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ECOSYSTEM-BASED ASSESSMENT OF SUSTAINABILITY STANDARDS AND THEIR EFFECTIVENESS

ECOS EFFECT

Methodological framework

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Content

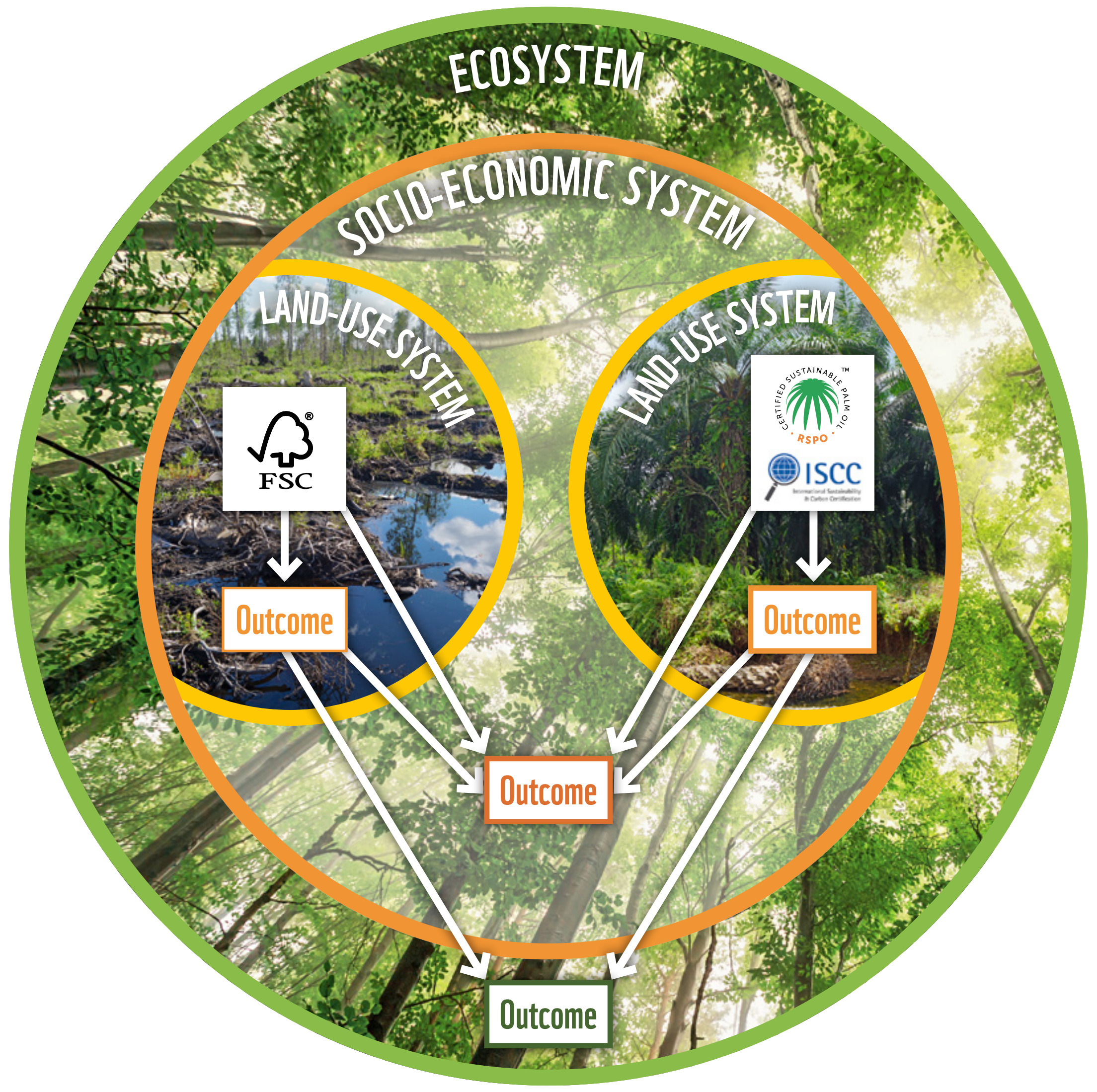
Introduction

The WWF network promotes certain *Multi-stakeholder Sustainability Initiatives* (MSIs) as instruments to reduce the negative impacts of anthropogenic land-use and exploitation of natural resources. MSIs as well as *Roundtables* gather diverse stakeholders such as NGOs, businesses, and producers aiming at providing corporative solutions for responsible production, sourcing, and manufacturing practices within or across a given sector. The WWF network played a crucial role in the establishment of several of these initiatives, including the Forest Stewardship Council – FSC, the Marine Stewardship Council – MSC, and the Roundtable on Sustainable Palm Oil – RSPO.

As a result, standards were developed comprising a set of environmental, social, and economic **Principles, Criteria** and **Indicators** (P, C & I) for the sustainable cultivation, processing, and trade of natural resources, agricultural or piscicultural commodities. The guidelines present a consensus for a baseline responsibility standard for business behavior that includes product labeling, verification, accreditation, and certification as a response to consumer expectations and to enforce governmental regulations. The first voluntary sustainability standards came into being in the 1970s as cooperative private initiatives for organic farming. In 1988 the *Fairtrade* label followed this tendency and became a global actor. Since then, the number of initiatives, sustainability standards, certified commodities, and areas under cultivation has steadily increased. However, despite substantial investments into these schemes, so far little was done to systematically assess the **effectiveness** of sustainability standards. In 2012, as part of the WWF Market Transformation Initiative (MTI), a program was set up with the assignment to understand the impact of MSIs. The study focussed on MSC, FSC, RSPO and RTRS (Round Table Responsible Soy) and brought about qualitative results of different certification schemes for various commodities in several regions. Nevertheless, in general, the comparability of findings amongst available studies is low, due to differences in the geographic scope and especially because of variances in methodological approaches. The need for a systematic approach towards assessing impacts of certification systems and producing comparable results became ever more evident.

Besides the operationalization of sustainability into businesses, sustainability standards are expected to increase the transparency concerning the production and supply chains of certified commodities and develop a common ground for mutual trust. The ultimate goal of sustainability standards is to safeguard biodiversity and ecological processes besides social and economic aspects and at the same time allow for land-use and resource extraction. Effective sustainability standards have to achieve positive outcomes on the ground to reduce environmental problems that occur in the conventional non-certified production system. From a conservation point of view, **ecologically effective** sustainability standards must contribute to conservation, development or restoration of biodiversity, especially related to the ecosystems typically degraded in the context of producing the certified commodity.

The successful application of sustainability standards will produce outcomes on various levels, regarding the certified production system, the corresponding socio-economic system, and the ecosystem that includes these nested subsystems. Outcomes on one level will not necessarily translate into outcomes and effects in systems of a higher order. For instance, an improvement of certain cultivation practice may help to save money or increase workers' safety, but this will not automatically prevent an ecosystem from being impacted by degradation. Following this logic, an ecosystem-based methodology is required that helps to understand and assess **results chains** from production practices to ecosystem health, the ultimately expected conservation effect. Any method for analysing the effectiveness of sustainability standards has to be practical, transparent and replicable. Therefore, it will have to work along a set of guiding steps, must be reasonable

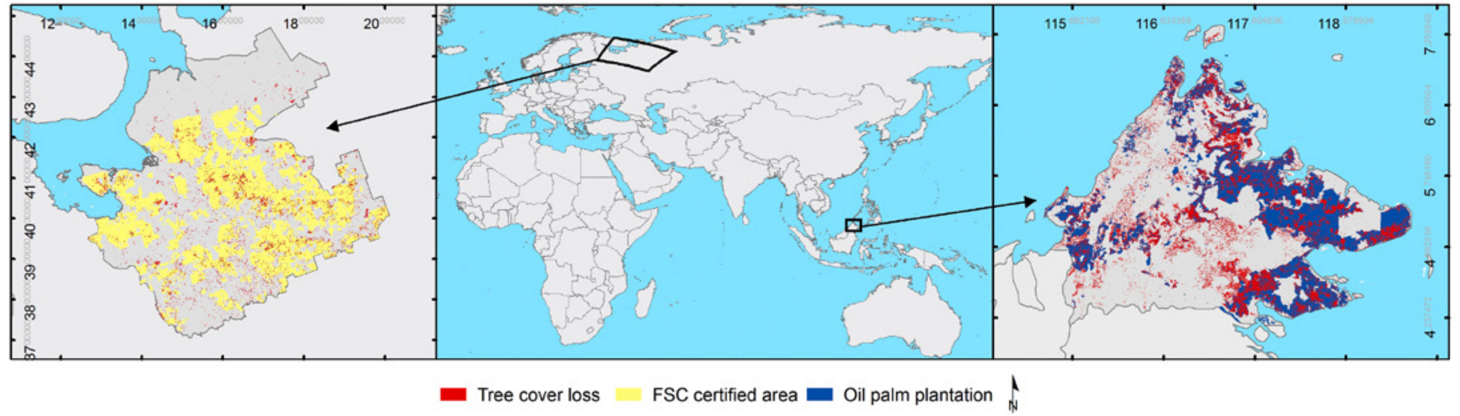


and applicable to any production system, region, biome, and sustainability standard. Furthermore, it needs to possess the ability to assess human-induced disturbances to functional ecological systems which are often not directly measurable or visible and to analyse the theoretical and empirical outcomes delivered by sustainability standards.

The *Open Standards for the Practice of Conservation is the Conservation Measures Partnership's* tool for adaptive management of conservation sites comprising a series of steps that follow an adaptive cycle. Based on the *Open Standards for the Practice of Conservation* the *MARISCO* method (adaptive **MA**nagement of vulnerability and **RIS**k at **CO**nservation sites) was developed at the *Centre for Econics and Ecosystem Management* to more explicitly address aspects of risks and vulnerability under an ecosystem-based approach (www.marisco.training). Both approaches provide tools to visualise and understand complex situations and the cause-and-effect relationships of involved elements that threaten biodiversity. In order to understand whether sustainability standards are effective in terms of reducing the actual negative impacts of land-use and production systems, WWF put up the hypothesis, that P, C & I of sustainability standards resemble strategies comparable to those developed in the frame of conservation projects and to the conceptual framework of the *Open Standard for the Practice of Conservation* and *MARISCO*.

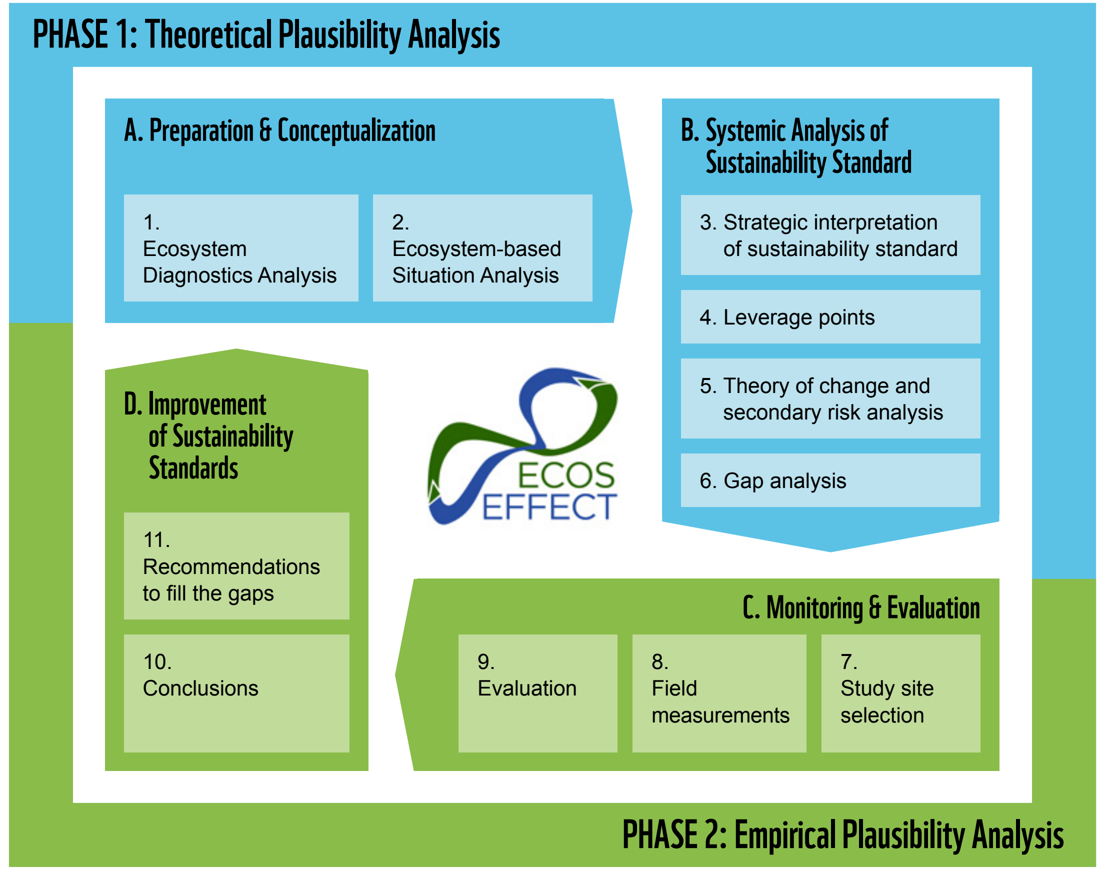
The initial idea was further developed and applied by the Centre for Econics and Ecosystem Management in cooperation with WWF within two case studies in Malaysia and the Russian Federation.

Case studies overview

SCOPE	Oblast Archangelsk, Russian Federation	Sabah, northern Borneo, Malaysia
		
PROJECT	Assessing the impact of FSC in the Archangelsk Oblast, Russian Federation	Assessment of ecological impacts of selected sustainability standards (RSPO-RED and ISCC) for biomass production of biofuels in Sabah, Malaysia
BIOME	Boreal forest of Northwest Russia	Tropical rainforest in Southeast Asia
SUSTAINABILITY STANDARD	Forest Stewardship Council Standard for Russian Federation (FSC-STD-RUS-V6-1-2012 Russia Natural and Plantations EN)	Malaysian National Interpretation of RSPO and RED relevant criteria, International Sustainability and Carbon Certification (ISCC EU version 2.4)
GOAL	Theoretical and empirical plausibility analysis of the Forest Steward Council (FSC) certification in the Archangelsk region, in the Northwest of the Russian Federation	Theoretical plausibility analysis of two sustainability standards for biofuels that are accepted by the EU Renewable Energy Directive (EU-RED): RSPO-RED (Roundtable on Sustainable Palm Oil and RED requirements) and ISCC (International Sustainability and Carbon Certification)
FUNDER	WWF Germany	German Federal Ministry of Food and Agriculture (BMEL) through the Agency for Renewable Resources e.V. (FNR)
ADDITIONAL PARTNERS	WWF Russia, Archangelsk office Northern (Arctic) Federal University (NArFU)	WWF Malaysia, Sabah office University Malaysia Sabah
TIMEFRAME	Phase I: January 2014 – January 2016 Phase II: February 2016 – June 2018	Phase I: November 2014 – December 2015 Phase II: to be conducted

Methodology

The ecosystem-based approach named ***ECOSEFFECT*** (**ECOS**ystem-based assessment of **S**ustainability standards and their **EFFECT**iveness) was designed as methodology that proposes a comprehensive and holistic assessment of sustainability standards in terms of reducing identified human-induced threats and their underlying drivers that cause environmental stresses and degrade biodiversity.



To assess the impact of and differentiate between a certification system and a conventional non-certified production system, it is crucial to get a holistic understanding of cause-effects chains relevant to the site. ECOSEFFECT starts with **an assessment of the initial situation as well as past and present ecosystem conditions** in the region of interest where a sustainability standard is implemented.

The **elaboration of a theory of change** helps us to understand how the activities required by or the absence of interventions stipulated through the certification system would theoretically change the situation. The identification of measurable indicators specific to the postulated outcomes helps to **design a subsequent empirical assessment** phase including various ecological and socio-economic parameters. Measurements are taken in comparable certified and non-certified land-use systems and analysed in relation to the most undisturbed reference sites available.

The two distinct but interrelated phases, the **Theoretical Plausibility Analysis** and the **Empirical Plausibility Analysis** of ECOSEFFECT comprise 11 sequential steps within an adaptive cycle. The adaptive character refers to the constant validation of previous assumptions that can be adjusted at any time whenever more knowledge or better quality information is available at each stage of the method. The procedure inherits an ongoing revision process and a steady improvment of findings. Moreover, minor methodological modifications are possible, if necessary given the specific circumstances and data availability. The two phases comprise two stages each, which are accompanied by close participation and involvement of diverse stakeholders.

The **Theoretical Plausibility Analysis** starts with the preparation and conceptualisation of the conditions and dynamics that relate to the generation of environmental problems and degradation of biodiversity by the conventional production system. Available information is collected ideally in a participatory workshop with diverse stakeholders or alternatively in a review of scientific literature. The information is systematically structured in a conceptual model that represents a knowledge map of complexly interrelated elements in a causal sequence: Starting with identifying biodiversity objects and the services they provide to human wellbeing and continuing with determining the services that are provided by social services and contribute to human wellbeing. Then the requirements for functionality of prescribed ecosystems (key ecological attributes) are designated. Furthermore, environmental stresses and the threats that trigger them as well as the contributing factors that present the ultimate drivers for ecosystem degradation are compiled:

Contributing factors, threats and stresses are semi-quantitatively evaluated according to their **criticality** (including geographical scope, severity of impact, and irreversibility), **dynamics** (e.g., trend of change, expected future criticality), and **systemic activity** (in- and outgoing influence) by applying the *MARISCO rating scheme* (the complete procedure can be looked up in the MARISCO manual, available online: http://www.marisco.training/resources/manual/). This helps to estimate the strategic relevance and finally prioritise the most important, influential, and relevant elements that increase the vulnerability of biodiversity objects. Those are the elements that would have to be addressed effectively by the certification system to transform negative impacts of resource extraction and land-use for the better.

The conceptual model is used for the next stage of the systematic analysis of sustainability standards. The P, C & I of the certification system are strategically interpreted into strategic complexes, strategies and activities. The leverage points, where the strategies enter are identified and the changes that are supposed to be induced are postulated. Elements within the conceptual model that are changed insufficiently or remain completely unaddressed are discussed in the gap analysis as the last step of the first phase.

Subsequently, in the **Empirical Plausibility Analysis** evidence is gathered to verify or falsify the outcomes assumed in the theoretical analysis. Measurement plots are determined on sites with similar landscape conditions including climatic zones, mean temperature, precipitation, soil type and elevation. Measurements are conducted in certified, non-certified and reference sites. Statistical analyses are conducted to evaluate the empirical data and provide findings for drawing overall conclusions about the performance of a certification scheme in an area of interest. The consolidation of theoretical and empirical findings allows for offering recommendations to improve the effectiveness of sustainability standards in order to move towards sustainable development.

CONTRIBUTING FACTORS

» Root causes of negative impacts.

» Human actions or activities.

» Direct or indirect drivers of threats.

» Assignable to various sectors: Spatial factors, governmental and institutional factors, economy and culture.

THREATS

» Pressures that directly degrade the natural structure and dynamics of ecosystems.

» Mostly human-induced.

» Processes of change inducing ecosystemic stresses.

STRESSES

» Degraded Key Ecological Attributes in terms of reduced quality or availability of biomass, information, and network.

» Caused by threats that affect the KEAs negatively.

» Comparable to the symptoms of a disease.

KEY ECOLOGICAL ATTRIBUTES (KEAs)

» Integral elements and properties of ecological systems.

» Key characteristics and requirements for adaptively functioning and ecosystems that cope with disturbance and change.

BIODIVERSITY OBJECTS

» Ecological elements representing the local biodiversity within the scope.

» Ecosystems and included (nested) elements such as populations or species.

ECOSYSTEM SERVICES

» Benefits that people obtain from functioning biodiversity.

» Provisioning, regulating, and cultural services.

HUMAN WELLBEING

» Supported by ecosystem services provided by biodiversity as well as by social services offered by social systems.

» Situation-dependent, reflecting local geography, culture and ecological circumstances.

SOCIAL SERVICES

» Services provided by social systems.

» Social services can relate to directly applied social benefits as well as the organization and administration of ecosystem services.

SOCIAL SYSTEMS

» Governmental and non-governmental institutions, business, religious groups, private organisations and any other groups of organized individuals as well as their interaction.

Description of the methodological steps using examples of two case studies

ECOSEFFECT method step	Output case study: FSC in Archangelsk, Russian Federation	Output case study: RSPO-RED and ISCC in Sabah, Malaysia

PHASE 1: Theoretical Plausibility Analysis

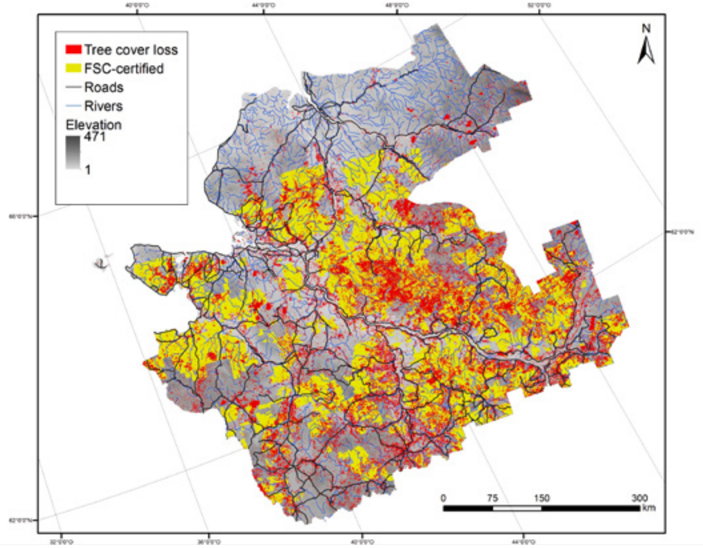
A. Preparation & Conceptualization

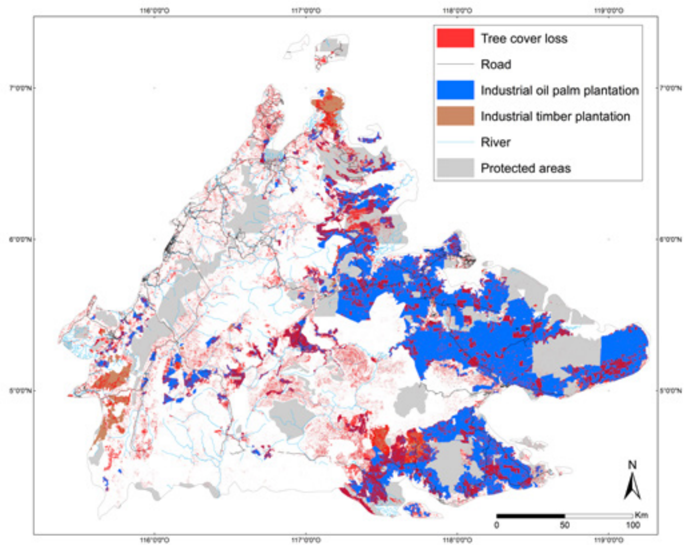
Initial analysis of the ecosystems and components that are affected by the land-use systems

1. Ecosystem Diagnostics Analysis

Understanding general ecological and socioeconomic land-use conditions:

- Initial analysis of spatial data to understand land-use patterns and dynamics of changes and underlying driving factors
- Ground-truthing exercise with rapid on-site observations and possibly initial assessments ideally on certified and non-certified areas
- Obtaining further information from local experts and stakeholders





ECOSEFFECT method step	Output case study: FSC in Archangelsk, Russian Federation	Output case study: RSPO-RED and ISCC in Sabah, Malaysia

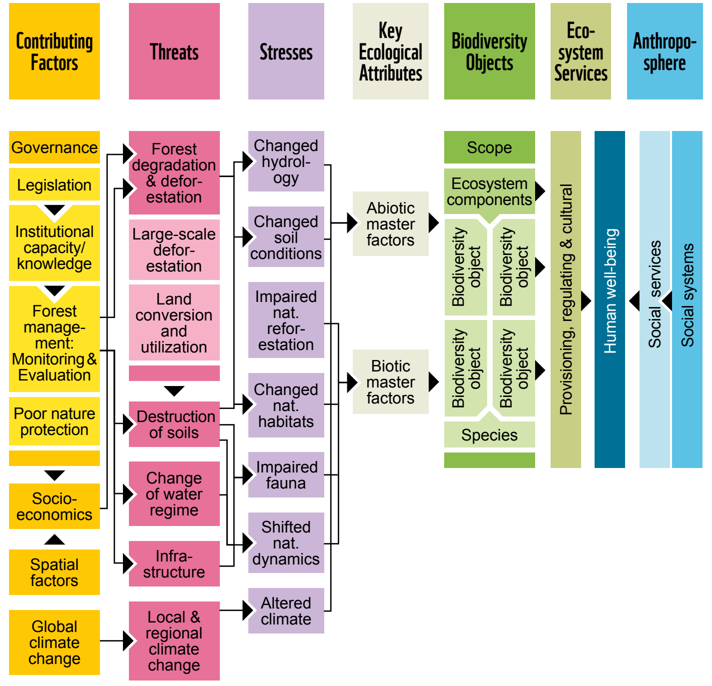
2. Ecosystem-based Situation Analysis

Gathering, structuring and interpretation of knowledge about situation in region of interest

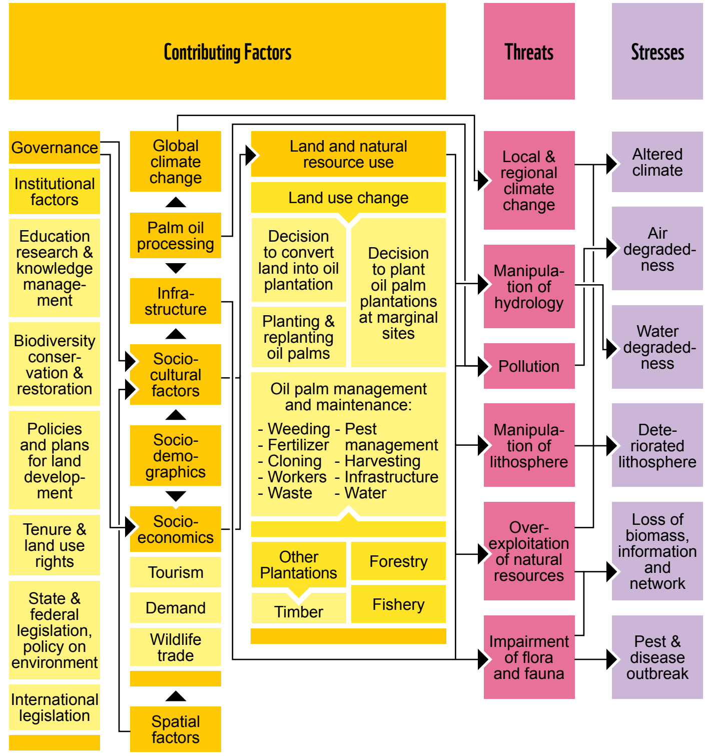
Creating comprehensive systemic web of identified system elements, processes and interactions in a conceptual model

Semi-quantitative evaluation of contributing factors, threats and stresses (rating according to the MARISCO rating scheme http://www.marisco.training/)

Participatory workshop to analyze the situation and development of a conceptual model



Desktop-based collection of knowledge in a conceptual model with subsequent verification by local stakeholders



ECOSEFFECT method step	Output case study: FSC in Archangelsk, Russian Federation	Output case study: RSPO-RED and ISCC in Sabah, Malaysia

B. Systemic Analysis of Sustainability Standard

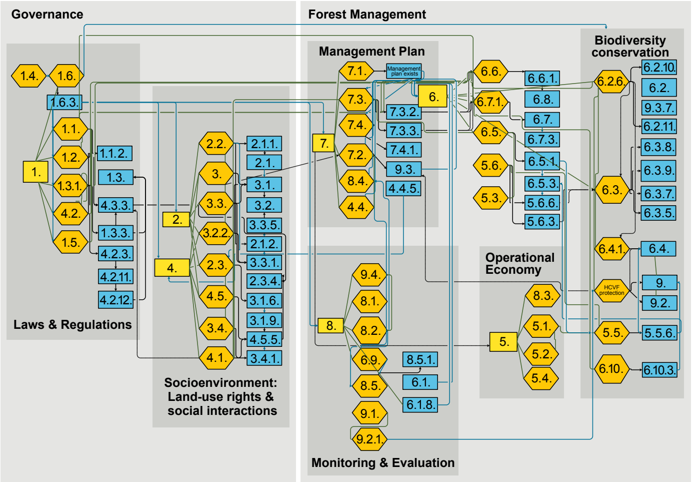
Analysis of the sustainability standard that applied to the analysed land-use system

3. Strategic interpretation of sustainability standard

Translation of P, C & I into strategic complexes, strategies and activities

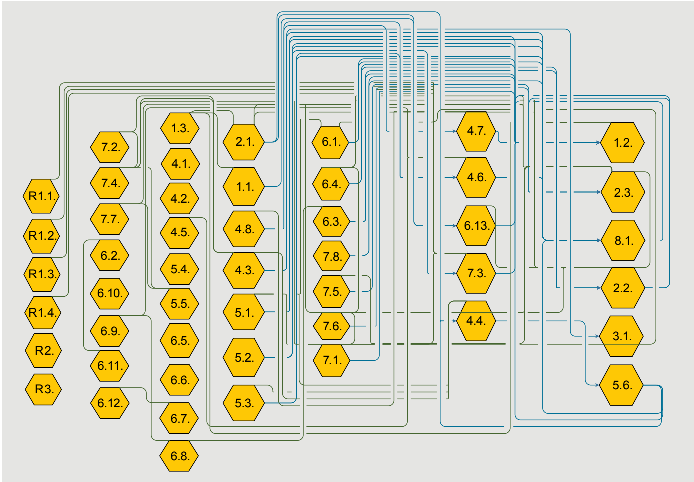
Determination of interrelations between the strategic components within a standard (coherency – depiction of how certain strategies require the accomplishment of others)

Output case study: FSC in Archangelsk, Russian Federation



Legend
- Direct cause-effect relationship
- Direct cause-effect relationship
- Direct dependency
- Close relationship

Output case study: RSPO-RED and ISCC in Sabah, Malaysia



Legend
- Direct dependency
  The strategy depends on the realisation of the previous strategy.
- Close relationship
  A strategy is close to another strategy.

4. Leverage points

ECOSEFFECT method step	Output case study: FSC in Archangelsk, Russian Federation	Output case study: RSPO-RED and ISCC in Sabah, Malaysia
The elements described in the conceptual model that can be addressed by the sustainability strategies Mapping of sustainability-strategies against elements in the model	Participatory workshop with 7 experts from 5 different institutions (including FSC International and FSC Russia) Identification of 104 leverage points of FSC on 29 of the 38 identified contributing factors in the conceptual model of the Archangelsk situation analysis	Participatory workshop with 21 experts from 14 different institutions (including RSPO) Identification of 64 leverage points of RSPO-RED and 43 leverage points of ISCC of the 227 contributing factors in the conceptual model deriving from the situation analysis

ECOSEFFECT method step	Output case study: FSC in Archangelsk, Russian Federation	Output case study: RSPO-RED and ISCC in Sabah, Malaysia

5. Theory of change and secondary risk analysis

Determining the direction and intensity of the influence

Assigning the effectiveness of induced changes (comprising influence and coherency)

Reformulation of addressed elements into expected outcomes (direct and indirect results)

Output case study: FSC in Archangelsk, Russian Federation

Semi-quantitative assessment influence of FSC against strategic relevance of contributing factors, threats and stresses

INFLUENCE		Intensity: High	Intensity: Low
Direction	Positive	4	3
	Negative	1	2

Output case study: RSPO-RED and ISCC in Sabah, Malaysia

Effectiveness assessment based on influence and plausibility against strategic relevance of contributing factors, threats and stresses

INFLUENCE		Intensity: High	Intensity: Low
Direction	Positive	4	3
	Negative	1	2

PLAUSIBILITY		Coherence: Supported/ Independent	Coherence: Dependent
Requirement	Major Must	4	3
	Minor Must	1	2

EFFECTIVENESS		Plausibility: 4 (plausible)	3 (somewhat plausible)	2 (somewhat implausible)	1 (implausible)
Influence	4 (high positive)	very likely to be effective	likely to be effective	likely to be effective	likely to be ineffective
	3 (low positive)	likely to be effective	likely to be effective	likely to be ineffective	likely to be ineffective
	2 (low negative)	very likely to be ineffective	very likely to be ineffective	very likely to be ineffective	very likely to be ineffective
	1 (high negative)	very likely to be ineffective	very likely to be ineffective	very likely to be ineffective	very likely to be ineffective

6. Gap analysis

Revelation of elements which have not been approached so far or are influenced in a negative way

Output case study: FSC in Archangelsk, Russian Federation

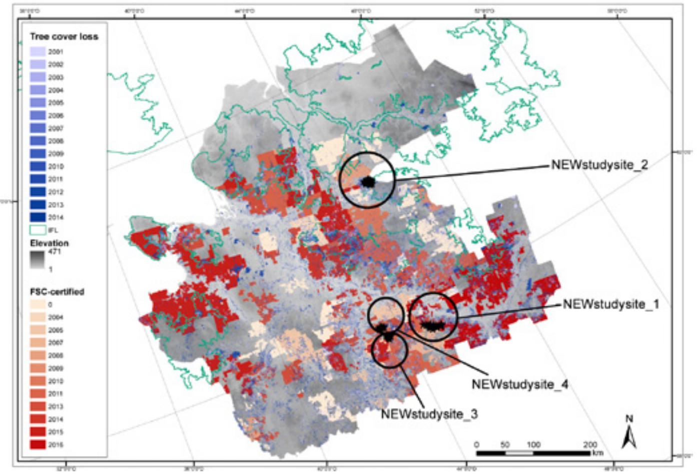
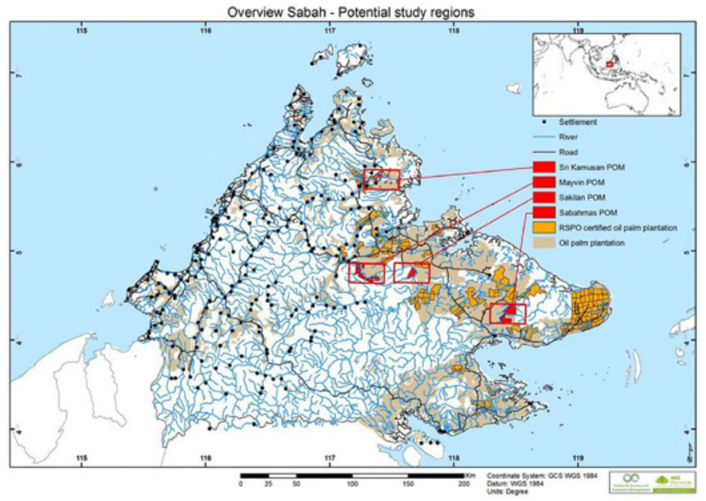
Amongst others the following gaps were identified:

- Adaptation to climate change
- Prevention of disturbance by existing roads and infrastructure
- Prevention of overhunting and exploitation outside of High Conservation Value Forests (HCVF)

Output case study: RSPO-RED and ISCC in Sabah, Malaysia

Amongst others the following gaps were identified:

- Adaptation to climate change
- Habitat connectivity
- Minimum-sized buffer zones
- Larger riparian zones
- Structural diversification of palm oil stands
- Prevention of disturbance by roads and infrastructure
- Ecosystem-friendly weeding techniques
- Buffering micro and meso-climatic changes

ECOSEFFECT method step	Output case study: FSC in Archangelsk, Russian Federation	Output case study: RSPO-RED and ISCC in Sabah, Malaysia
PHASE 2: Empirical Plausibility Analysis		
C. Monitoring & Evaluation **Collecting empirical measurements and analysis**		
7. Study site selection		
Identification of comparable landscape conditions at certified and non-certified study sites Assessment of tree cover loss or rotation patterns Consultation with local experts		
8. Field measurements		
Indicators along the result-chains deriving from the theory of change Collection of data in certified, non-certified/not-yet-certified and undisturbed (as far as possible) sites	Amongst others the following indicators were identified: Vegetation • Ground cover vegetation • Forest inventory • Deadwood and dying trees • Rejuvenation Forest infrastructure Microclimate • Temperature and humidity of soil and air Water systems and hydrology • natural and artificial water bodies • evidence of manipulation	Amongst others the following indicators were identified: Vegetation • Ground cover vegetation • Structural diversity • Epiphytes on palm stands • Extent and distribution of natural vegetation • Deadwood and dying trees • Rejuvenation Fauna • Species abundance Microclimate • Temperature and humidity of soil and air

ECOSEFFECT method step	Output case study: FSC in Archangelsk, Russian Federation	Output case study: RSPO-RED and ISCC in Sabah, Malaysia
9. Evaluation		
Analysis of field measurements	Spatial and statistical analysis comparing data in and outside certified areas in comparison to the reference system (natural ecosystem) To be conducted	Spatial and statistical analysis comparing data in and outside certified areas in comparison to the reference system (natural ecosystem) To be conducted
D. Improvement of Sustainability Standards **Communication of findings**		
10. Conclusions		
Recapitulation of the outcomes of the theoretical plausibility analysis and the empirical findings Identification of concrete options for improvements of the sustain-ability standard to obtain better ecological conditions on certified grounds	To be conducted	To be conducted
11. Recommendations to fill the gaps		
Formulation of concrete recom-mendations for improvements and communication to decision makers as well as interested stakeholders and parties	Potential audiences: • FSC and other standard organisations • Foresters • Policy makers • NGOs	Potential audiences: • RSPO, ISCC, other standard-setting organisations • BMEL and FNR • Policy makers • NGOs


Oil palm plantation in Sabah, Malaysia, certified by both RSPO and ISCC.

Conclusion

The ECOSEFFECT method is developed to assess the effectiveness of sustainability standards taking various possibly influencing circumstances and stakeholders into account, being a very holistic and systemic approach that seeks to capture the whole complexity of anthropogenically changed ecosystems. This is achieved in a transparent way, enabling every party interested to retrace and understand developed outputs and causal relationships. As ECOSEFFECT follows an adaptive cycle it includes the constant ability to learn from experiences and incorporate lessons learned into the future adaptive management. The participatory procedure guarantees relevant stakeholders a voice and includes their input into the analysis. ECOSEFFECT is a comprehensive and appropriate methodology to assess the effectiveness of sustainability standards. The two case studies revealed the practicable applicability and demonstrated the particular importance of ECOSEFFECT as an instrument used to scrutinize the impacts of sustainability standards. ECOSEFFECT can be applied to assess any sustainability standard worldwide.

Cooperation Partners

Centre for Econics and Ecosystem Management

The Centre for Econics and Ecosystem Management is a joint establishment by the Eberswalde University for Sustainable Development (EUSD), Germany, and Writtle University College, UK, which is supported by a registered society with the same name (Centre for Econics and Ecosystem Management e.V.). With the aim to foster cooperation in international projects that seek to learn from ecological systems for sustainable development. Complex systems theory as well as scaled ecosystem dynamics lay the foundation for the Centre's ecosystem-based approaches to sustainable management of natural resource-dependent socio-economic systems and adaptation to climate change. Therefore, the concept of "Econics" as a transdisciplinary idea of learning from and studying the dynamics and functioning of complex ecological systems and thus gaining an insight into how to effectively work with nature and not against it, is fundamental to the endeavours of the Centre. The Centre also incorporates these principles into its experienced teaching of Adaptive Conservation Management. In the framework of developing various tools and approaches for ecosystem-based sustainable development, the Centre created the ECOSEFFECT method and is responsible for its application and evaluation of the results gathered.

World Wildlife Fund For Nature

The World Wildlife Fund For Nature (WWF) has been an active and driving organization in nature conservation for over 50 years. Since 1961 it has acted on an international scale with honorary members, who engaged in diverse activities to save faunal species all around the globe. Nowadays it initiates projects in over 150 countries, creating an immense network to sustainably secure biodiversity on earth. After its foundation in 1963, the WWF Germany has enforced numerous activities according to its values of "Respect towards humans and nature", "Credibility", "Independence", "Responsibility" and engages in ongoing innovative initiatives to bring man and nature into harmony.

WWF Germany and the Centre for Econics and Ecosystem Management are cooperating for the assessment of the effectiveness of sustainable certification schemes. The aim is to measure, improve, and monitor the ecological outcomes of sustainability standards at different exemplary research sites.

100%
RECYCLED

Why we are here
To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

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