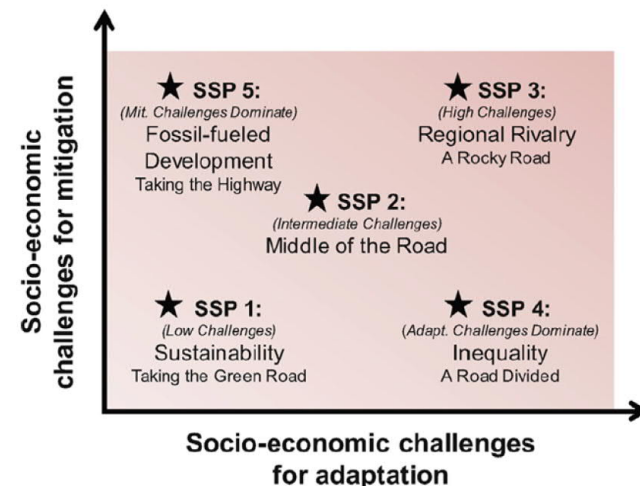
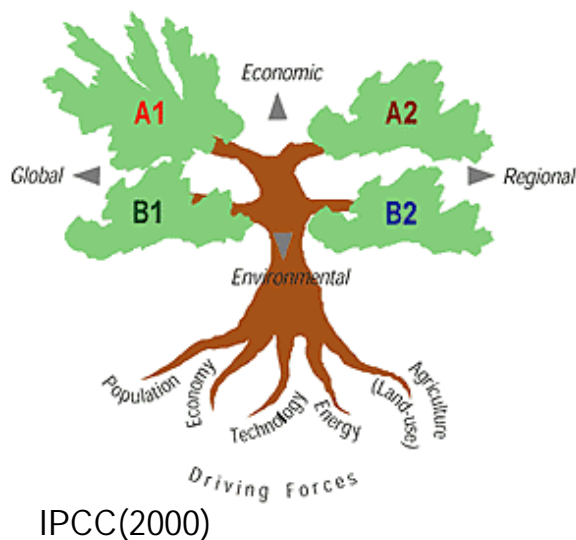


シナリオの定義

一貫性のある、もっともらしい将来イメージ

IPCC

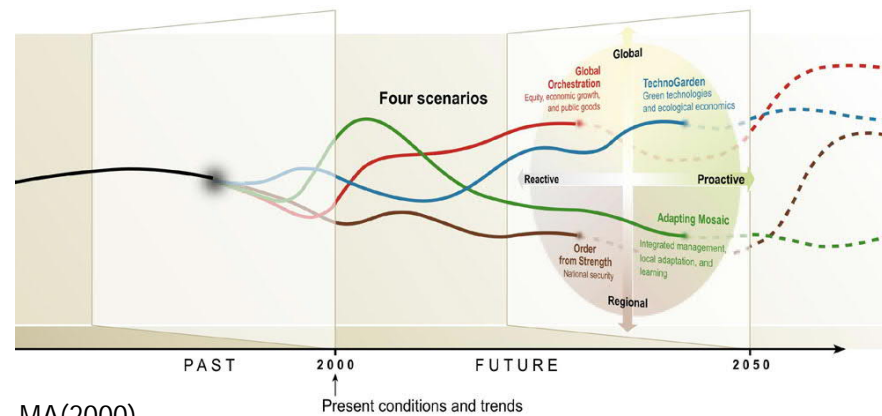
「複数の将来イメージ」



O'Neill et al. (2014)

MA(ミレニアム生態系評価)

「もっともらしい複数の将来イメージ」,
「特定の仮定の下に何が生じるかを示したもの」

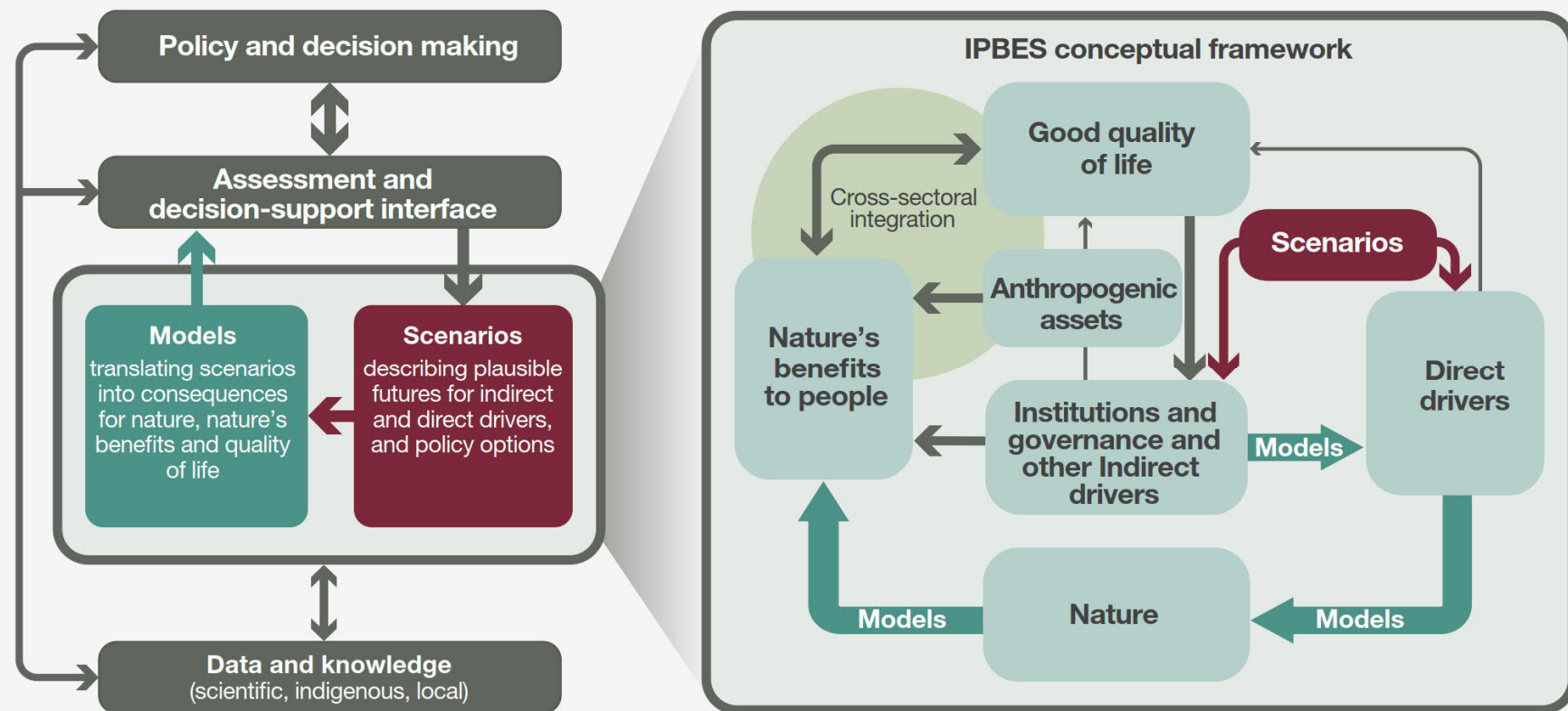


MA(2000)

IPBESにおけるシナリオの定義

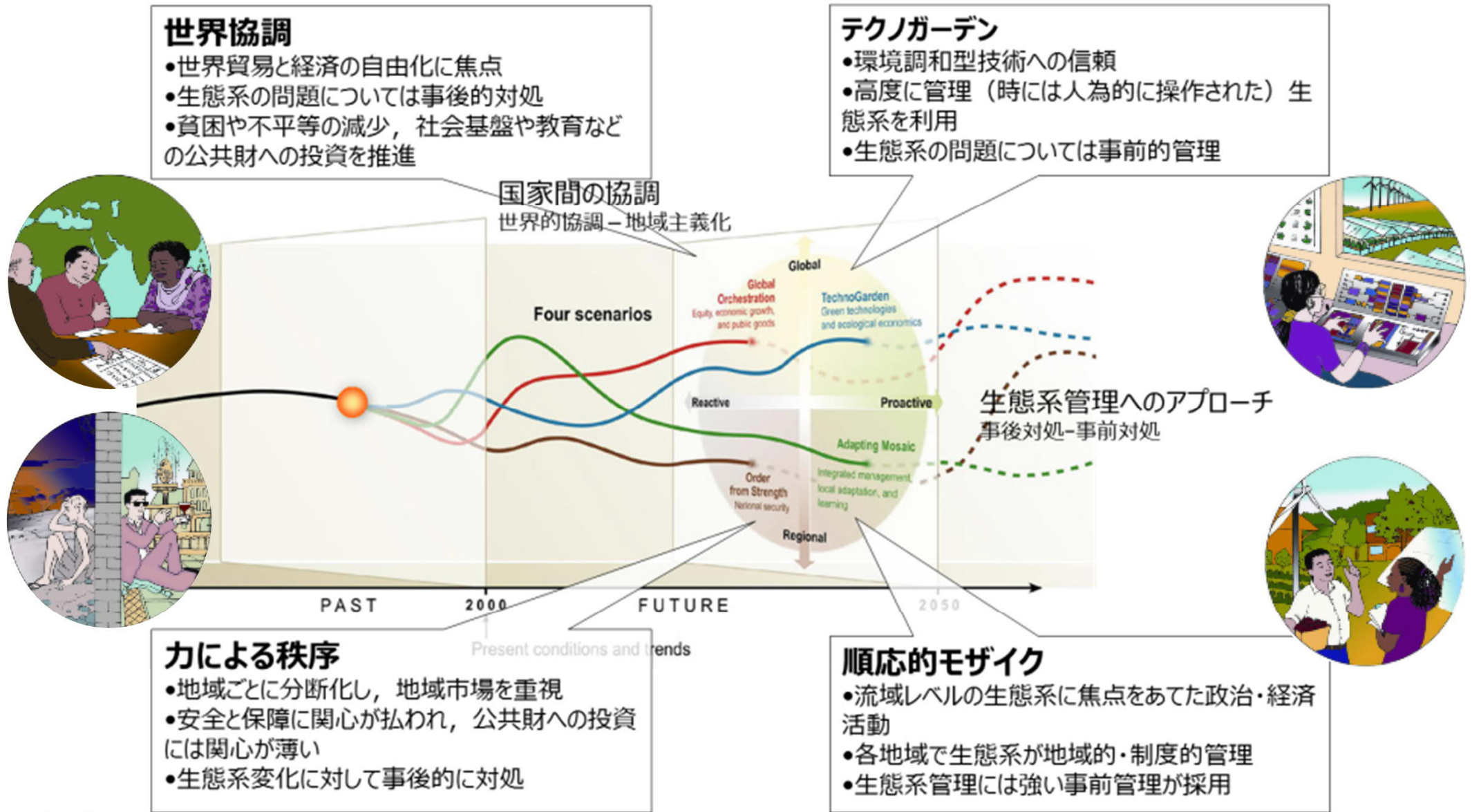
(分析対象とする)システムの、1つまたは複数の構成要素について、特に自然における変化の要因とNCP／生態系サービスについて、起こりうる未来を表現したもので、政策や管理オプションも含まれる。

Representations of possible futures for one or more components of a system, particularly for drivers of change in nature and nature's contributions, including alternative policy or management options.



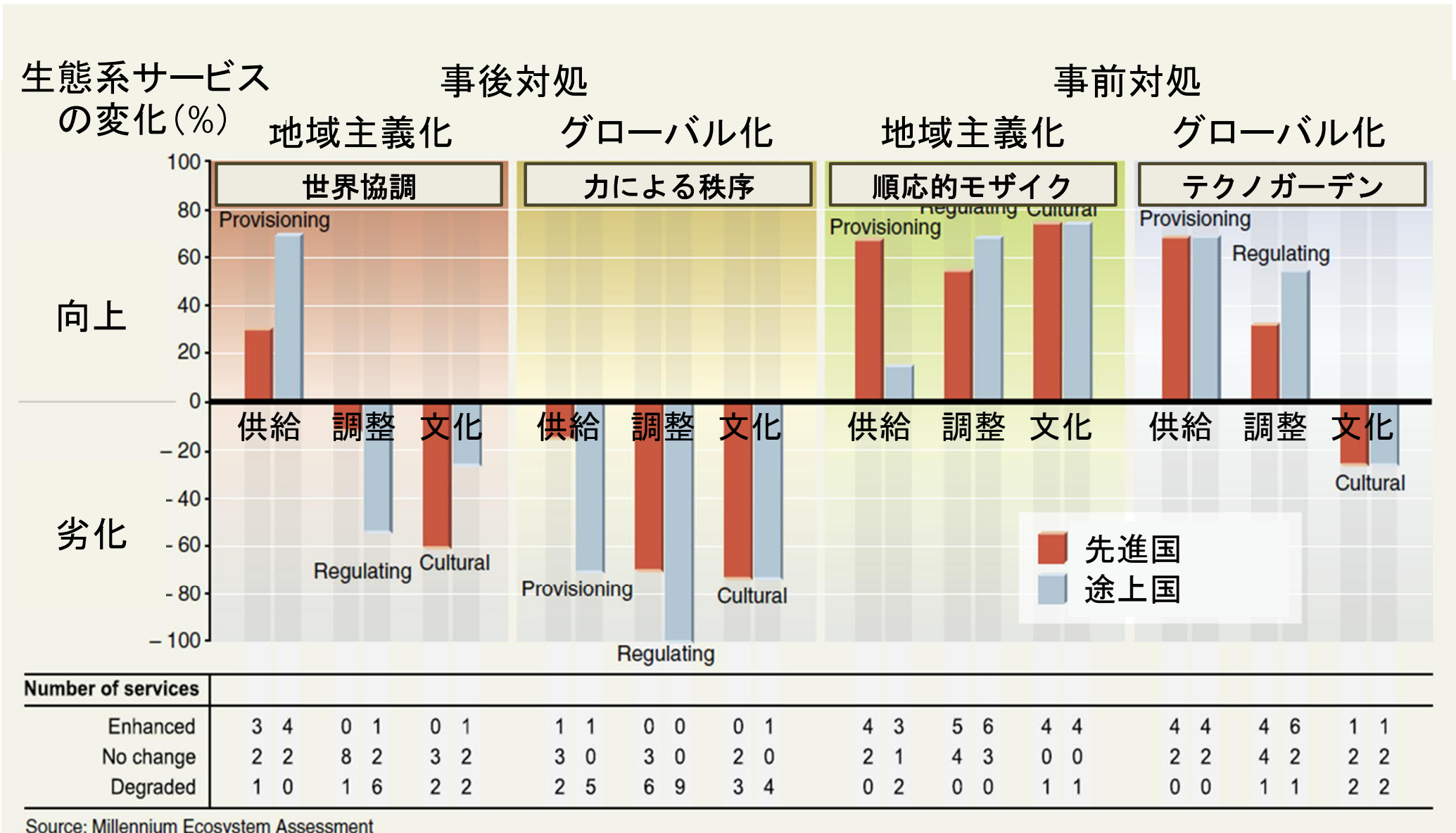
ミレニアム生態系評価におけるシナリオ

人口・経済成長、都市の拡大、産業構造の変化等の間接要因の変化が、土地利用や直接採取、気候変動等の直接要因を通じて、生態系サービスや人間の福利の変化に与える影響を分析



ミレニアム生態系評価におけるシナリオ

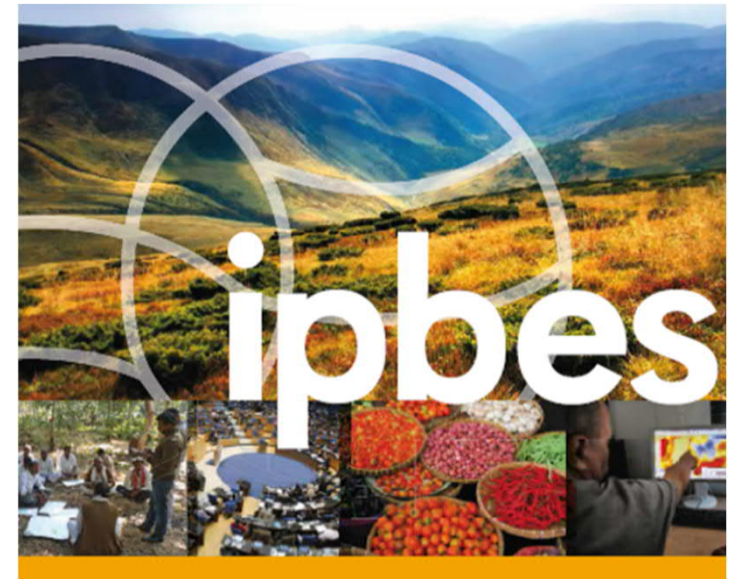
供給サービス（6項目）、調整サービス（9項目）、文化的サービス（5項目）の2000年比で2050年のサービスの状態（向上/劣化）を、先進国（赤）、途上国（青）で評価



Source: Millennium Ecosystem Assessment

生物多様性・生態系サービス評価におけるシナリオ研究の課題

- 気候変動の影響や適応策の評価を中心テーマとしたシナリオが多く、生物多様性・生態系サービスは受動的な位置づけ。そのため、生物多様性保全の議論に積極的に使うには限界
- 専門家が作成(ステークホルダーの参加の不足)
- 必ずしもポジティブな将来社会を描いておらず、社会を導く指針にはならない
- IPCCの1.5°Cレポート、IPBESの地球規模評価等で持続可能な社会の実現には“Transformative change”が必要とされるが、望ましい社会の将来ビジョンが描かれていない

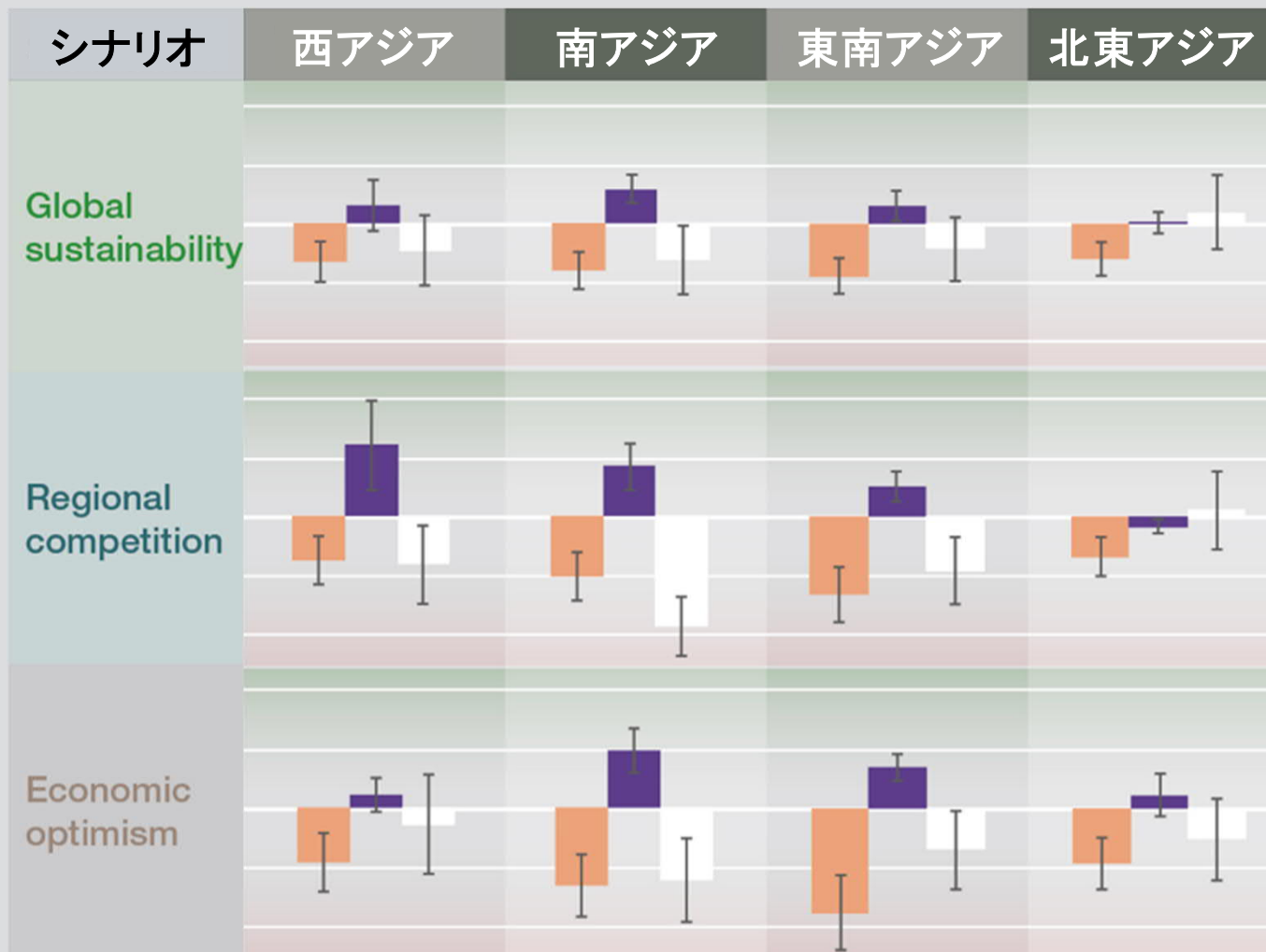


The methodological assessment report on
**SCENARIOS AND MODELS
OF BIODIVERSITY AND
ECOSYSTEM SERVICES**

SUMMARY FOR POLICYMAKERS

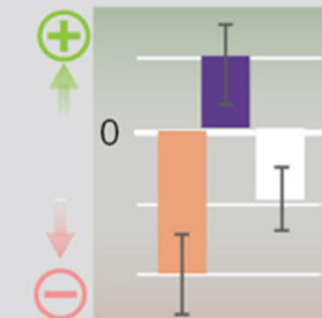


IPBES(2016)



- 生物多様性
動植物種数の変化
- 供給サービス
食料、飼料、木材、バイオエネルギー
- 調整サービス
窒素除去、土壌保護、作物の花粉媒介、作物の害虫防除、生態系による炭素貯留

2015～2050年の変化



Global Sustainabilityシナリオ (SSP1、RCP2.6)

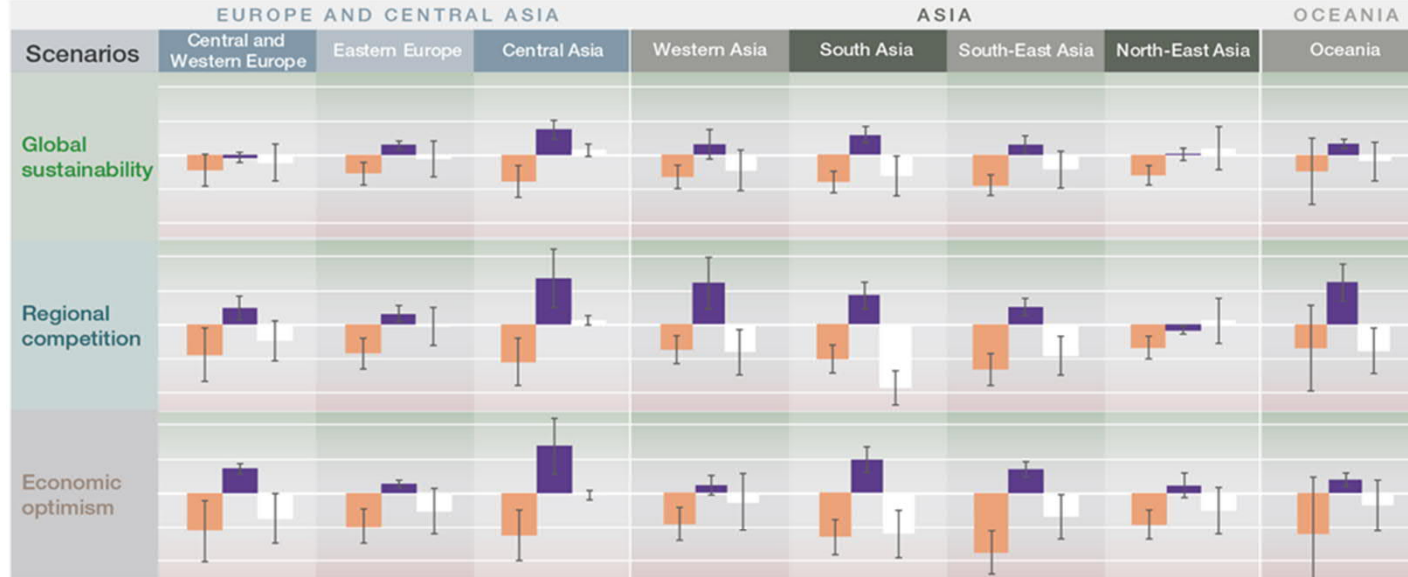
- 積極的な環境政策と持続可能な生産と消費
- 低レベルの温室効果ガス排出量

Regional Competitionシナリオ (SSP3、RCP6.0)

- 貿易などについての高い障壁と貧富の格差の拡大
- 高レベルの温室効果ガス排出量

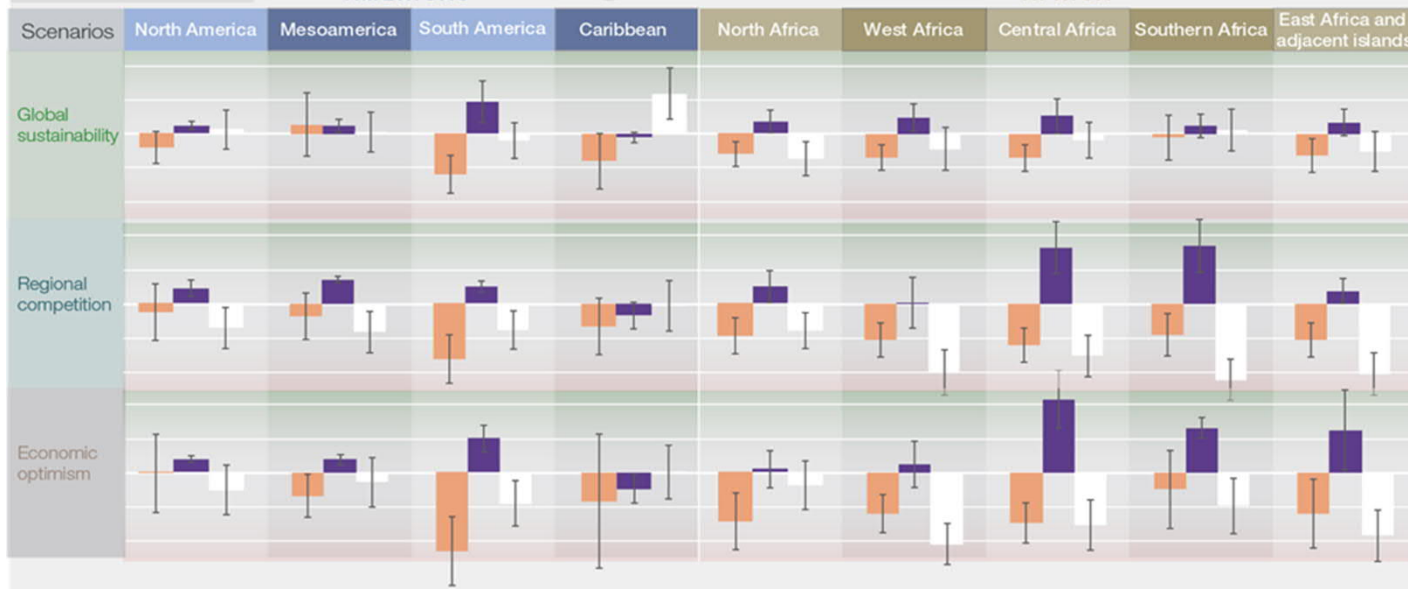
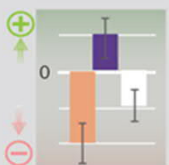
Economic Optimismシナリオ (SSP5、RCP8.5)

- 急速な経済成長と緩い環境規制
- 非常に高レベルの温室効果ガス排出量



Indicator
 Species richness (Orange)
 Material NCP (Purple)
 Regulating NCP (White)

Change between 2015 and 2050



2015年から2050年までの土地利用変化と気候変動による生物多様性、供給サービス、調整サービスへの影響

- ほぼ全地域で、Global Sustainabilityシナリオで生物多様性と生態系サービスへの影響が最も小さい。Regional CompetitionシナリオとEconomic Optimismシナリオでは影響の地域差が大きい
- 供給サービスはRegional CompetitionシナリオとEconomic Optimismシナリオで最大だが、生物多様性と調整サービスを犠牲(トレードオフ)にしている

生物多様性・生態系サービス評価におけるシナリオ研究の課題

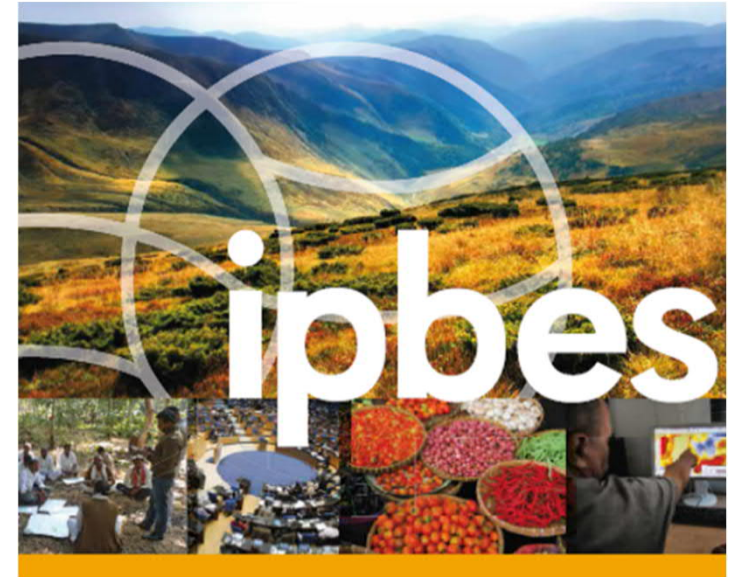
- 気候変動の影響や適応策の評価を中心テーマとしたシナリオが多く、生物多様性・生態系サービスは受動的な位置づけ。そのため、生物多様性保全の議論に積極的に使うには限界
- 専門家が作成(ステークホルダーの参加の不足)
- 必ずしもポジティブな将来社会を描いておらず、社会を導く指針にはならない
- IPCCの1.5°Cレポート、IPBESの地球規模評価等で持続可能な社会の実現には“Transformative change”が必要とされるが、望ましい社会の将来ビジョンが描かれていない

生物多様性や生態系サービスを中心テーマに据え、人と自然の関係の好ましい姿を描いたシナリオが必要

→IPBESにシナリオ & モデルの専門家グループを設置(2019年からタスクフォースに再編)

マンデート

- ①アセスメントをはじめとするIPBESの活動におけるシナリオやモデルの利用についての助言
- ②将来のアセスメントでの活用のために、科学コミュニティによるシナリオとモデルの開発を促進



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SUMMARY FOR POLICYMAKERS



IPBES(2016)

Nature Futures Frameworkの作成に様々なステークホルダーが関与

- オークランドWS(ニュージーランド)(2017)
 - ステークホルダー・エンゲージメントによる人と自然の関係のビジョンに関するワークショップ。31カ国から70名以上のステークホルダーが参加
- Natural Capital Symposium(2018)
 - ワークショップの成果を報告、加盟国やステークホルダーからフィードバック
- ハーグWS(オランダ)(2018)
 - シナリオ & モデルの専門家グループがNFFの骨格を作成
- CBD-COP14サイドイベント(2018)
 - NFFの情報発信、加盟国やステークホルダーからのフィードバック
- バンクーバーWS(カナダ)(2019)
 - 自然科学だけでなく社会科学や人文分野の専門家40人が参加
- ハーグWS(2019)
 - BES評価に関する数理モデルの専門家を対象としたワークショップ
- IPBESユースワークショップ(2019)
 - ブラジル、サン・ペドロ 2019年6月27-28日
- 葉山WS(日本)(2020)
 - NFFにもとづく定性シナリオのドラフティング
- NFFワークショップ(2021、2022)オンライン
 - 数理モデルの専門家を対象としたNFFシナリオの定量化に関するワークショップ
- NFPダイアログ、ILKダイアログ、ステークホルダーダイアログ(2022)オンライン
 - NFFをIPBES総会にかけるにあたっての事前の意見交換
- IPBES-9でNFFの基盤が総会により歓迎

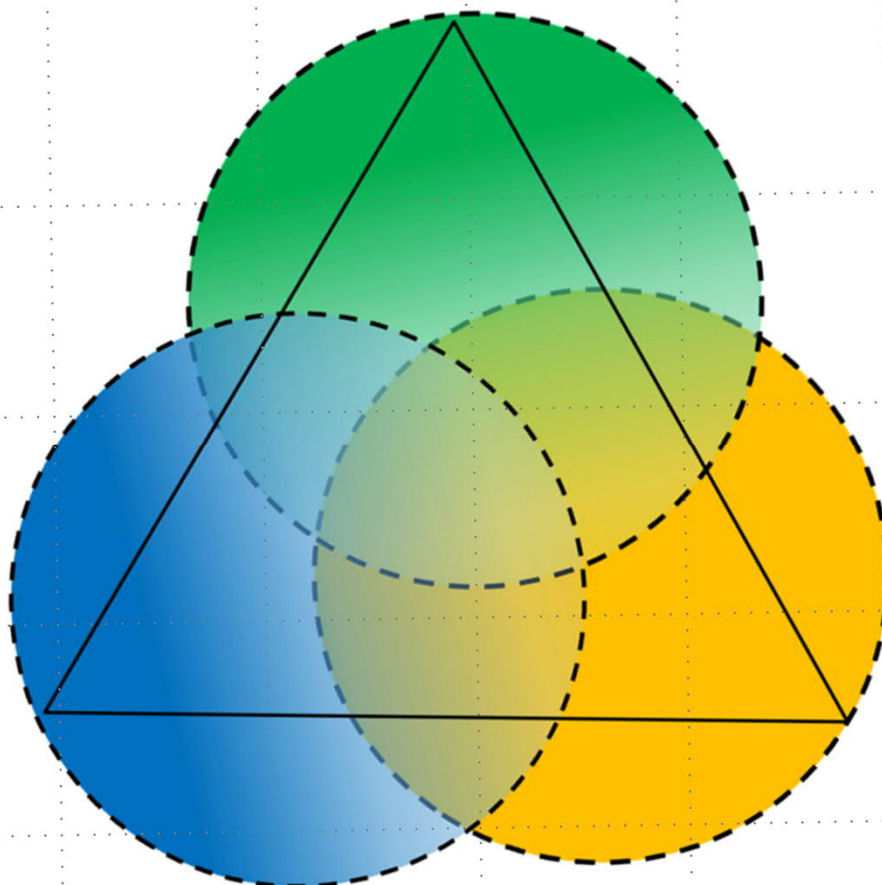


Nature Futures Framework

NFFは、多くのステークホルダーのビジョン策定作業で浮かびあがった自然に対するさまざまな価値観や視点を表現し、これらの多様な価値を取り入れたシナリオを開発するためのツール

Nature for Nature
自然のための自然(内在的価値を重視)

自然にはそれ自体に価値がある

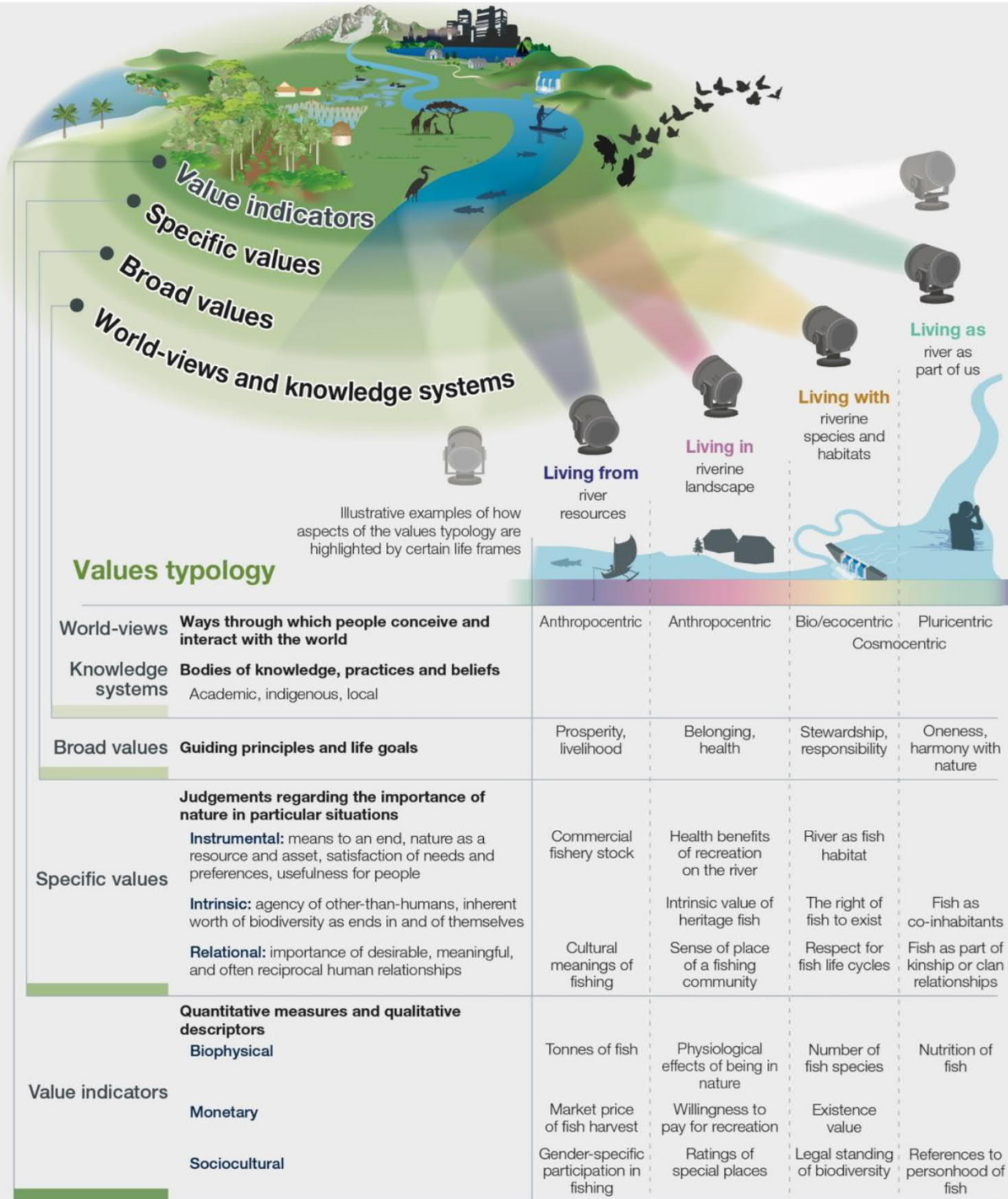


自然と人は一体であり、その関係性に価値がある

Nature as Culture/
One with nature
文化としての自然/
自然との一体化
(関係価値を重視)

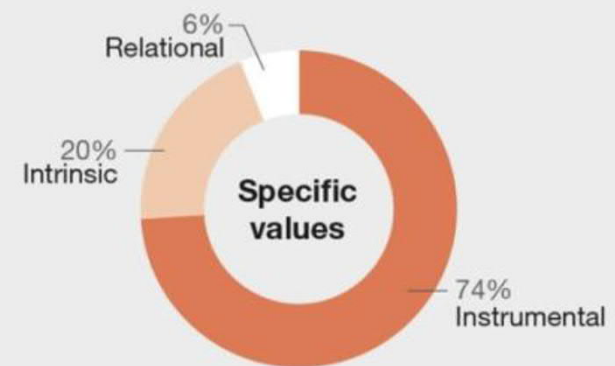
自然は社会に有用であるから価値がある

Nature for Society
社会のための自然
(道具的価値を重視)



- 価値アセスメントでは、人びとが自然にどのような価値 (Specific values) を見いだすかは、評価者の世界観 (World-views) や知識体系 (Knowledge systems)、広範な価値 (Broad values) の影響を受けることが示されている。
- Nature Futures Frameworkはこのうち“Specific values”に焦点をあてている

自然の価値の評価は道具的価値に焦点があてられがち



Nature Futures Frameworkに関する出版物

• 主要論文

- Rosa, I.M.D., Pereira, H.M., Ferrier, S. et al. (2017) Multiscale scenarios for nature futures. *Nat Ecol Evol* 1, 1416–1419. <https://doi.org/10.1038/s41559-017-0273-9> 614
- Pereira, L. M., Davies, K. K., den Belder, E., Ferrier, S., Karlsson-Vinkhuyzen, S., Kim, H., ... & Lundquist, C. J. (2020). Developing multiscale and integrative nature–people scenarios using the Nature Futures Framework. *People and Nature*, 2(4), 1172-1195.
- Kim, H., Peterson, G.D., Cheung, W.W.L., Ferrier, S., et al., and Pereira, H. (2021 in preprint) “Towards a better future for biodiversity and people: modelling the Nature Futures.” <https://osf.io/preprints/socarxiv/93sqp/>
- Duran, A.P., Kuijper, J.J., ... & Pereira, L. M. (in prep). “Bringing the Nature Futures Framework to life: Creating a set of illustrative narratives of nature futures”.
- Lundquist, et al. (in prep) “A pluralistic Nature Futures Framework for policy and action”.

• ワークショップ報告書

- Lundquist, C. J., Pereira, H., Alkemade, R., Den Belder, E., Carvalho Ribeira, S., Davies, K., ... Leigh, D. (2017) “Visions for nature and nature's contributions to people for the 21st century”, NIWA Science and Technology Series 83 (1–123). Auckland, New Zealand: NIWA.
- PBL (2018), Report on the Workshop ‘Next Steps in Developing Nature Futures’. PBL Netherlands Environmental Assessment Agency, The Hague.
- PBL (2019). Report on the workshop “From visions to scenarios for nature and nature’s contributions to people for the 21st century’. PBL Netherlands Environmental Assessment Agency, The Hague. 593
- PBL (2019), Report on the workshop “Global Modelling of Biodiversity and Ecosystem Services’. PBL Netherlands Environmental Assessment Agency, The Hague.
- PBL (2020), Report on the Workshop “New Narratives for Nature: operationalizing the IPBES Nature Futures Scenarios’. PBL Netherlands Environmental Assessment Agency, The Hague.
- IPBES (2021) Report of the IPBES task force on scenarios and models on its workshop on modelling Nature Futures scenarios under the 2030 IPBES rolling work programme, 35 p.

この他にもNFFを使った複数のケーススタディ研究が進行

Sustainability Science誌でNature Futures Frameworkの特集号を編集中

Nature Futures Frameworkの運用に関するガイドライン

IPBES/9/INF/16

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IPBES/9/INF/16



Intergovernmental Science-Policy
Platform on Biodiversity and
Ecosystem Services

Distr.: General
5 May 2022

English only

Plenary of the Intergovernmental Science-Policy
Platform on Biodiversity and Ecosystem Services
Ninth session

Bonn, Germany, 3–9 July 2022

Item 8 (a) of the provisional agenda*

**Building capacity, strengthening knowledge foundations
and supporting policy: work programme deliverables and
task force workplans**

Information on advanced work on scenarios and models of biodiversity and ecosystem functions and services

Note by the secretariat

1. In section V of decision IPBES-4/1, the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) approved the summary for policymakers of the methodological assessment of scenarios and models and accepted the individual chapters of the assessment. In the same decision, the Plenary requested the Multidisciplinary Expert Panel to oversee further work related to scenarios and models, and to appoint an expert group to perform that work.
2. At its seventh session, in decision IPBES-7/1, the Plenary adopted the rolling work programme of the Platform for the period up to 2030, which includes among its six objectives advanced work on scenarios and models of biodiversity and ecosystem functions and services (objective 4 (b)). The objective consists of providing advice to expert groups assessing the use of existing models and scenarios, and catalysing the development of new scenarios and associated models for the future work of IPBES and application in policy development, while also promoting coherence with similar work carried out by the Intergovernmental Panel on Climate Change and other bodies, as appropriate.
3. In the same decision, the Plenary established a task force on scenarios and models of biodiversity and ecosystem services for the implementation of objective 4 (b) of the rolling work programme of IPBES up to 2030, in accordance with the revised terms of reference set out in sections I and V of annex II to the decision, and building on the work of the former expert group on scenarios and models, whose mandate ended with the seventh session of the Plenary. The Plenary requested the Bureau and the Multidisciplinary Expert Panel, through the IPBES secretariat, to constitute the task force in accordance with the terms of reference.
4. According to its terms of reference, the task force oversees and takes part in the implementation of objective 4 (b) of the rolling work programme up to 2030, “Advanced work on scenarios and models of biodiversity and ecosystem functions and services”, and acts in accordance with relevant decisions by the Plenary and its subsidiary bodies, including by building on lessons learned in the implementation of deliverable 3 (c) of the first work programme. The task force implements the work on scenarios and models based on the terms of reference for the further development of tools and methodologies regarding scenarios and models to facilitate the provision of advice to all the expert teams, in particular those working on assessments on the use of scenarios, and to catalyse the further development of scenarios and models for future IPBES assessments, as well as to guide the secretariat, including the dedicated technical support unit, in the provision of support.

* IPBES/9/1.

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Appendix I

The nature futures framework and its methodological guidance

Background

1. In order to catalyse the further development of scenarios and models for future IPBES assessments, the former IPBES expert group and current IPBES task force on scenarios and models produced the nature futures framework (NFF) with input from diverse stakeholder groups. The NFF is compatible with the IPBES conceptual framework and provides a tool for the development of future scenarios of nature and nature’s contributions to people. The framework was developed in direct response to the conclusions of the Methodological Assessment of Scenarios and Models, which identified limitations of existing scenario approaches in their usefulness for biodiversity and ecosystem services, particularly in their ability to incorporate policy objectives related to nature conservation and human wellbeing. To address these issues, input from stakeholder groups and modellers was collected through more than 10 workshops (held between 2016 and 2021), which resulted in the development of the NFF. The NFF provides a framework for the scientific community to develop new scenarios for future IPBES assessments, and for the modelling communities to develop models to identify the impact of such scenarios on biodiversity and nature’s contributions to people.
2. At its eighth session, in decision IPBES-8/1, the Plenary approved the interim workplan of the task force on scenarios and models for the intersessional period 2021–2022, setting out a process to collect feedback on the NFF and the methodological guidance through an external review and consultations with Governments, the wider scientific community, including experts in social science and humanities, as well as modelling groups, and with experts on indigenous and local knowledge and representatives of indigenous peoples and local communities.
3. The document below provides the description of the NFF developed by the task force, and preliminary methodological guidance on how the framework can be used for scenario development. These materials were made available for external review from 6 September 2021 to 31 October 2021 (8 weeks). To support the review, online dialogues were held. This document was revised based on the comments received. Section II of this document is also reproduced in document IPBES/9/10.

Methodological guidanceでは Nature Futures Frameworkの運用に関する 基礎的な概念

- Common & specific features
 - Illustrative narratives
 - Narrative family
 - Indicators
- 等を解説

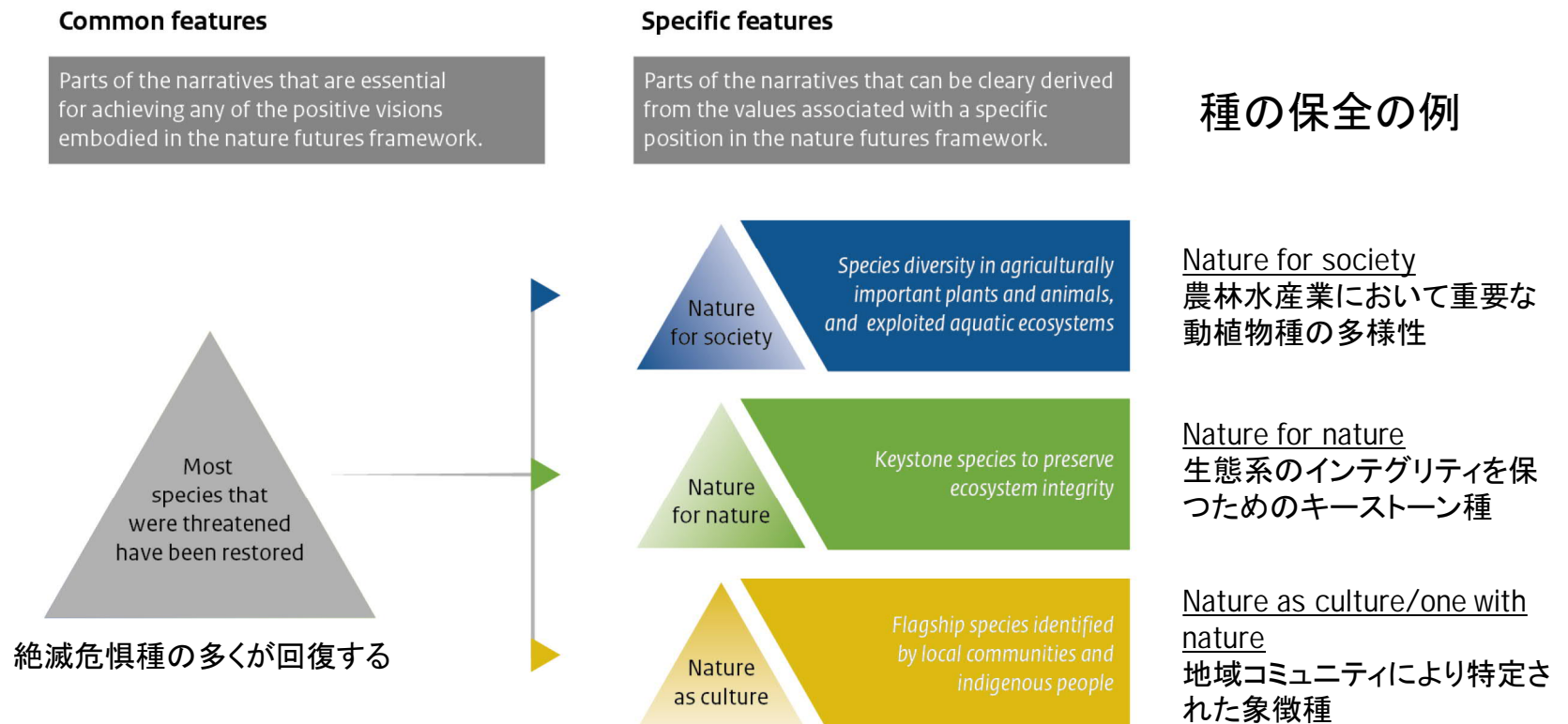
Common & specific features

Common features

- すべてのNFFベースのシナリオが具備すべき特徴。例えば、すべてのグローバルシナリオは、種の絶滅を最小限に抑えること、世界的な気候目標を達成すること、世界の人口を支えるのに十分な食糧生産を確保することを目指すことを想定

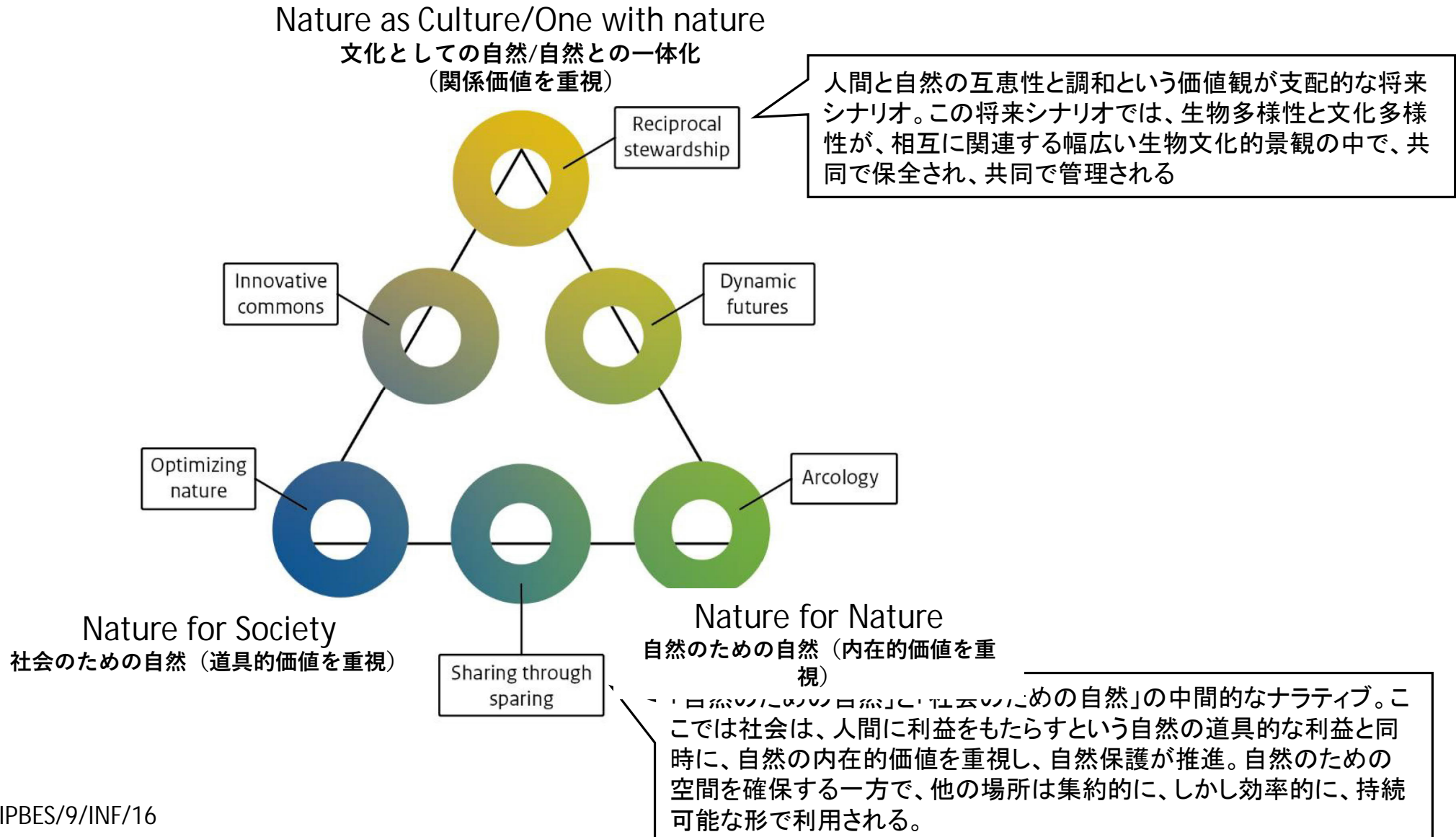
Specific features

- シナリオがNFFのどこに位置するかにより異なる、NFFトライアングルの特定の位置に特有の特徴。Specific featuresにより、NFFトライアングルの特定の位置のシナリオを定義する重要な要素に一貫性を持たせることができる。



Illustrative narratives

- 2020年2月に葉山(日本)で開催されたタスクフォース・ワークショップで、三角形中の6つの場所に対応するナラティブの草案を作成
- 他地域でのシナリオ作成の基礎になることを想定



Nature Futures Frameworkの運用に関するガイドライン

IPBES/9/INF/16

UNITED
NATIONS



Food and Agriculture
Organization of the
United Nations



BES

IPBES/9/INF/16



Intergovernmental Science-Policy
Platform on Biodiversity and
Ecosystem Services

Distr.: General
5 May 2022
English only

Plenary of the Intergovernmental Science-Policy
Platform on Biodiversity and Ecosystem Services
Ninth session

Bonn, Germany, 3–9 July 2022

Item 8 (a) of the provisional agenda*

**Building capacity, strengthening knowledge foundations
and supporting policy: work programme deliverables and
task force workplans**

Information on advanced work on scenarios and models of biodiversity and ecosystem functions and services

Note by the secretariat

1. In section V of decision IPBES-4/1, the Plenary of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) approved the summary for policymakers of the methodological assessment of scenarios and models and accepted the individual chapters of the assessment. In the same decision, the Plenary requested the Multidisciplinary Expert Panel to oversee further work related to scenarios and models, and to appoint an expert group to perform that work.
2. At its seventh session, in decision IPBES-7/1, the Plenary adopted the rolling work programme of the Platform for the period up to 2030, which includes among its six objectives advanced work on scenarios and models of biodiversity and ecosystem functions and services (objective 4 (b)). The objective consists of providing advice to expert groups assessing the use of existing models and scenarios, and catalysing the development of new scenarios and associated models for the future work of IPBES and application in policy development, while also promoting coherence with similar work carried out by the Intergovernmental Panel on Climate Change and other bodies, as appropriate.
3. In the same decision, the Plenary established a task force on scenarios and models of biodiversity and ecosystem services for the implementation of objective 4 (b) of the rolling work programme of IPBES up to 2030, in accordance with the revised terms of reference set out in sections I and V of annex II to the decision, and building on the work of the former expert group on scenarios and models, whose mandate ended with the seventh session of the Plenary. The Plenary requested the Bureau and the Multidisciplinary Expert Panel, through the IPBES secretariat, to constitute the task force in accordance with the terms of reference.
4. According to its terms of reference, the task force oversees and takes part in the implementation of objective 4 (b) of the rolling work programme up to 2030, “Advanced work on scenarios and models of biodiversity and ecosystem functions and services”, and acts in accordance with relevant decisions by the Plenary and its subsidiary bodies, including by building on lessons learned in the implementation of deliverable 3 (c) of the first work programme. The task force implements the work on scenarios and models based on the terms of reference for the further development of tools and methodologies regarding scenarios and models to facilitate the provision of advice to all the expert teams, in particular those working on assessments on the use of scenarios, and to catalyse the further development of scenarios and models for future IPBES assessments, as well as to guide the secretariat, including the dedicated technical support unit, in the provision of support.

* IPBES/9/1.

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Appendix I

The nature futures framework and its methodological guidance

Background

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Methodological guidanceは、IPBES-9での審議結果の反映、その後の加盟国からのコメントへの対応などを経て、IPBES-10に提出予定