

Project Report

# Market Conditions for Integrating Forest Ecosystem Services into a Forest Certification Scheme

Analysis of FSC Stakeholder Perceptions

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**Center for International Forestry Research (CIFOR)**

CIFOR advances human well-being, environmental conservation and equity by conducting research to help shape policies and practices that affect forests in developing countries. CIFOR is a member of the CGIAR Consortium. Our headquarters are in Bogor, Indonesia, with offices in Asia, Africa and South America.

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# Abbreviations

<b>CB</b>	Certification bodies
<b>CIFOR</b>	Center for International Forestry Research
<b>FES</b>	Forest ecosystem service(s)
<b>ForCES</b>	Forest Certification for Ecosystem Services
<b>FSC</b>	Forest Stewardship Council
<b>GEF-UNEP</b>	Global Environment Facility-United Nations Environment Programme
<b>MA</b>	Millennium Ecosystem Assessment
<b>NGOs</b>	Non-governmental organizations
<b>NTFP</b>	Non-timber forest product
<b>PES</b>	Payment for ecosystem services, or payment for environmental services
<b>PEFC</b>	Programme for the Endorsement of Forest Certification
<b>REDD+</b>	Reducing emissions from deforestation and forest degradation and enhancing forest carbon stocks
<b>WWF</b>	World Wildlife Fund
<b>WWF-GFTN</b>	WWF-Global Forest & Trade Network

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# Abstract

This study assesses the market conditions under which forest certification stakeholders might successfully incorporate a new scheme of certification of forest ecosystem services (FES). The primary question addressed is whether and how the principles and criteria and key operating procedures of an existing forest certification scheme designed for timber production could be adapted or expanded to encompass FES. We evaluated this potential through surveying the perceptions of 275 stakeholders on both the supply and demand sides of Forest Stewardship Council (FSC)'s forest management certification scheme. On the supply side, the survey results reflect auditors' capacity and areas in which FSC partners have the capacity and interest to provide training. On the demand side, the survey measures the level of experience and expectations of FSC certificate holders vis-à-vis FES. Our results show relatively supportive market conditions for integrating three types of FES, namely biodiversity conservation, non-timber forest products, and carbon storage (though the latter is not explicitly mentioned in FSC Principles and Criteria). In contrast, market conditions for integrating ecotourism and agricultural products were relatively weak, which signals that stakeholders might have difficulty including these as certified FES. Although commonly managed by certificate holders, the market conditions for certified watershed services were limited due to low capacity to audit delivery of these FES and low capacity to provide the necessary training. These findings contribute to assessing the potential opportunities and challenges of applying the FSC forest management certification scheme to managing and conserving FES, based on the perspectives of FSC stakeholders.

# 1.0 Introduction

Like any other market, the market for forest ecosystem services (FES) is susceptible to asymmetric information between sellers and buyers (Ferraro, 2008; Muradian & Rival, 2012). Asymmetric information is a market failure that reduces cost efficiency and the ability of actors to trade effectively (Ferraro, 2008; Sterner & Coria, 2012). For example, in the national program of payment for ecosystem services (PES) in Costa Rica, major information asymmetries were found to prevent optimal ecosystem service provision: because FES buyers lacked sufficient information about the quality of FES, they paid for more than was delivered (Muradian & Rival, 2012). In turn, asymmetric information inflates FES prices, increases buyers' opportunity costs, and can demotivate market participation (Ferraro, 2008). Thus, mitigating asymmetric information is a vital part of designing and implementing market-based policy instruments for FES (Sterner & Coria, 2012).

Certification has been widely applied to mitigating the problem of asymmetric information in the market (Dranove & Jin, 2010). For this reason, its potential application to FES markets is receiving increased attention (Meijaard et al., 2010; Meijaard et al., 2014). One potential approach to certifying FES is to integrate new principles, criteria and operating procedures into an existing forest certification scheme. Forest certification schemes have been implemented for more than 20 years to promote sustainable management of production forests and to build market support for certified wood products (Rametsteiner, 2002; Kozak et al., 2004; Cashore et al., 2006). Although these schemes mainly focus on timber and face many challenges such as high costs (Durst et al., 2006), there has been interest to apply them to the management and conservation of FES, including biodiversity conservation, watershed management, and even carbon sequestration/storage (Rametsteiner & Simula 2003; Vogt et al., 2000). For instance, the FSC Principles and Criteria explicitly address managing forest biodiversity, watersheds, and soil (FSC, 2012). Especially, conserving biodiversity is embedded in the developmental history of FSC, which was founded by environmental NGOs concerned about the rate of global biodiversity loss (Cashore et al., 2006; Elliott & Schlaepfer, 2001; Rametsteiner & Simula, 2003). Consequently many studies address the contribution of forest certification to biodiversity conservation in certified forests (Eriksson & Hammer, 2006; Gullison, 2003; Medjibe et al., 2013; Nasi et al., 2012; Sheil et al., 2010). A handful of studies examine the potential to adapt FSC certification, integrating a range of FES, to certify forests producing wood for biofuel (Gan & Cashore, 2013; van Dam et al., 2010). However, these studies do not consider the possibility of expanding FSC certification scheme beyond the current principles and criteria.

As part of a broader project<sup>1</sup> led by the FSC, we examined the perceptions of FSC stakeholders regarding various forest ecosystem services (FES) in order to explore FSC certification's potential to incorporate various FES (Figure. 1). We investigate this potential by using a broad range of FES employed from the Millennium Ecosystem Assessment (MA) (MA, 2003). Some of these FES are beyond the scope of current FSC principles and criteria; this study assumes that the FSC system will be able to evolve once market potential and new technologies are established. Challenges to address will include building capacity to monitor and verify the provision of FES and overcoming high certification costs (Meijaard et al., 2010; Meijaard et al., 2014). Because of the diversity of FES (MA,

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<sup>1</sup> This project is entitled "Forest Certification for Ecosystem Services (ForCES)," testing FSC certification's potential to expand its scope from timber to forest ecosystem services, based on its ten pilot sites in Chile, Indonesia, Nepal, and Vietnam. More information is available at <http://forces.fsc.org/>



2003), the associated challenges and opportunities to expand FSC certification will differ according to the characteristics of each FES. These characteristics and associated market conditions are key to assessing the potential to incorporate FES into forest certification. However, there is no systematic comparison that examines these challenges and opportunities by FES; this study attempts to contribute to filling this existing knowledge gap by analyzing the perspectives of FSC stakeholders.

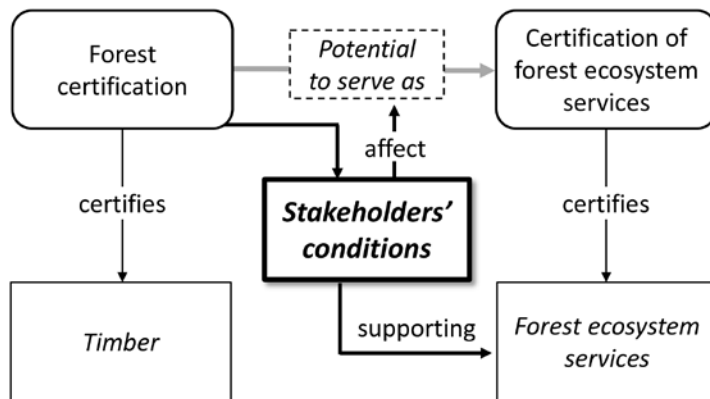


Figure 1. Forest certification's conditions to serve as certification of forest ecosystem services

## 2.0 Methods

### 2.1 Analytic framework

We analysed the market conditions surrounding forest certification to assess the degree to which they are likely to support certification of forest ecosystem services (FES). We conducted a perception analysis of stakeholders based on online surveys. The analytic framework for this analysis was built around three FSC certification stakeholder groups; nine indicators of market condition based on stakeholder capacity, experience, preference, and expectation in regards to FES and eleven ecosystem services in four categories defined by the Millennium Ecosystem Assessment (MA, 2003).

The analytic framework assessed the perceptions of three global stakeholder groups of the FSC certification: (a) certification bodies, (b) FSC partners, and (c) FSC certificate holders (Table. 1). *Certification bodies* are those accredited by the FSC and PEFC to grant and administer forest management certification. *Surveyed FSC partners* included representatives of FSC national networks, World Wildlife Fund for Nature (WWF), and Greenpeace. *FSC certificate holders* are those with forest holdings certified with FSC forest management certification. These three stakeholder groups are not only familiar with FSC certification but are also potential stakeholders for certification of FES because production forests contain various FES (Bauhus et al., 2010).

**Table 1. Analyzed stakeholder groups of forest certification**

Certification market	Analyzed stakeholders of forest certification	Potential roles in certification of forest ecosystem services (ES)
Supply	(a) <i>Certification bodies:</i> Certification bodies accredited by the FSC and PEFC	→ Potential auditors who audit forest ES
	(b) <i>FSC partners:</i> FSC network partners, WWF-GFTN network, and Greenpeace	→ Potential supporting networks who promote certification and support forest owners' capacity to manage forest ES
Demand	(c) <i>FSC certificate holders:</i> Forest owners who obtained the forest management (FM) scheme of the FSC certification	→ Potential sellers of forest ecosystem services

The analytic framework examined the perceptions of respondents in relation to nine indicators of forest management certification market conditions relevant to FES (Table. 2 and (1)-(9) below). Survey participants were asked to vote for their preferences for specific FES in relation to their capacities, experience, and expectations. Certification bodies were asked to vote for all FES for which they had auditing capacity (1). FSC partners were asked to indicate their preferences for specific FES for which they were willing to offer technical training to forest owners. The technical training was divided into: training in legal aspects of FES (2), training in setting baselines for FES provision (3), training in quantification of FES (4), and training in monitoring FES (5). FSC certificate holders were asked to indicate their preference for specific FES in regard to their experience in protecting FES (6), their expectations of future sales potential of FES (7), their experience in selling FES (8), and their experience with ecosystem services certification (9).

**Table 2. Analytic framework of the perceptual market conditions**

<b>Analysis targets</b>	<b>Indicators of market conditions</b>	<b>Descriptions</b>
<i>Certification bodies</i>	(1) Capacity to audit forest ecosystem services (FES)	Analysing FES that are currently auditable by certification bodies
<i>FSC partners</i>	(2) Training in legal aspect of FES (3) Training in setting FES baseline (4) Training in FES quantification (5) Training in monitoring FES provision	Analysing FES preferred by the networks in terms of training forest owners
<i>FSC certificate holders</i>	(6) Experience in protecting FES (7) Expected sale value of FES (8) Experience in selling FES (9) Experience with FES certification	Analysing FES having past experience and future expectation from FSC certificate holders

The analytic framework used the definition and categories of ecosystem services developed by the Millennium Ecosystem Assessment (MA) (MA, 2003), which are commonly used in the literature (Fisher et al., 2009). The MA groups ecosystem services in four categories: regulating services, cultural services, supporting services, and provisioning services. Within the four categories, eleven forest ecosystem services were identified (Table 3). Watershed protection and ecotourism consist of three sub-services. These services were presented in simplified form in the survey of FSC certificate holders to ensure a higher response rate.

**Table 3. Framework of forest ecosystem services (FES) (MA, 2003)**

<b>Categories</b>	<b>FES</b>
Regulating services	1. Water quality ( <i>watershed protection</i> ) 2. Water quantity ( <i>watershed protection</i> ) 3. Water risk ( <i>watershed protection</i> ) 4. Carbon storage 5. Biodiversity conservation
Cultural services	6. Scenic beauty ( <i>ecotourism</i> ) 7. Cultural experience ( <i>ecotourism</i> ) 8. Biodiversity experience ( <i>ecotourism</i> )
Supporting services	9. Soil conservation
Provisioning services	10. Agriculture goods 11. Non-timber forest products ( <i>NTFP</i> )

## 2.2 Surveys

Data was collected using online surveys to evaluate the perceptions of global stakeholders of forest certification (Table 4). Three online surveys were designed and administered following the Tailored Design Method (Dillman, 2011), with a total of 269 respondents. *Certification bodies* were surveyed from March 12 to 26, 2012 with a response rate of 31.88%. They represented 64.29% and 28.26% of the FSC and PEFC accredited certification bodies respectively. *FSC partners* were surveyed from April 16 to 30, 2012 for the FSC network partners and from July 10 to August 30, 2012 for WWF-GFTN and Greenpeace with a response rate of 36.72%. Participants came from 33 countries. *FSC certificate holders* were surveyed from July 9 to August 3, 2012 with a response rate of 16.23%.

**Table 4. Survey participants**

Survey participants	No. of participants (response rates)
Certification bodies	44 (31.88%)
FSC partners	43 (36.72%)
FSC certificate holders	188 (16.23%)
Total	275

## 2.3 Overall and specific conditions

Two scales were used in the market perception analysis: overall and specific scales. *The overall analysis* illustrated supply and demand side market perceptions and overall conditions as measured by indication of stakeholder preferences against indicators 1-9 (Table 2). The overall conditions were examined by counting two of the highest and lowest normalized selected values returned in the analysis, corresponding to the different forest ecosystem services (FES). For the normalization, the vote values' norm vectors, or the Euclidean distances, were used since it allows obtaining positive values for all normalized values unlike z-score based normalization (Abdi, 2010). The counts of the highest vote values (or support scores) were taken to indicate that the corresponding conditions are supportive of market conditions for the respective FES. The counts of the lowest values (or penalty scores) were taken to indicate that the conditions involve some challenges for the respective FES to be integrated into the FSC certification system. The overall conditions for FES were calculated by subtracting the penalty scores from support scores. This counting analysis was based on an assumption that each of the nine perceptions equally contribute to the market conditions since it was not feasible to calculate the weight of each condition's contribution to the development of certification of FES. On the other hand, *the specific analysis* focused on each indicator to compare the degrees to which they represent supportive or challenging market conditions for FES. The analysis used radar charts for these comparisons. The normalized values of FES were used to draw the radar charts.

## 3.0 Results

### 3.1 Overall market conditions

The overall market conditions demonstrate the overall results of the perception analysis: supply-side, demand-side, and overall market conditions for forest ecosystem services (FES). First, *the supply-side market conditions* present the market perceptions of certification bodies and FSC partners (Figure. 2). On average, biodiversity conservation, non-timber forest products (NTFP), and carbon storage scored high in the voting. FSC partners' willingness to offer training in setting baselines for FES provision received the highest votes, while their willingness to offer training in legal aspects of FES obtained the lowest votes among the five perceptions. This implies that stakeholders perceive that working on legal aspects of FES is more challenging than the technical measurement of FES including setting baselines and quantification of FES.

Second, *the demand-side market conditions* show the perceptions of FSC certificate holders (Figure. 3). Averaging the votes against the four indicators in the demand-side, biodiversity conservation, watershed protection, and carbon storage obtained the three highest votes among forest ecosystem services (FES). Among the four indicators, FSC certificate holders' experience in protecting FES obtained a distinctively higher vote than the other indicators. This signals that there is a high chance that FES are delivered in their certified forests. However, relatively low votes on sales experience, expected sales, and certification experience demonstrates that there are potential challenges to integrate these FES, even though they are available, into FES markets and a FES certification scheme.

Third, *the overall market conditions* corresponding to the different FES (calculated by subtracting penalty scores from support scores) summarize supply and demand-side conditions (Figure. 4). The support and penalty scores are also shown, which are the counted numbers of two of the highest and lowest normalized values of FES from each condition respectively (Table 5). The overall scores indicated that the market conditions were favourable to biodiversity conservation (score=7), carbon storage (score=4), and non-timber forest products (NTFP) (score=3). On the other hand, the conditions were disadvantageous to cultural experience for ecotourism (score=-7), agriculture products (score=-5), and scenic beauty for ecotourism (score=-4). The services under watershed protection fell in a neutral score range (Score=1 to -1), suggesting that the market conditions were neither supportive nor disadvantageous to those services.

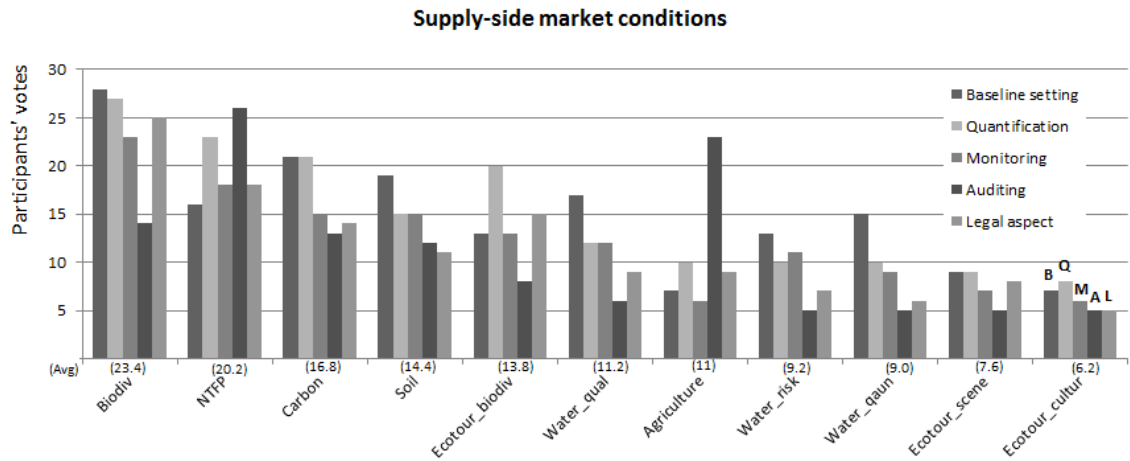


Figure 2. Market conditions from *certification bodies* and *FSC partners*

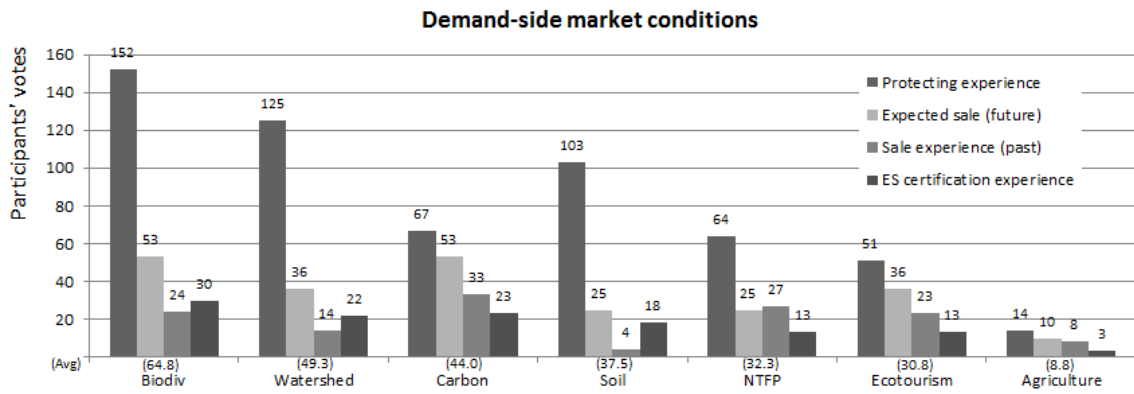


Figure 3. Market conditions from *FSC certificate holders*

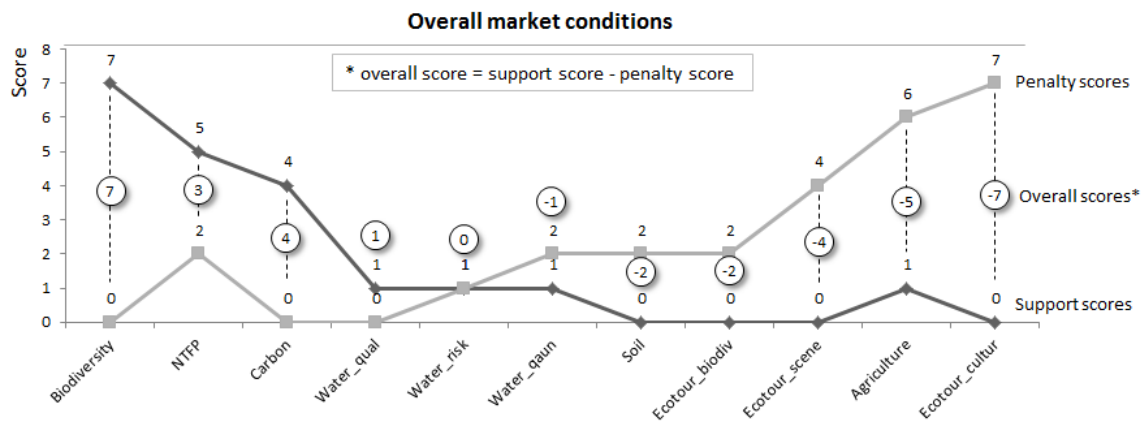


Figure 4. Overall scores of forest ecosystem services

**Table 5. Normalized values of the market conditions**

	CBs		FSC partners			FSC certificate holders			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Forest ecosystem services	Auditing capacity	Legal training	Baseline training	Quantifi. training	Monitoring training	Protecting experience	Expected sale	Sale experience	Certification experience
Water_qual	0.11	0.18	0.28	0.20	0.23	<b>0.51</b>	0.37	0.25	0.43
Water_qun	<u>0.09</u>	<u>0.12</u>	0.25	0.17	0.17	<b>0.51</b>	0.37	0.25	0.43
Water_risk	<u>0.09</u>	0.14	0.21	0.17	0.21	<b>0.51</b>	0.37	0.25	0.43
Carbon	0.23	0.28	<b>0.35</b>	0.36	0.29	0.27	<b>0.54</b>	<b>0.58</b>	<b>0.45</b>
Biodiversity	0.25	<b>0.50</b>	<b>0.46</b>	<b>0.46</b>	<b>0.45</b>	<b>0.62</b>	<b>0.54</b>	0.42	<b>0.59</b>
Ecotour_scene	<u>0.09</u>	0.16	0.15	<u>0.15</u>	0.14	<u>0.21</u>	0.37	0.41	<u>0.26</u>
Ecotour_cultur	<u>0.09</u>	<u>0.10</u>	<u>0.12</u>	<u>0.14</u>	<u>0.12</u>	<u>0.21</u>	0.37	0.41	<u>0.26</u>
Ecotour_biodiv	0.14	0.30	0.21	0.34	0.25	<u>0.21</u>	0.37	0.41	<u>0.26</u>
Soil	0.21	0.22	0.31	0.25	0.29	0.42	<u>0.26</u>	<u>0.07</u>	0.35
Agriculture	<b>0.41</b>	0.18	<u>0.12</u>	0.17	<u>0.12</u>	<u>0.06</u>	<u>0.10</u>	<u>0.14</u>	<u>0.06</u>
NTFP	<b>0.46</b>	<b>0.36</b>	0.26	<b>0.39</b>	<b>0.35</b>	0.26	<u>0.26</u>	<b>0.48</b>	<u>0.26</u>

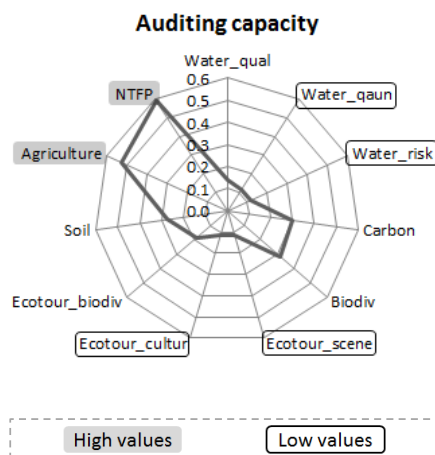
Notes:

- Two of the highest (**bold italic**) and lowest (underline) values were marked for each condition to estimate “support scores” and “penalty scores” of forest ecosystem services. When multiple services had equal values, all of them were marked.

- For the perceptions of FSC certificate holders (6-9), the values are identical for water\_qual, water\_qun, and water\_risk and for ecotour\_scene, ecotour\_cultur, and ecotour\_biodiv because watershed protection and ecotourism represented their sub-services in the survey.

### 3.2 Specific market conditions

The specific market conditions were illustrated in radar charts for each indicator of market condition. The normalized vote values for forest ecosystem services (FES) were used to draw the charts (Table 5). First, *certification bodies* showed their capacity to audit FES (Figure 5). NTFP and agricultural products yielded the highest values, suggesting that their current audit capacity is relatively higher for provisioning services (e.g. provision of maple syrup or cocoa). The high value of agricultural products was a distinctive result, reflecting the fact that certification bodies are closely working with agricultural certification schemes such as Rainforest Alliance certification. The normalized vote values were low with watershed protection and ecotourism.



**Figure 5. Market conditions from perception of certification bodies**

Second, *FSC partners* showed preferences against four indicators: training on legal aspect of FES, training for quantifying FES, training for setting FES baselines, and training for monitoring provision of FES (Figure. 6). The four indicators yielded similar shapes in the radar charts. Their normalized vote values were generally high for biodiversity conservation, non-timber forest products (NTFP), and carbon storage. On the other hand, the values were generally low for agricultural products, ecotourism with scenic beauty and cultural experience, and watershed protection for improving water quantity and reducing water-related risks.

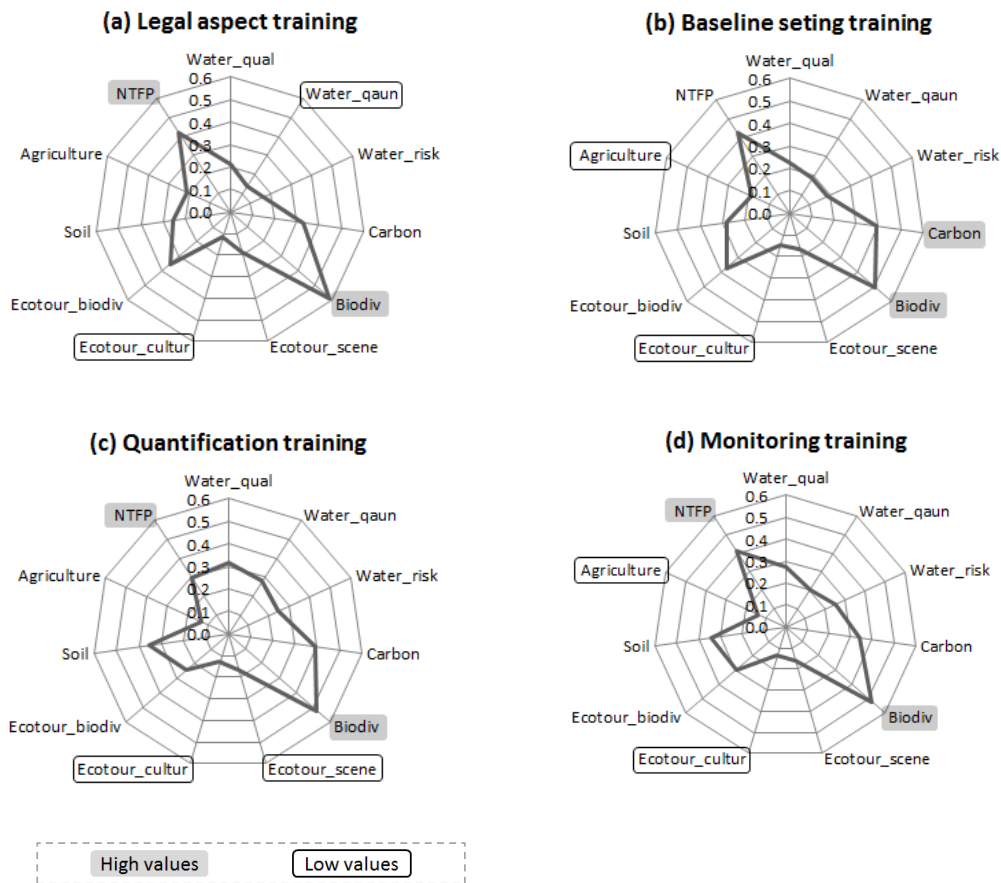


Figure 6. Market conditions from perceptions of *FSC partners*



Third, *FSC certificate holders* showed four market conditions: their experience to protect forest ecosystem services (FES), their expected sale of FES in their forests, sale experience with FES, and certification experience with FES (Figure. 7). Although the radar chart shapes were diverse (unlike with FSC partners), biodiversity conservation and carbon storage generally had high values, while agricultural products received very low values. This reflects the fact that the most of the forest owners with the FSC certificate were likely not engaged with agricultural activities.

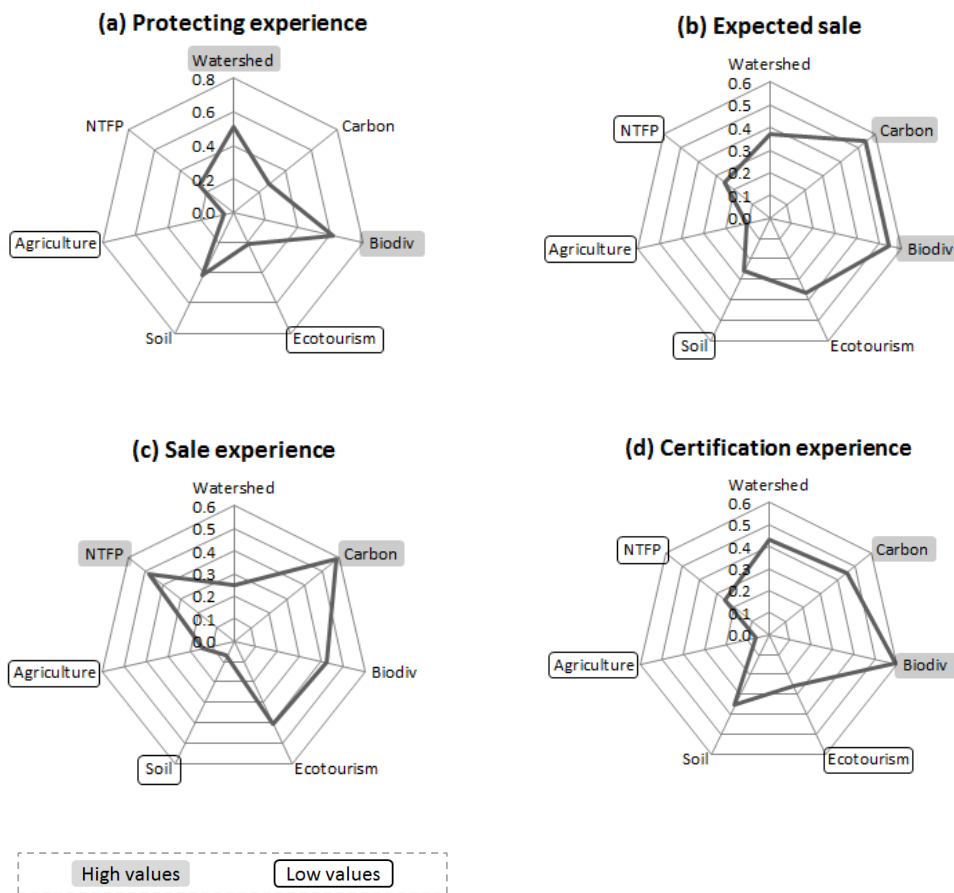


Figure 7. Market conditions according to perceptions of *FSC certificate holders*

## 4.0 Discussion

### 4.1 FSC's market conditions for FES

Our results indicate that stakeholder perceptions were relatively supportive of potential certification of biodiversity conservation, carbon storage, and non-timber forest products (NTFP). In contrast, ecotourism and agricultural products scored low. The results signal relative opportunities and challenges associated with integrating specific forest ecosystem services (FES) into forest certification, which depend on increasing awareness of FES to stakeholders, training forest owners, and existing experience and demand of the FSC stakeholders. Reflected in the analyzed perceptions, these activities likely represent enabling conditions to integrate certification of FES into the FSC scheme. For forest owners the first step is awareness of the existence and nature of particular FES. Managing FES is a challenging task, so many forest owners are likely to need substantial training. Additionally, many institutions and actors lack sufficient capacity to manage and monitor the provision of FES, including even biodiversity conservation and carbon storage, which received high scores for potential FSC certification in our analysis (Corbera & Brown, 2008; Eriksson & Hammer, 2006; Nasi et al., 2012; Romijn et al., 2012).

The score results of this study can be explained by two factors. First, if a particular FES is already covered by existing FSC principles and criteria, it is likely to score high in our analysis. Second, existing business experience related to the provision or marketing of particular FES will increase the associated scores. Thus, this analysis is well grounded in the perceptions of stakeholders as informed by their current practices and offers conservative insights on likely market performance should a certifier (FSC or other) incorporate FES in forest certification.

The FSC principles and criteria directly address biodiversity conservation, watershed protection, soil conservation, and non-timber forest products (FSC, 2012) (Table 6). Except for carbon, FES addressed in the Principles and Criteria obtained higher overall scores than FES not directly addressed, such as ecotourism and agricultural products. The high score of biodiversity conservation can also be explained by the fact that forest certification was initially developed specifically to address biodiversity loss (Cashore et al., 2006; Elliott & Schlaepfer, 2001; Rametsteiner & Simula, 2003). Furthermore, some NTFPs such as maple syrup and Brazil nuts have been already certified by forest certification (Shanley et al., 2008). This partially accounts for the high overall score of NTFPs. Although watershed and soil protection achieved higher scores than ecotourism and agricultural products, the score range was between 1 to -2 indicating that currently there is, most likely, a lack of supportive market conditions.

Three forest ecosystem services (FES) are not explicitly covered by the FSC Principles and Criteria, leaving stakeholders' relevant business experience as the factor affecting the market condition scores. These were: carbon storage, agricultural products, and ecotourism. While carbon storage scored high, agricultural products and ecotourism scored low. The high score of carbon storage signals that FSC stakeholders (especially certification bodies and some forest owners) have business experience with carbon storage, including operating and auditing forest carbon projects. It indicates that although carbon storage is not included in the current FSC system (Gan & Cashore, 2013; van Dam et al., 2010), stakeholders have relatively high capacity to incorporate carbon storage. Management of forest is closely linked to carbon storage and is therefore relatively easy to quantify and audit, compared to other FES, especially intangible ones. However, of course, making a decision to integrate carbon storage into the FSC system must take into account other factors as well, such as potential conflicts between the existing certification scope (i.e. certifying timber production

involving harvesting trees) and the new scope (i.e. certifying forest carbon storage based on the volume of standing trees). On the other hand, although ecotourism and agricultural products have well established markets, our analysis indicates that these services are not within the current business scope of FSC stakeholders. Therefore, there are challenges in attracting current FSC stakeholders to a certification scheme for ecotourism and agricultural products. The FSC would need to attract forest owners specialized in ecotourism and agricultural production rather than timber production.

**Table 6. Forest ecosystem services in FSC principles and criteria (C)**

<b>Forest ecosystem services</b>	<b>Overall scores</b>	<b>FSC principles and criteria (FSC, 2012)</b>
Biodiversity conservation	7	C6.4/ C6.6/ C6.8/ C9.1-1/ C9.1-2/ C9.1-3/ C10.10
Carbon storage	4	
NTFP	3	C10.11
Water quality (watershed)	1	C6.7/ C9.1-4/ C9.1-5/ C10.10
Water risk (watershed)	0	C9.1-4
Water quantity (watershed)	-1	C6.7/ C9.1-4/ C9.1-5/ C10.10
Soil conservation	-2	C9.1/ C10.10
Biodiversity experience (ecotourism)	-2	
Scenic beauty (ecotourism)	-4	
Agricultural products	-5	
Cultural experience (ecotourism)	-7	

## 4.2 Limitations of the study

The results are limited in that (1) perceptions would be altered by capacity building of certification stakeholders; (2) stakeholders of forest ecosystem services (FES) markets would have different perceptions on FES; and (3) high-scoring perceptions are not sufficient conditions for successful development of certification of FES. First, perceptions are changeable in the future through any capacity building on FES for forest certification stakeholders. For example, the audit capacity of certification bodies corresponds to the availability of auditors. Once certification bodies hire auditors specialized in provision of watershed protection, their capacity to audit watershed protection would increase. However, this decision is still conditioned by the potential market for watershed protection to certification bodies. Second, market conditions would differ once stakeholders of ecosystem services markets are included in the analysis. This study mainly focuses on the market conditions of the FSC system. Thus, future studies would be necessary to analyze certification demands from ecosystem services markets since they would be targets of certification of FES once developed. Last but not least, high-scoring perceptions would support certification development but do not guarantee successful certification. Certification implementation requires various factors, such as market demand, low certification cost, and indicator development (Meijaard et al., 2014). These factors also imply a need for further studies to complete the feasibility analysis of certification of FES.

## 5.0 Conclusions

This study examines the underlying market conditions of the FSC forest management scheme to integrate forest ecosystem services (FES) into its system based on a perceptual analysis of FSC stakeholders. This study indicates relatively supportive market conditions, as assessed from FSC stakeholder perceptions, for expanded forest certification incorporating the FES of biodiversity conservation, carbon storage, and NTFPs. Market conditions for integration of ecotourism and agricultural products were relatively weak. These analyzed perceptions shed light on only one dimension of the FSC's potential to integrate FES. These results must be considered along with other complementary studies, including estimation of market demand for FES certification and business model analyses.

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