

4e Rencontre GE-EN-VIE  
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# Indicateurs des limites de la planète en Suisse

Une étude sur mandat de l'Office fédéral de l'environnement (OFEV)  
dans le contexte de la votation sur l'initiative populaire « économie verte » (25.9.2016)

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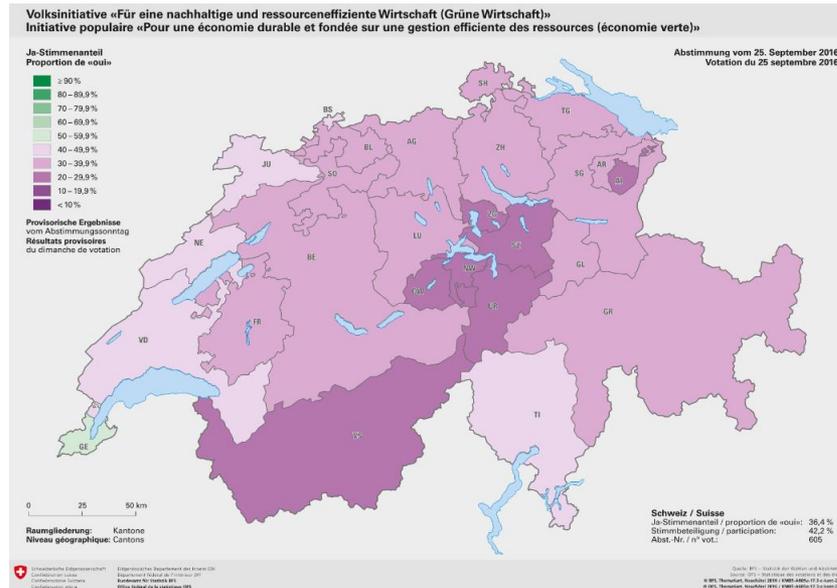
# Etude Suisse – contexte politique

**Swiss position on a framework for sustainable development post-2015 (25 June 2014)**

*‘achieve sustainable development and eradicate extreme poverty in all its forms while respecting planetary boundaries’*

Initiative populaire «Pour une économie durable et fondée sur une gestion efficace des ressources (économie verte)» (25.09.2016)

*‘L’«empreinte écologique» de la Suisse ... d’ici à 2050 ... ne dépasse pas un équivalent planète’*

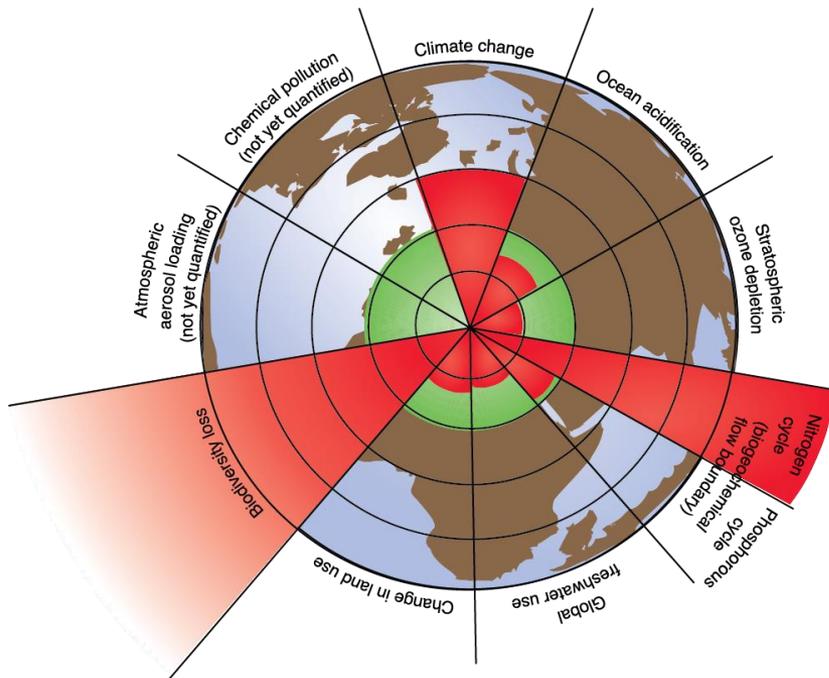


Résultat:  
oui = 36.4%,  
1 canton sur 23  
(Genève)

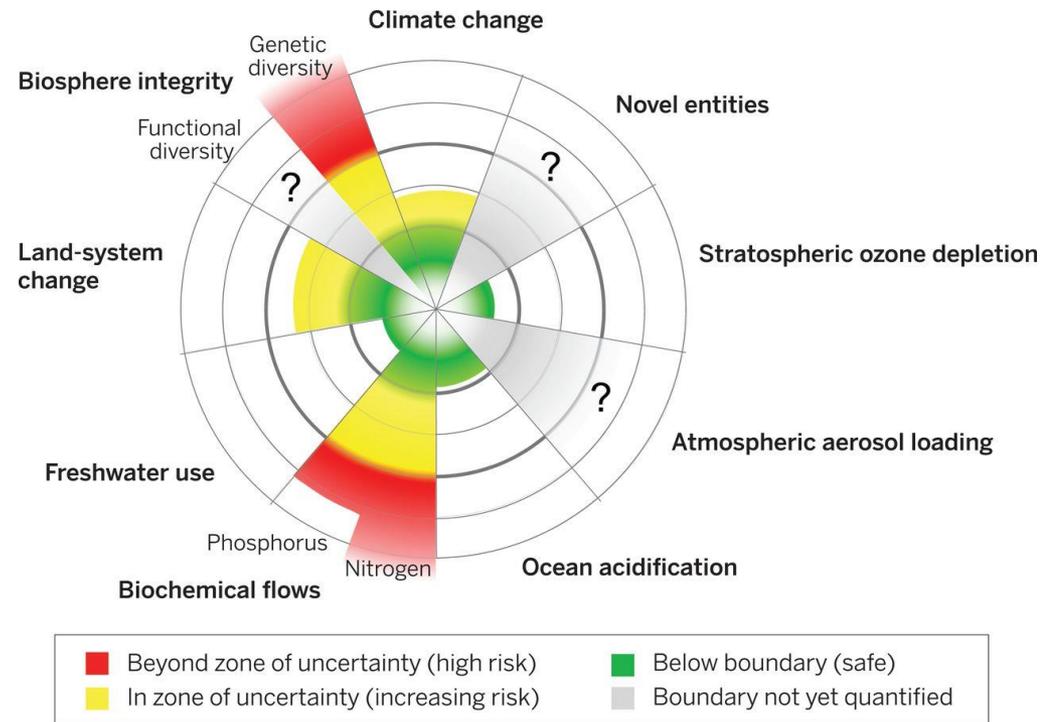
# Limites planétaires 2009, 2015, ...

## Stabilité et résilience du Système Terre

Un ensemble de neuf limites biophysiques du système Terre qui devraient être respectées afin de maintenir, sur Terre, des conditions favorables à la poursuite du développement humain



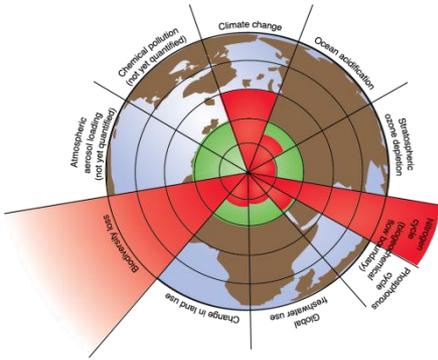
Rockström et al. (2009)



Steffen et al. 2015

<https://www.stockholmresilience.org/research/planetary-boundaries.html>

# Les quatre aspects principaux de l'étude



## 1. Indicateurs et limites globales

Climate change | Ocean acidification | Stratospheric ozone depletion | Nitrogen Cycle | Phosphorus cycle | Atmospheric aerosol loading | Global freshwater use | Land system change | Biodiversity Loss | Chemical pollution



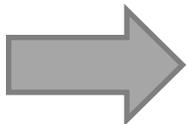
## 2. Juste part

Principes d'allocation à la Suisse d'une part des budgets globaux



## 3. Impacts

Approche empreinte pour tenir compte des impacts environnementaux à l'étranger



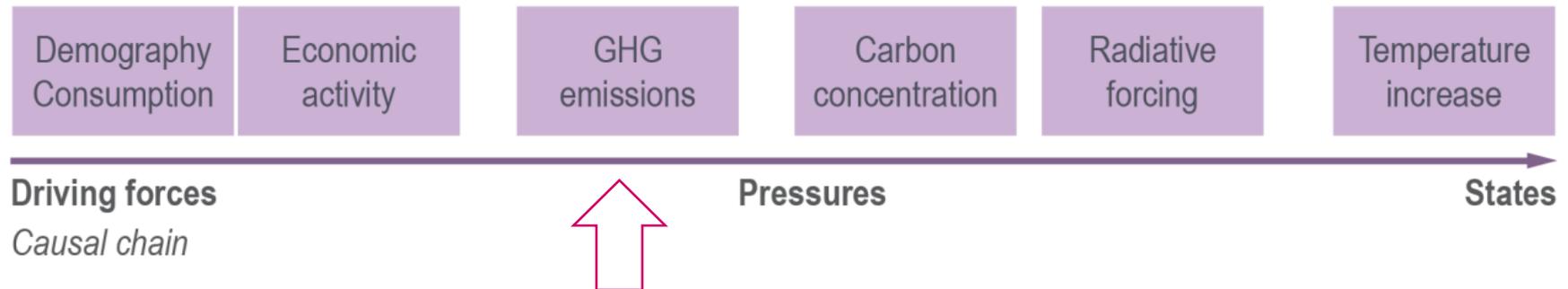
## 4. Performances

Scores et interprétations en termes de priorités d'action

# Indicateurs : limites et liens causaux

- Limites disponibles dans la littérature scientifique
- Liens avec les activités humaines (consommation, production)

## Exemple du changement climatique



Émissions de gaz à effet de serre : liens clairs avec le changement climatique et la consommation de biens et services, limites identifiées, empreintes carbone disponibles.

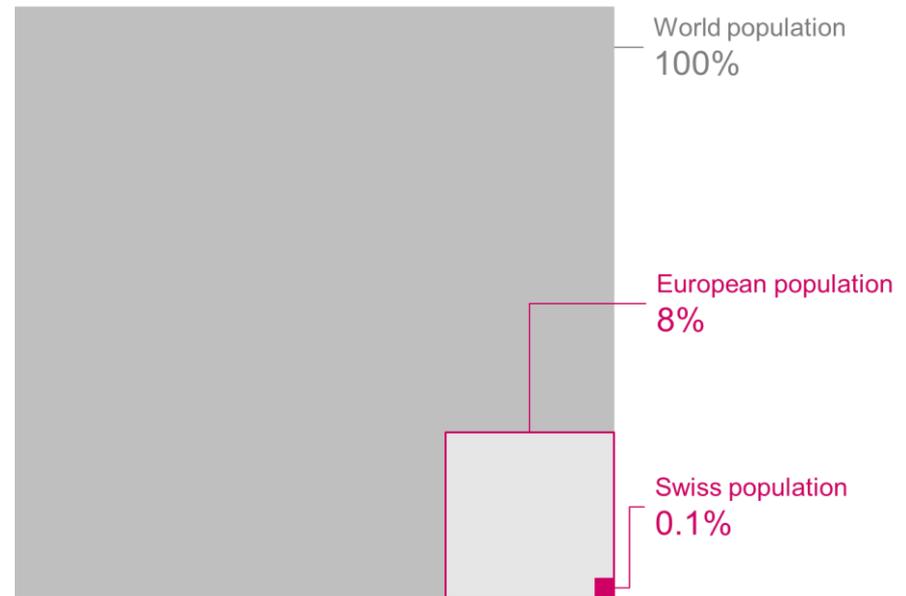
Pour certaines limites planétaires, nos indicateurs diffèrent de ceux de Rockström & al. 2009 et Steffen & al. 2009, par ex. Biodiversity loss :

- Rockström et al. 2009: “Extinction rate (nb of species per million species per year)”
- Dao et al. 2018 : “Average biodiversity damage potential” (à partir de la couverture du sol)

# (Juste) part – principes d'allocation

Allocation principles
<b>Equality</b>
<b>Needs</b> (age, climatic conditions, ...)
<b>Right to development</b> (development level, poverty line, ...)
<b>Sovereignty</b> (acquired rights, ...)
<b>Capability</b> (ability to pay, ...)
<b>Responsibility</b> (past impacts, ...)
<b>Cost-effectiveness</b> (cost of mitigation, technical feasibility, ...)

E.g. demographic shares in 2015



## Principles appliqués dans l'étude sur la Suisse

- Equality (e.g. for Land use) => **part Suisse (2015) = 0.11% de la limite globale**
- Responsibility (e.g. for Climate Change), past (since 1990) and future (until 2100) => **part Suisse (2015) = 0.04% de la limite globale (soit 3x moins que la part basée sur le poids démographique)**

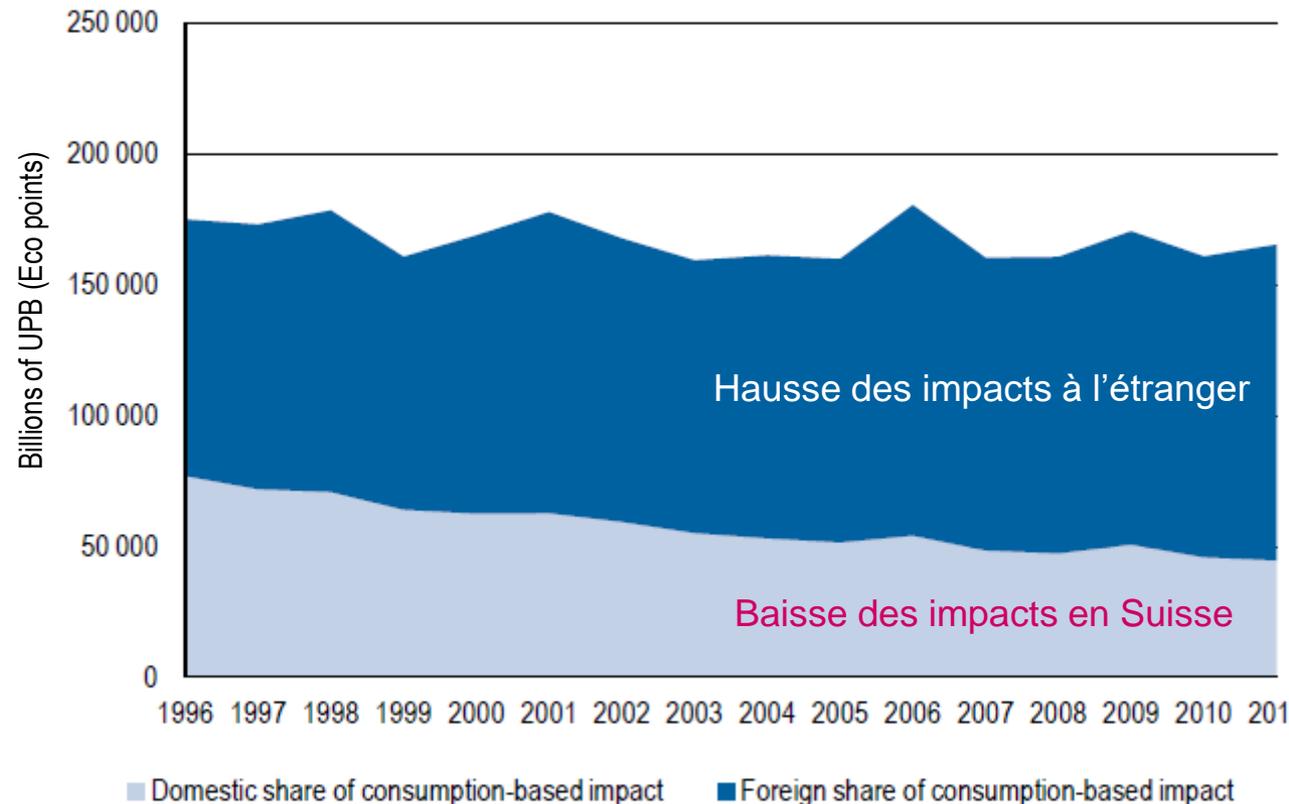
# Nécessité des indicateurs «empreinte»

“En 2011, les trois quarts ou presque des atteintes générées par la consommation suisse l’ont été hors de nos frontières.” (Frischknecht et al. 2014)

“Footprint indicators calculate the environmental impact (emissions or resource consumption) of Switzerland’s final demand for goods and services along the entire value chain – from the extraction of raw materials and their processing to their use and disposal.” (FOEN, Environment Switzerland 2018)

- carbon footprints
- land footprints
- water footprints
- ...

Development of the consumption-based overall environmental impact of Switzerland



# Performances : limites et empreintes

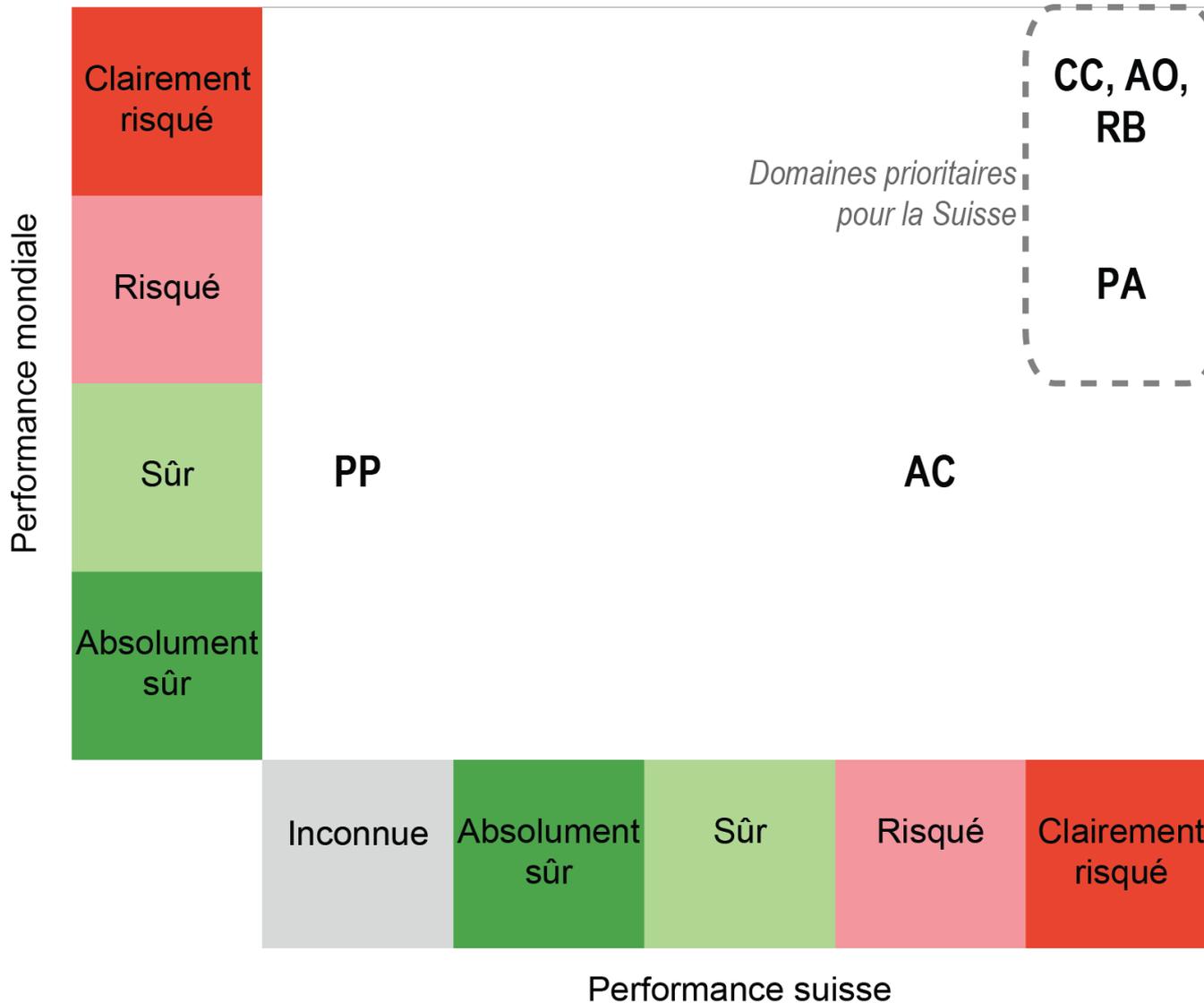
## Exemple Changement climatique

Indicateur: émissions de gaz à effet de serre

Score: empreinte / limite



# Performances : synthèse



**RB** : Réduction de la Biodiversité  
**CC** : Changement Climatique  
**AC** : Anthropisation de la Couverture du Sol  
**PA** : Pertes en Azote  
**AO** : Acidification des Océans  
**PP** : Pertes en Phosphore (performance suisse inconnue par manque de données).

Pour les quatre autres Limites de la Planète - l'Appauvrissement de l'Ozone Stratosphérique, l'Augmentation des Aérosols Atmosphériques, l'Utilisation de l'Eau Douce et la Pollution Chimique - il n'existe aucune preuve de dépassement au niveau mondial, leurs performances mondiales sont donc considérées dans les zones vertes. Les performances suisses de ces Limites de la Planète n'ont pas été évaluées.

## Prochaines étapes suggérées

- Se concentrer sur les territoires, secteurs, entreprises, ... prioritaires
- Évaluer les coûts des (in)actions



Merci pour votre attention

# Publications

## Environmental Limits and Swiss Footprints Based on Planetary Boundaries

A study commissioned by the Swiss Federal Office for the Environment (FOEN)

Final Report



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## National environmental limits and footprints based on the Planetary Boundaries framework: The case of Switzerland

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### ABSTRACT

The Planetary Boundaries concept is a recent scientific framework, which identifies a set of nine bio-physical limits of the Earth system that should be respected in order to maintain conditions favourable to further human development. Crossing the suggested limits would lead to drastic changes in human society by disrupting some of the ecological bases that underlie the current socio-economic system. As a contribution to the international discussion, and using the case of Switzerland, this study proposes a methodology to apply the Planetary Boundaries concept on the national level. Taking such an approach allows to assess the environmental sustainability of the socio-economic activities (e.g. consumption) by the inhabitants of a country in a long-term global perspective, assuming that past, current and future populations on Earth have similar "rights" to natural resources. The performance of countries is evaluated according to a consumption-based approach, which assesses the environmental sustainability of the Planetary Boundaries and understand which socio-economic indicators for which both countries and Switzerland are exceeding the limits, footprints and performances (at global level). The assessment of global and national performance is based on the assessment of global and national performance footprints related to Climate Change, Ocean Acidification, and Land Use Change. The results developed herein can be applied to the analysis of other countries and specific economic sectors.

### 1. Introduction

Since the 1950s, the extraction of natural resources and related environmental impacts have greatly accelerated worldwide (Steffen et al., 2015a). Human activities now generate ever-more significant pressures on the global environment: climate change, deforestation, biodiversity losses, and decline in air and water quality have been recognised as important issues which need to be addressed (UNEP, 2012).

The concept of Planetary Boundaries (PBs) is a fairly recent one (Rockström et al., 2009). The PBs are a set of nine physical and bio-

oceans, Global Warming, and Ocean Acidification. The PBs are a set of nine physical and bio-



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