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Insights from the ground level? A content analysis review of multi-national REDD+ studies since 2010

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ABSTRACT

The REDD program ("Reducing Emissions from Deforestation and Degradation") was launched in 2007. Two years later it was modified into REDD+. Since then, numerous sub-national initiatives have implemented REDD+ or REDD+-like mechanisms. Now, shortly before the COP (United Nations Framework Convention on Climate Change, Conference of the Parties) in Paris 2015 it is timely and necessary to analyze insights and to draw upon lessons learned. This study reviews multi-national REDD+ studies by applying qualitative content analysis using the UNFCCC Warsaw Framework for categorization.

Experiences with the implementation of core REDD+ topics like institutional responsibility and results-based financing are mostly not encouraging. Monitoring systems require further development, and guidance for jurisdictional approaches is lacking. Experiences with reference levels, permanence and leakage have hardly been reported. More general topics like stakeholder participation, tenure clarification and biodiversity co-benefits are in turn more advanced. But these are not necessarily effects of REDD+ components in the projects. The projects obviously offer a platform to advance classical development issues.

We conclude that financial signals from the upcoming COP in Paris are essential to encourage further development and implementation. This supports conclusions in accordance with the UNFCCC session in Bonn 2015 stating that methodologies are now complete and implementation must begin. Additional conclusions are drawn for specific topics of the Warsaw Framework. Authors claim that REDD+ should stimulate and support transformational change.

1. Introduction

1.1. Policy context and aims

Forests play a crucial role in the context of climate change. A total of 12% of total greenhouse gas emissions in the period 2000–2009 were from forests and other forms of land use (IPCC, 2014). On a global level, deforestation is still high. Around 13 million hectares of forests were lost each year in the first decade of the millennium (FAO, 2010), most of these in tropical countries (GFW, 2015). In 2007, the REDD ("Reducing Emissions from Deforestation and Degradation") process was launched in Bali under the United Nations Framework Convention on Climate Change (UNFCCC, 2007a). Two years later it was modified into REDD+. The program was designed, developed and promoted as an innovative approach to reduce deforestation based on broad cooperation and shared responsibilities between developing and developed countries. The core idea is that developed countries would financially compensate losses due to avoided deforestation and degradation. These conditional payments would depend on a verified monitoring of carbon stocks and fluxes by developing countries. REDD+ raised high expectations as it was hoped that it would mobilize billions of dollars to compensate for the opportunity costs of forest conservation.

Eight years later no binding international agreement has yet been reached on how to pay for or reimburse verified net emission reductions or enhanced removals of greenhouse gases. However, in the readiness phases, preparation activities and pilot projects, a wealth of expertise and experiences has become available on different aspects and functionalities of the REDD+ mechanism. In the present analysis we aim to review scientific publications and reports that summarize results from a larger number of such formal and informal REDD+ activities in order to check for ground-level information supporting REDD+ implementation. We also seek information to provide lessons that can be learned for the further development and implementation of the REDD+ process. The results and conclusions aim at supporting policy makers, as expectations for international agreement are high in this pre-conference period of the Conference of the Parties in Paris 2015. In order to verify whether the manifold initiatives on the ground provide compatible perceptions of the political UNFCCC Framework, discussion also focused on the differing conclusions between "top down" or "bottom up" studies.

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1.2. The REDD + mechanism

REDD+ is implemented in three phases (UNFCCC, 2011), including (i) the development of national strategies or action plans, policies and measures, and capacity-building, followed by (ii) the implementation of national policies and measures and (iii) results-based actions that should be fully measured, reported and verified. The initial phase is usually called the "readiness phase" and is supported by institutions like the UN-REDD program, or the Forest Carbon Partnership Facility (FCPF) of the World Bank. The current status of national REDD+ activities is reported in formal documents such as "readiness proposals" and national communications. The requirements for implementing REDD+ are laid down in the Warsaw Framework (UNFCCC, 2013). With this framework, "REDD+ made much progress — on financing, transparency and safeguards, and monitoring and verification" (Morgan et al., 2014). But even pledges to the Convention's Green Carbon Fund made at the last COP meeting in Lima passed the 10 billion USD mark, no agreement has yet been reached on how to pay for or reimburse verified net emission reductions or enhanced removals of greenhouse gases.

While the formal REDD + process under UNFCCC is still under discussion, numerous REDD+ projects have been installed in developing countries. They include REDD+ pilot projects that are linked to national REDD + strategies as a response to a call for demonstration activities (UNFCCC, 2007b). Simonet et al. (2014) show that 23% of all REDD+ projects are pilot projects integrated into national REDD+ strategies. In addition, there is a wide variety of informal approaches, concepts and self-defined REDD+ projects that are labeled as REDD+ by their proponents. Thus, most of these activities do not formally operate under the REDD+ process of UNFCCC, even though that they all aim to cover main elements defined by UNFCCC. Nevertheless, there is great interest in learning from their experiences for the development of the formal REDD+ process and these initiatives can indeed be regarded as "the laboratory in which the REDD+ experiment is being conducted" (Sunderlin in Sills et al., 2014).

2. Methods

Our study reviews material published from different sources and compiles the lessons learned within the structure of the Warsaw Framework as input to the UNFCCC policy level (Fig. 1).

We used qualitative content analysis as an approach for the systematic analysis of the published articles. Qualitative content analysis is a mixed methods approach. It includes categorization of the text into sub-components text as a qualitative step, working through text passages and analysis of sub-components as a quantitative part (Mayring, 2000, 2014). The analysis is based on the methodological steps shown in Fig. 2.

The important characteristics of the method are feedback loops from Steps 6 and 7 back to Step 3 which makes the method an iterative approach in which the differentiation of the subcomponents, analysis techniques and procedural model are successively adapted during analysis.

2.1. REDD + definitions

The main differences of the REDD+ projects compared to the UNFCCC REDD+ process are that (i) they are mostly based on other standards like the Verified Carbon Standard (VCS) or the Climate, Community & Biodiversity Alliance (CCBA), (ii) often aim at financing through the international voluntary carbon market and (iii) they are sub-national, whereas REDD+ by definition is a national exercise (with a few interim exceptions). In our review, REDD+ project definitions vary substantially and influence the basis and results of each study. A specific ambiguity is related to afforestation and reforestation (A/R). It often remains unclear if afforestation and reforestation projects are included within the studies reviewed. Under UNFCCC, the REDD+ activity "enhancement of forest carbon stocks" may be understood to include afforestation and reforestation (Angelsen et al., 2011; Iverson et al., 2014), but at the same time the Clean Development Mechanism under the Kyoto Protocol also allows the generation of emission reduction certificates from afforestation/reforestation projects, which does

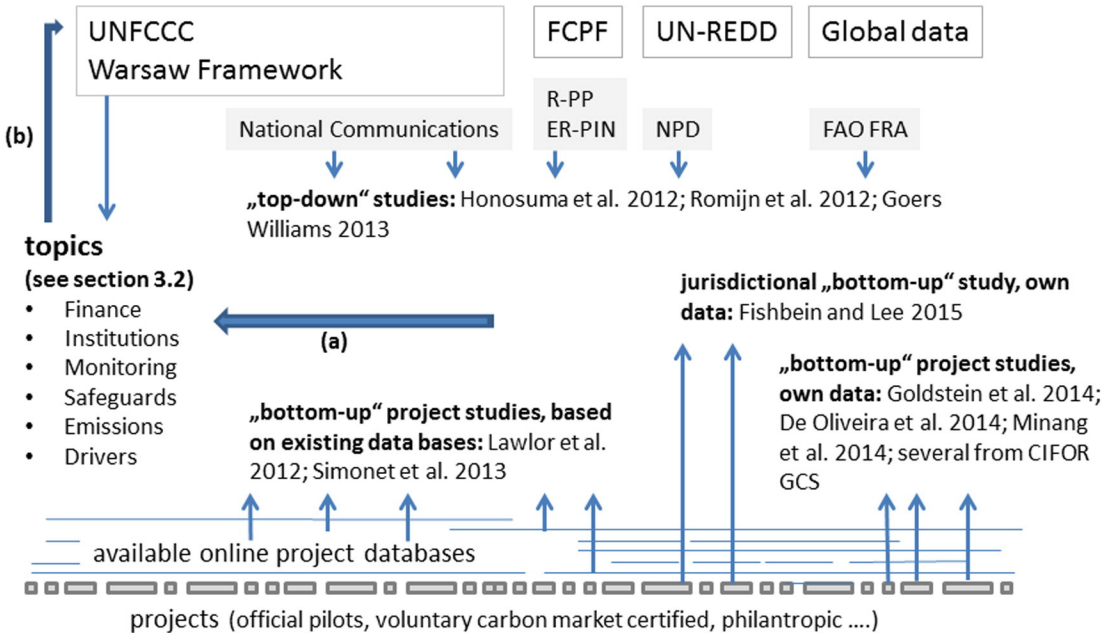

Fig. 1. Conceptual framework of the review. Top down studies are based on official documents or global data. Bottom-up studies are based on projects or on available project data bases; (a) results from different studies are summarized and structured along the topics of the Warsaw Framework applying qualitative content analysis (Mayring, 2000, 2014); (b) they serve as input to the policy level. Further explanations in the text, abbreviations explained in caption to Table 1.

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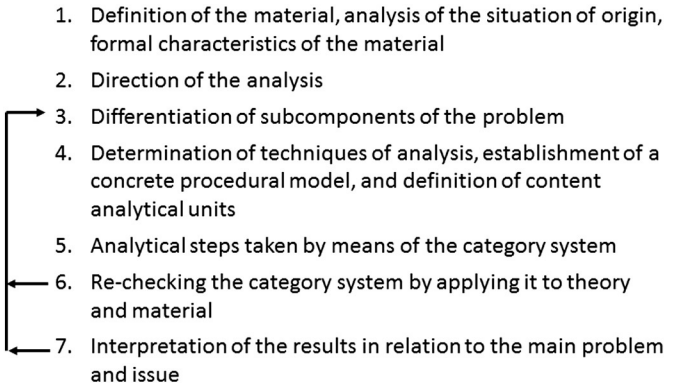

Fig. 2. Steps within qualitative content analysis (simplified after (Mayring, 2014)).

not make a REDD+ project definition easier. Among the studies reviewed, Sills et al. (2014) only rely on projects that "do not derive most of their carbon benefits from afforestation/reforestation outside of existing forest." Lawlor et al. (2013) explicitly include A/R projects. Simonet et al. (2014) explicitly distinguish REDD, A/R and Improved Forest Management (IFM) projects but include them all in their study. Other studies do not specify the selection criteria for the projects, which is the reason for the fact that we included all of the selected studies. Due to the missing definitions in a number of studies, a selection according to an own REDD+ definition was simply not possible. The resulting vagueness needs to be taken into account.

2.2. Definition of the material: studies and sources used for the review

We applied a basic search in Science Direct (www.sciencedirect.com) with "REDD" and "project" in the title, abstract or keywords and with publication date >2010 and a second search with "REDD" and "readiness" in the title, abstract or keywords. This yielded 92 results. In the Web of Knowledge (www.webofknowledge.com) we used the same words as topic and yielded 420 articles. Gray literature was added from an own EndNote library, which was a collection of 187 REDD+ related publications compiled by the authors during previous ongoing research. As we were searching for multi-national studies we consecutively removed all those studies that mentioned one specific country in the title. This reduced the number of publications by over 50%. On the basis of abstracts, introduction and methods we selected those that contained results from REDD+ activities in at least three countries in order to focus on overview studies and generalizing conclusions that reach beyond single case studies. Further on we only selected studies providing conclusions from REDD+ activities to at least one of the topics of the Warsaw Framework (Section 2.3). In cases where results from the same studies were provided in different publications, we prioritized reviewed scientific articles. We found 21 studies that matched our formal selection criteria. From these we excluded four studies: Cerbu et al. (2011) and Caplow et al. (2011) which were very early studies with rather preliminary results; Nguon and Kulakowski (2013), which had a very specific topical focus on natural disturbances and FCPF & UN-REDD (2012) which was based on a questionnaire among partner countries which we interpreted as a policy targeted "wish list" rather than a scientific study. We grouped the remaining 17 studies (Table 1) according to their information sources into:

- studies relying on national REDD+ documents under UNFCCC, FCPF and UN-REDD, as well as global data; we called these studies "top-down" studies;
- studies using online data bases and maps of REDD+ projects including project descriptions and design documents; we called these studies "bottom-up" studies; and
- studies from research projects with own field assessments; we called these studies "bottom-up" studies.

Only three studies were top-down studies, i.e. based on official REDD+ documents or based on global data sets. There were two bottom-up studies based on existing online project data bases. A list of publicly available project data bases that are a substantial basis for these studies is provided in the supplementary material (Supplementary material, Table A). With twelve studies the largest share of the material is based on own, original data collection. CIFOR's Global Comparative study (GCS) played a dominant role. Eight studies in the review rely on this project. There are more publications from the project that are not included in the review because these studies tackle only single countries (Resosudarmo et al., 2014; Awono et al., 2014; Dokken et al., 2014; Cromberg et al., 2014; Duchelle et al., 2014; political economy studies introduced by Brockhaus et al. (2014a)), tackle topics that are beyond the operational level of the Warsaw Framework (Brockhaus et al., 2014b), or because the results are included in other GCS studies (Larson et al., 2013; Brockhaus and Di Gregorio, 2014). All CIFOR GCS studies were treated as one respondent in the quantitative analysis as many authors collaborate in several publications and all results are from similar projects. With regard to the State of the Forest Carbon Markets report (Goldstein et al., 2014) we used only the most recent report within this annual series, as the latest version includes the previous years' data as historical information as well.

Table 1
Studies reviewed. In gray: studies based on the CIFOR "Global Comparative Study" (GCS).

	Year of public.	N pro–jects	N coun–tries	Sources	Scient. review Y/N	Main topic
"Top–down" studies based on REDD + documents						
Hosonuma et al.	2012		46	FCPF R–PINs and R–PP, UNFCCC NatComm, Lit, CIFOR country profiles	Y	Drivers for deforestation and degradation
Romijn et al.	2012		99	FAO FRA	Y	Forest monitoring systems
Goers Williams	2013		32	FCPF R–PP, UN–REDD NPD	N	Several
"Bottom up" studies based on existing online data bases						
Lawlor et al.	2013	41	22	CCBA	Y	Community participation and benefits
Simonet et al.	2014	329	47	Own data base	N	Several
"Bottom up" studies with own assessments						
Goldstein et al.	2014	417	39	Own data base	N	Carbon market
Fishbein and Lee	2015	8	7	Project descriptions, own research	N	Jurisdictional approaches
De Oliveira et al.	2014	6	6	Own research	N	Several
Minang et al.	2014		4	Own research	Y	Several
Sills et al.	2014	23	6	CIFOR GCS	N	Several
Sunderlin et al.	2014a	23	6	CIFOR GCS	N	Several
Sunderlin et al.	2014b	23	6	CIFOR GCS	Y	Tenure
Murdiyarso et al.	2012	23	6	CIFOR GCS	Y	Several
Jagger et al.	2014	16	3	CIFOR GCS	Y	Safeguards
Luttrell et al.	2013	20	6	CIFOR GCS	Y	Benefit sharing
Joseph et al.	2013	21	6	CIFOR GCS	Y	MRV
Korhonen–Kurki et al.	2014		12	CIFOR GCS	Y	MRV, institutions

Studies excluded from the further evaluation. Further explanations in the text.
CCBA — Climate, Community & Biodiversity Alliance; CIFOR — Center for International Forestry Research; ER-PIN Emission Reduction Program Idea Note; FAO — Food and Agriculture Organization; FCPF — Forest Carbon Partnership Facility; FRA — Forest Resource Assessment; GCS — Global Comparative Study; MRV — Monitoring Reporting Verification; NatComm — National Communication; NPD — National Program Document; R-PP — Readiness Preparation Proposal; UN-REDD — United Nations Collaborative Initiative on Reducing Emissions from Deforestation and Forest Degradation.

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2.3. Direction of the analysis and differentiation of subcomponents: the Warsaw Framework

The REDD+ framework of the UNFCCC provided a structure for differentiating the existing information into subcomponents. Within the so-called Warsaw Framework, UNFCCC has specified the fields relevant for the implementation of REDD+. These specific fields were used as subcomponents within our content analysis. We called them topics. Scientific input, if relevant to the policy and development of the formal REDD+ process, needs to deal with and discuss these topics. Most studies had a specific topical focus and did not provide results and conclusions on all of the topics.

2.4. Techniques of analysis and procedural model

A category system within qualitative content analysis that we specifically developed for our study constitutes the central instrument used to structure and analyze the text. We formulated policy relevant questions and statements as sub-components and scored our reviewed material on this basis.

First, we coded all main messages within the studies referring to the topics of the Warsaw Framework. Coding was carried out using the signaling tool in Acrobat Reader. In parallel we copied the relevant texts into an MS Excel table assigning it to columns for the respective topics. Based on overview literature (e.g. Angelsen et al., 2012) and the topics formulated in the Warsaw Framework (Table 2) we then deducted policy relevant statements/questions. The formulation of statements/questions is an iterative process that reflects the feedback loops in qualitative content analysis. The final statements/questions are presented in Table 4.

Table 2
Topics and summary of the UNFCCC REDD+ "Warsaw Framework" (UNFCCC, 2013; Climate Law&Policy, 2014).

Sub-component/topic	Summarized content
Results-based financing	• Encourage adequate and predictable results-based financing from variety of sources • Key role of Green Climate Fund • Incentivize non-carbon benefits
Institutional arrangements	• Set up of national REDD+ entities or focal points
National forest monitoring systems	• Establish robust and transparent national forest monitoring systems • Guided by IPCC guidelines. • Sub-national forest monitoring systems as interim measure
Monitoring, reporting, verification	• Measure, report and verify anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest carbon stock and forest-area changes • As part of the National Forest Monitoring System • Parties' biennial update reports • Verified by a team of technical experts
Forest reference emission levels and/or forest reference levels	• These benchmarks are a precondition for results-based payments • Sub-national levels may be elaborated as an interim measure
Safeguard reporting	• Take into account national forest programs, international conventions and agreements • Governance • Rights of indigenous peoples • Stakeholder participation • Natural forests, Biodiversity • Risks of reversals • Emission displacement
Drivers of deforestation and forest degradation	• Parties are encouraged to take action to reduce drivers and to share the results of their work

2.5. Analytical steps

Qualitative content analysis is a mixed method in which quantitative components gain particular importance when generalization of the results is required (Mayring, 2014). We defined our content analysis units as a five level Likert scale reaching from 1 (fully agree) to 5 (completely disagree). In a second step we then analyzed the coded texts and for each study answered to the statements/questions "on behalf" of the authors. Having key expressions in mind (Table 3) we thus interpreted the conclusions of the studies according to the scale. Converting thematic analysis into Likert scales constitutes a data transformation based on an intensity scale (Castro et al., 2010). A number of constraints related to qualitative content analysis are mentioned in literature. Mayring (2000) mentions that the method is not appropriate if the research question is highly open-ended, explorative or variable, which was not the case, as we had the Warsaw Framework to structure and define our categories. Kohlbacher (2006) points to the fact that "replicating a mixed method package is hardly possible", which is true and might be a constraint in our study. Therefore, and in order to at least make our decisions and interpretations transparent we copied key statements in the reviewed studies related to each topic into a single table (Supplementary material, Table B). However, this table should be used with care as single and isolated sentences mostly transport shortened messages and cannot replace the full understanding of the studies. Elo et al. (2014) mention the possible failure to develop a complete understanding of the context. This is a general problem of qualitative content analysis, which we aimed to overcome by thorough reading of the text and discussions in the research team. Here, we tried to produce an interpretation based on expert knowledge and a best possible understanding of the texts. The saturation of data which is referred to by the same authors was not a constraint in our case, as the material was predefined based on our literature selection criteria.

3. Results

The results chapter starts with overarching study findings and identifies sub-topics. In the sub-sections, findings within single topics are considered in more detail.

The most frequently raised questions address drivers of deforestation and tenure questions; they are tackled in 65%, respectively, 59%, of the studies. In contrast, conclusions on permanence and leakage were not provided in any of the reviewed literature (Table 4, Fig. 3). Hosonuma et al. (2012) and Romijn et al. (2012) focus only on very selected topics, whereas other studies like Sills et al. (2014); De Oliveira et al. (2014) and Minang et al. (2014) provide a broader view with answers to 63%, respectively, 58% of the statements. Not surprisingly, as based on several studies, the CIFOR GCS project provides scores for nearly all statements.

Overall, there were more negative scores (32 "no" answers in Fig. 3) than positive ones (22 "yes" answers in Fig. 3). The status and implementation of activities under REDD+ specific topics like financing and benefit sharing, REDD+ institutions and monitoring systems were perceived rather negatively (listed on top in Fig. 3). Technical REDD+

Table 3
Key expressions for the interpretation of study conclusions when answering on a five level Likert scale reaching from 1 (fully agree) to 5 (completely disagree).

Scale	Key expressions
1	"always", "in all countries"
2	"mostly applied", "in many cases"
3	"not sure", "neither yes nor no", "may potentially be"
4	"not applicable in most countries", "little clarity"
5	"not applicable in all countries", "topic was a major obstacle", "completely unclear"

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Table 4
Statements and related scores for each of the studies on a five level Likert scale from 1 (fully agree) to 5 (completely disagree). In cases where scores to a specific statement were available from several CIFOR GCS studies, we only used the study with the most detailed and substantiated content (repeated in column "summary CIFOR GCS") and disregarded the other studies (scores in brackets).

Statement	N studies	Honosuma	Romijn	Goers Williams	Lawlor	Simonet	Goldstein	Fishbein & Lee	De Oliveira	Minang	Summary GCS	CIFOR GCS: Sills	Murdiyarso	Sunderlin (a)	Sunderlin (b)	Jagger	Luttrell	Joseph	Korhonen–K.
3.1 Finance																			
Conditional and results–based payments on project–and jurisdictional level presently play a significant role																			
	5					4	*)	4			4	4		(4)					
Conditional and results–based payments at project or jurisdictional scale are regarded as a promising cornerstone of future REDD + implementation																			
	6					3	3	3	4		3	3		(3)					
3.2 Institutions																			
There are clear institutional responsibilities related to REDD + implementation in the countries/jurisdictions																			
	7			4				4	4	2	4		(4)				(5)		4
3.3 Monitoring																			
The status of monitoring systems is satisfying																			
	9		4	3					4	4	3	(3)	(5)		(4)			3	(4)
There are promising options for technical cooperation on MRV systems																			
	4		2						2		2	(2)						2	
Based on clear guidance for bridging the project and national scales, jurisdictional approaches are on the way to becoming milestones in the global REDD + implementation																			
	6					3	3	3		4	4	4						(4)	
3.4 Safeguards																			
3.4.1 National forest programs																			
REDD + activities take into account national forest programs and/or international agreements beyond UNFCCC																			
	1										1					1			
3.4.2 Governance (incl. tenure)																			
Tenure rights are clarified in REDD + projects or jurisdictions																			
	10			4	2		2	3	2	4	4	(4)	(4)	(4)	4				
REDD + provides a valuable framework/process to clarify tenure rights																			
	7				1		3	2	2		2	(3)		(2)	2				
3.4.3 Indigenous peoples and stakeholder participation																			
Indigenous people and stakeholders are involved in REDD+ activities																			
	7			2	2	2		2	3	1	2	2							
The level of participation and/or the background information provided to stakeholders is adequate																			
	5				5	4			4	3	4	4							
3.4.4 Permanence and Leakage																			
Experience on permanence and leakage is provided from projects																			
	0																		
3.4.5 Social safeguards and benefit sharing																			
Social and/or biological safeguard reporting receives attention in the REDD + activities and is implemented based on documented procedures																			
	4			3					4	2	4					4			
Socio–economic co–benefits are provided																			
	5				3	3	3				4	4		(3)					
Procedures for benefit–sharing are defined																			
	6			4					4	3	4	(3)				(4)	4		
Procedures for benefit–sharing are implemented																			
	4			4						5	4	(4)					4		
3.4.6 Natural forests, Biodiversity																			
Conservation and biodiversity services are provided																			
	4					3	3	2			3			3					
3.5 Forest reference emission levels and/or forest reference levels																			
There are unambiguous standards and capacities to set reference levels in projects																			
	4									3	3		(5)	(3)				3	
3.6 Drivers of deforestation and forest degradation																			
Project specific drivers for deforestation and degradation are taken into account																			
	11	3			2	2	3	1	2	5	2		(3)	(2)	(1)			2	
Number of topics		1	2	7	6	8	8	9	11	11	18	12	5	8	4	3	3	5	2

*) Study not taken into account as (Goldstein et al., 2014) exclusively focus on projects with conditional payments.

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topics like reference emission levels and permanence and leakage, were hardly tackled at all in the studies. Topics that are not REDD+ specific, like tenure rights, participation, conservation and biodiversity, as well as consideration of project specific drivers received more positive ratings (listed at the bottom part of Fig. 3).

There were no systematic differences in results and conclusions between bottom-up and top-down studies. However, the number of studies and of topics covered in most studies was too low to analyze possible differences statistically.

3.1. Finance

Three studies present expertise with results-based financing. All three studies consistently disagree whether this financial mechanism plays a central role of at present. Sunderlin et al.'s (2014) "doubt about its centrality" summarizes the general perception. Of 329 projects assessed globally by Simonet et al. (2014), only 21% are at present engaged in carbon transactions. With four out of 23 projects (=17.4%) selling carbon credits, the share is comparable for the CIFOR GCS sites (Sills et al., 2014). Also most jurisdictions studied are currently driven by official development assistance (ODA) and not by results-based payments (Fishbein and Lee, 2015). The low shares may partly be due to the fact that the projects need more time to develop the framework at the ground level. This is reflected by the fact that a larger share of projects is expecting to sell credits in the future: this applies to 53% of the 329 globally assessed projects and 78% of the GCS projects. Nevertheless and in general, the authors of the studies remain noncommittal as concerns a possible future role of conditional payments. The hope "that applying conditionality at a higher scale, outside of site boundaries, will make sense" (Sunderlin et al., 2014) is countered by the perception from the jurisdictional projects as in general this "ambitious scale greatly raises the bar on the challenges" (Fishbein and Lee, 2015).

3.2. Institutions

Only one publication (Minang et al., 2014) identifies clear institutional responsibilities, whereas four other studies taking a look at institutional development are rather skeptical. 59% of the studies do not deal at all with these issues. Goers Williams (2013) shows that readiness proposals did not identify specific next steps to establish mechanisms for coordination and coherence of proposed new REDD+ bodies with existing forest sector institutions. Korhonen-Kurki et al. (2014) report "serious shortcomings in effective horizontal, cross-sectoral coordination mechanisms" in nearly all countries. Within the jurisdictions studied, institutional arrangements were in many cases still not clear or created. However, jurisdictional approaches were seen as a platform to involve at least local governments and to stimulate institutional development (Fishbein and Lee, 2015).

3.3. Monitoring and scales

In the five studies that tackle National Forest Monitoring Systems (NFMS) including Monitoring, Reporting and Verification (MRV) systems, the status of the monitoring systems was either not satisfying or unclear. Based on ongoing and recent REDD+ projects Joseph et al. (2013) offer a more positive conclusion, whereas the critical results of Romijn et al. (2012) are based on all non-Annex I countries in a de facto pre-REDD+ situation. Technical cooperation was generally seen as a promising opportunity to improve the situation. However, De Oliveira et al. (2014) point to the fact that "the MRV component of forest–carbon initiatives generally involves external agencies and consultants" which can create a dependency.

At present there are obviously no clear options for bridging project and national scales in jurisdictional monitoring systems. Sills et al. (2014) identify scale as one of the largest uncertainties, as the link between local project based systems and the national scale is not at all clear. The IPCC guidelines have been developed for generating national greenhouse gas inventories. But on the project level guidelines of carbon certifiers play an important role. Related to the scales problem, the Verified Carbon Standard (VCS) to date provides the only defined standard for nesting scales in jurisdictional approaches. Also, a number of projects are engaged with a government entity on integrating project baselines with regional efforts (Goldstein et al., 2014). However, these are individually negotiated solutions and there is no harmonized approach under UNFCCC.

3.4. Safeguards

Safeguards include a number of topics that we evaluated separately.

3.4.1. National forest program, international conventions and agreements

Only one study (Jagger et al., 2014) reports on dialogs with national forest programs. This positive report is based on projects in three countries.

3.4.2. Governance and tenure rights

From the broad range of aspects included under a definition of modern governance (Giessen and Buttoud, 2014), tenure rights are the most widely studied factor in our review. Tenure questions are high on the agenda in most projects but perceptions of tenure seem to be case specific. Tenure rights are one of the most pressing and influential factors for the complete REDD+ process among the CIFOR GCS projects (Sunderlin et al., 2014) and most of these projects "have not yet succeeded in creating a secure tenure foundation for REDD+ activities" (Sills et al., 2014). The survey by Fishbein and Lee (2015) is more positive, as their interview partners "suggested it is not always the most difficult challenge that a jurisdiction faces" and for De Oliveira et al. (2014) the "cases presented no apparent conflicts coming from land tenure." Independent of the status of tenure, REDD+ projects are obviously helping populations to clarify tenure rights.

3.4.3. Indigenous people and stakeholder consultation

The necessity to involve and empower indigenous people as well as to enable stakeholder participation is widely perceived and taken into account in REDD+ projects. A majority of projects obtain local populations' free, prior, and informed consent (Lawlor et al., 2013) or inform them through a participatory rural appraisal (Simonet et al., 2014). However, the level of participation seems to be mostly inadequate. People "are rarely involved in decision-making and project design" (Simonet et al., 2014), individuals and communities lack "detailed information about project risks and opportunities" (Lawlor et al., 2013), and "many participatory processes are reduced to a few workshops" (De Oliveira et al., 2014). With respect to the REDD+ approach, project developers seem to be reluctant to propagate it too actively being afraid to raise expectations that cannot be fulfilled (Sills et al., 2014).

3.4.4. Permanence and leakage

Avoidance of the risks of reversals (permanence) and actions to reduce displacement of emissions (leakage) are not considered in any of the reviewed studies.

3.4.5. Social safeguards and benefit sharing

Social safeguard reporting seems to be neglected in most REDD+ projects. De Oliveira et al. (2014) point to the fact that there are simply "too many social and environmental safeguards and different organizations use different processes to guarantee the safeguards." This limited internal attention is in conflict to external information demands, because there are clear expectations on poverty alleviation and nature conservation linked to carbon projects. One third of all REDD+ projects worldwide are certified by a social standard, which illustrates the "importance of having a social label to sell in the voluntary market"

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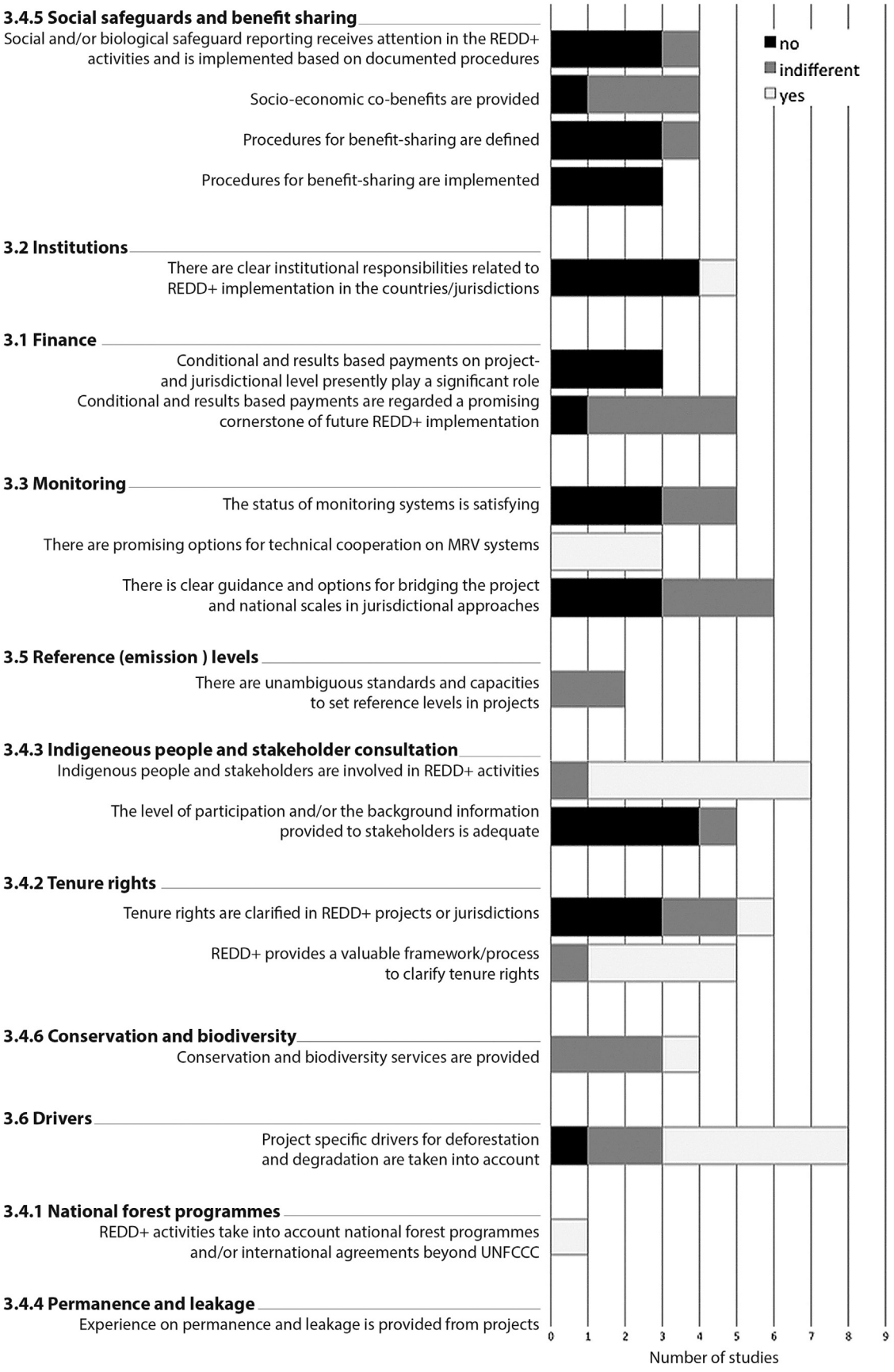

Fig. 3. Summary of answers to different statements. Scores on a five level Likert scale from 1 (fully agree) to 5 (completely disagree) were summarized: 1 and 2 — yes; 3 — indifferent; 4 and 5 — no. Topics are sorted from those with strongest disagreement to strongest agreement.

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(Simonet et al., 2014). Goldstein et al. (2014) point to the fact that "buyers demand to know the 'story' behind the offset".

There is no clear picture on livelihood co-benefits. These are complex and difficult to design, implement and monitor, as they "encompass different scales, a large and varied body of stakeholders and heterogeneous conditions on the ground" (Sills et al., 2014). For many projects, "it is simply too early to assess whether they have produced material benefits for communities" (Lawlor et al., 2013). Socio-economic benefits that are mentioned by Simonet et al. (2014) are mostly not provided as co-benefits of the REDD+ procedure but through input-based and ODA-related finance in the same project.

As concerns benefit sharing, procedures were neither defined nor implemented in most cases. Many countries had several alternative proposals on the table, e.g., one for national and several others for projects (Luttrell et al., 2013).

3.4.6. Biodiversity

Conservation, as well as species and watershed protection play an important role in many REDD+ projects. This is partly due to the fact that many of them were former conservation projects that developed a "new" REDD+ component later on. About 30% of the globally analyzed projects are thus located in a protected area. Climate is presented as the main objective of only 14% of the projects, far behind conservation (35%) (Simonet et al., 2014). There were forest protection activities at 20 of the 23 CIFOR GCS sites (Sunderlin et al., 2014). Twenty percent of carbon dioxide equivalents certified by VCS were from projects developed within a land area that was certified by the Forest Stewardship Council (FSC) (Goldstein et al., 2014).

3.5. Reference emission levels, reference levels

There is not much evidence on the status or lessons learned from previous activities on reference (emission) levels in the reviewed material. Murdiyarso et al. (2012) detected large capacity gaps for developing reference levels and Joseph et al. (2013) complain about "ambiguity in methodological guidelines on how to set reference emission level in REDD+ projects".

3.6. Drivers

The awareness of and the need to take specific drivers for deforestation and degradation into account is reflected in most studies, with 11 out of 17 studies offering summarizing results or drawing dedicated conclusions. The ranking and importance varies between the studies. Hosonuma et al. (2012) give a widely accepted summary stating that "commercial agriculture is the most important driver of deforestation, followed by subsistence agriculture. Timber extraction and logging drives most of the degradation, followed by fuelwood collection and charcoal production, uncontrolled fire and livestock grazing".

4. Discussion

Given the broad range of REDD+ topics included in the Warsaw Framework, and the policy focus of our review, we concentrate the discussion on politically controversial issues like financing and benefit sharing, tenure rights, and co-benefits (see subsections). Topics for which we perceive no controversial discussions in recent literature are not discussed. This applies for stakeholder participation (Gebara, 2013; Awono et al., 2014; Lawlor et al., 2013), institutional responsibilities (Kanowski et al., 2011) integration of REDD+ programs with other policies (Nepstad et al., 2014; Corbera and Schroeder, 2011; Robiglio et al., 2014) and safeguard reporting (Arhin, 2014). Our discussion starts with general thoughts on REDD+ projects and ends with methodological considerations.

4.1. How much REDD+ is in the projects?

The core principles of REDD+ are financial compensation for the consequences of avoided deforestation and degradation by developed countries. They are based on a set of novel mechanisms and tools that include result-based financial transfers, specific monitoring systems, dedicated institutions, reference levels as benchmarks for emission reductions, permanence of the reductions and avoided emission displacement (leakage) in order to guarantee for climate effectiveness (UNFCCC, 2013). Our review shows either negative experience or low implementation and negligence of these REDD+ core topics in most of the reviewed studies. Specifically, results-based financing has been implemented to a rather low extent and most authors remain undecided on its future potential. Responsible institutions were rated as being hardly operational. The authors acknowledge the development of monitoring systems as proceeding slowly. Astonishingly, reference levels were only discussed by the CIFOR GCS and one additional study. Leakage and permanence were not dealt with at all. Based on our review it is hard to answer why these core themes of the REDD+ approach were not covered in the multitude of projects. It seems that either the voluntary standards applied are clear in this respect or that the topics are not perceived to be of high relevance on the project level.

In addition to these specific REDD+ related topics, the Warsaw Framework includes tenure rights, participation, livelihood and biodiversity co-benefits as well as specific drivers of deforestation. These may be rather "old", but nevertheless urgent development topics, well known from integrated conservation and development projects (ICDP) and numerous other global initiatives. Surprisingly, these topics received greater attention and/or more positive ratings in the reviewed studies than specific REDD+ topics like benefit sharing and results-based financing. Is REDD+ at the ground level consistently just a new framework to tackle these issues? How much REDD+ really remains beyond the safeguards and co-benefits? Is the program just old wine in new skins? Positively spoken, fears voiced by Buizer et al. (2014) whereby REDD+ would displace progress on such topics by focusing on measurability of carbon stocks do not seem to be substantiated.

For effects on tenure rights, participation, biodiversity and drivers there is evidence for some positive effects in the so-called REDD+ projects. But the studies provide hints that these effects are not necessarily due to REDD+ components of the projects which are obviously not (yet) operational in many cases. Simonet et al. (2014) note that socio-economic benefits are mostly not provided as co-benefits of the REDD+ procedure but through ICDP inputs in the same project. Thus, the reviewed studies reveal that in addition to creating new financing and accounting tools, REDD+ obviously offers a platform to advance classical development issues.

4.2. No breakthrough for results-based financing

There is no doubt that the global financial potential falls short of what has originally been expected and what would be needed to implement the REDD+ approach in the original extent. Norman and Nakhooda (2014) report on pledges of US$8.7 billion for the period between 2006 and March 2014, but with the pace of new pledges slowing after 2010. After the COP in Lima 2014, pledges to the Green Climate fund passed the US$10 billion mark. In contrast, the Eliasch Review had assumed "that the finance required to halve emissions from the forest sector by 2030 could be around US$17–US$33 billion per year" (Eliasch, 2008). Specifically, after 2011, there was a strong decline of project starts (Simonet et al., 2014) which is in line with a decline of donor financing to recipient countries after 2011 (REDD+ Partnership, 2013).

This global situation has direct implications for the project level. The uncertainty has potentially prevented the broad implementation of results-based financing (Sunderlin et al., 2014). But on the other hand, and in the absence of success stories from the ground level, the

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reluctance of donor countries may be understandable. As long as the lessons learned from the pilot projects, related to conditional payments are negative it might be hard to mobilize the funds needed.

4.3. Benefit sharing systems need to be country specific

The scientific debate on incentive systems within the countries is controversial with different proposals being elaborated and argued for (Skutsch et al., 2011; Skutsch et al., 2013; Balderas Torres and Skutsch, 2012; Karsenty and Ongolo, 2012; Pfund et al., 2011; Vatn and Vedeld, 2013). It is obviously left to the countries to develop, test and implement own systems and these will certainly be country specific. Ha Hoang et al. (2013) present an example with substantial results based financing components for Vietnam, whereas Maraseni et al. (2014) for Nepal is an example proposing to shift away from market-based incentives to input-based support.

4.4. Land tenure is always essential

With regard to land tenure, an important global change in land use rights has been observed globally since the 1980s, with a number of countries granting new tenure rights to communities living in and around forests (Larson, 2011; Sunderlin, 2011; Agrawal, 2007). Also, the relevance of secure tenure for REDD+ has been mentioned frequently (Corbera et al., 2011; Resosudarmo et al., 2014; Karsenty and Assembe, 2011). The studies in this review confirm that REDD+ projects are intrinsically interwoven with national tenure situations, because on the one hand, REDD+ depends on secure tenure rights and, on the other hand, may have a potential to foster ongoing tenure clarification and security. Lawlor et al. (2013) find this is an "important, transformational effect that projects can have — and likely more enduring than carbon payments". But on the other hand, REDD+ cannot "replace broader, national programs for land tenure reform" (Larson et al., 2013). In such national programs REDD+ will have to compete with other land use forms, which bears additional challenges (Brockhaus et al., 2012).

4.5. No clear picture on socio-economic and biodiversity co-benefits

Non-carbon benefits were discussed intensively at the most recent UNFCCC session in Bonn (Leonard, 2015), probably based on a wish to tackle additional immediate challenges like poverty and conservation issues within the existing framework. However, the question of whether and in how far REDD+ projects provide socio-economic or biodiversity co-benefits can simply not be answered by this review, as many projects are mixtures of biodiversity, socio-economic and carbon components. But given the complex and slowly proceeding development and implementation of REDD+, the integration of additional biodiversity modules in REDD+ programs (Gardner et al., 2012) or a specific decoupling of biodiversity services (Potts et al., 2013) seems challenging. Project proponents and national REDD+ managers should be aware of trade-offs between carbon and biodiversity or poverty (Potts et al., 2013; Phelps et al., 2012; Pistorius and Reinecke, 2013; Visseren-Hamakers et al., 2012, Lawlor et al., 2013).

4.6. Real change needs to be transformational

Transformational change is a keyword emphasized in the reviewed studies (Murdiyarso et al., 2012; Sunderlin et al., 2014; Brockhaus et al., 2014b; Fishbein and Lee, 2015) and probably the only basis on which sustainable development, including reduced emissions, can take place. (Brockhaus and Angelsen, 2012) define transformational change as a "shift in discourse, attitudes, power relations, and deliberate policy and protest action that leads policy formulation and implementation away from business as usual policy". Babon et al. (2014) list "more transparent and participatory policy processes, functioning multi-stakeholder governance arrangements, attention to equity and a review of existing or planned policies that enable deforestation" as more operational aspects of transformational change. The results of our study show that many of these components have not been satisfactorily implemented in REDD+ projects. Beyond these single components a fundamental change in perception, values and attitudes seems to be essential for real change (Hauser, 2014). Ownership (OECD, 2005) is another core condition. Within the reviewed papers, De Oliveira et al. (2014) report that "funding and the idea of forest–carbon projects [was] in all cases from international or outside organizations". Such financing may probably stimulate and support, but not automatically implement, transformational change. It also supports earlier findings showing globally that REDD+ was primarily steered and influenced by donor countries (Gallemore and Munroe, 2013).

4.7. Can project experience provide recommendations for the national level?

Project level experience with REDD+ is an important efficiency check for REDD+ and we consider a review of existing experiences as necessary and essential. However, transferring project experience into policy recommendations has to consider that most of the reviewed projects are self-proclaimed REDD+ projects, with differing REDD+ definitions and rather following certification standards and NGO guidelines but not necessarily the formal UNFCCC Warsaw Framework. UNFCCC, in contrast, has been designed for national scales and implementation will differ from project applications. Our approach to validate project experience by differentiating between top-down and bottom-up conclusions could not add clarity here as the number of top down studies was too low. The ultimate reality check can thus only be based on the implementation which is hoped to be definitely launched in Paris 2015 (UNFCCC, 2015).

The representativeness of the projects needs to be questioned. Selection criteria either tend to prioritize project areas which are more promising for earning carbon credits or simply rely on existing projects. De Oliveira et al. (2014) explicitly mention that, "one reason for the inexistence of conflicts in the projects may have been that the proponents may have had as criteria to choose areas for the initiative where there is no land tenure conflict." Lawlor et al. (2013) study CCBA certified projects only and the study has good scores for tenure and participation. But it may be assumed that these CCBA projects are best case scenarios and most likely not representative for all non-Annex I countries. Sills et al. (2014) evaluate the representativeness of the CIFOR GCS projects by comparing key features to the full set of REDD+ projects given by Simonet et al. (2014), but the representativeness of the latter remains open.

Many projects did not explicitly compare their observed outcomes to a reference scenario when reporting their impacts. The CIFOR GCS project is the only one that explicitly assesses and reports control data, but only for one of the GCS studies (Sunderlin et al., 2014).

5. Conclusions and outlook

Based on a review of 17 multinational studies we show that implementation of REDD+ in readiness phases and projects on the ground level is proceeding rather slowly. Project experience is not convincing for key topics such as 'results based finance', 'institutions', 'incentives', 'monitoring systems' and 'jurisdictional approaches' or is hardly reported in the case of 'reference levels', 'leakage' and 'permanence'. There is, however, progress in classical development topics such as 'tenure rights', 'participation' and 'biodiversity'.

Despite substantial international efforts and support, the development of REDD+ on the ground has in many cases not yet succeeded in acquiring results-based financing. Also the future potential and role of such financing mechanisms remains open. Some projects claim that they need more time to develop these mechanisms from a bottom-up approach. However, signals from the political process under UNFCCC are also required in a top-down approach. Especially in the context of

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the upcoming COP in Paris, this is essential to encourage further development and implementation. Stronger financial commitments and a release of funds for national implementation of REDD+ would thus have a stimulating effect for activities on the project level.

The positive effects of REDD+ activities on 'tenure clarification' and 'participation' and to some extent also on 'socioeconomic co-benefits' and 'biodiversity' can partly be attributed to the positive legacy of previous project phases under official development assistance. We conclude that through these 'safeguards' REDD+ initiatives are, on the one hand, successfully linked to essential development topics. However, on the other hand, there is slow progress in core REDD+ aspects. This implies the danger that initiatives are losing the carbon storage and emission reduction focus even when they are sailing under the REDD+ flag. Harmonized safeguard reporting and impact assessments are needed to disentangle effects of REDD+ activities and mostly older, input-based, project components.

Climate efficiency can only be ensured if 'permanence' of the emission reduction is guaranteed and 'leakage' is avoided. These issues were hardly considered in the reviewed studies, indicating that they require stronger attention in the projects and probably also in the subsequent national implementation. Whereas there is a clear methodology in the context of accreditation for the voluntary carbon market, it is unclear how these issues are tackled in numerous self-proclaimed REDD+ projects. In order to link projects to sub-national (and in the future also to national) levels, jurisdictional approaches need to be further elaborated and clear guidance would also be needed under UNFCCC on how to account, monitor and share benefits across scales. Specifically for 'benefit sharing' it became clear that country specific-solutions need to be elaborated and one-size-fits-all approaches are not desirable. 'Monitoring systems' remain a crucial backbone for REDD+. The studies show that technical MRV cooperation also between countries of the South is promising and should be further supported. The broad range of topics touched by REDD+ calls for improved cross sectoral coordination between 'institutions', specifically as institutional development was reported to be weak in most reviewed articles.

Research in the REDD+ arena is complex with consequently high requirements on availability, transparency and reliability of data sets. Its geographical scope is global and it needs to be interdisciplinary due to the wide range of topics. Most of the reviewed studies focused only on a small number of selected REDD+ topics. Our review is restricted to transnational studies, leaving aside the huge amount of information which we showed to be publicly available from various sources for over 300 projects (Supplementary material, Table A). It remains a rewarding challenge to elaborate on these specifically with approaches going beyond summarizing descriptions. From a methodological point of view, it might be challenging to consider how to use such a large "found sample" (Overton et al., 1993) in order to derive reliable and valid results.

Only one of our studies used reference scenarios (Sunderlin et al., 2014), which is essential to show the effects of REDD+ and which should be considered for additional studies. More research is needed related to what we called 'top down' approaches, i.e. national activities, such as readiness phases, impacts of REDD+ strategies, or hopefully in the near future related to payments for verified emission reductions on national level in final REDD+ phases. Only then can we learn about impact and possible success of REDD+ in complex reality and not only in the laboratories of single projects.

A number of reviewed studies underline the relevance of transformational change if REDD+ is to have sustained effects. On the long term such change leads away from business-as-usual scenarios and must be accompanied by a fundamental shift in perception, values and attitudes. Transformational change is hardly measurable and therefore rightly not included in the Warsaw Framework. Nevertheless, it is an important topic for both science and practice. Transformational change is evidently necessary for the idea of REDD+ to be translated into practice on a scale that makes a difference.

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