Off print

Wirtschaft – Gesellschaft – Natur

Ansätze zu einem zukunftsfähigen Wirtschaften

Festschrift für Prof. Dr. Eberhard K. Seifert

Edited by
Djordje Pinter and Uwe Schubert

Metropolis-Verlag
Marburg 2011

ISO Standards, Environmental Management Systems and Ecosystem Services[1]

Ira R. Feldman[2]

Introduction

Over the past decade or so, the advent of systems thinking and the implementation of environmental management systems (EMS's) has changed the face of corporate environmental management. Beginning with the promulgation of the ISO 14001 standard in 1996, EMS's have become an increasingly accepted framework for managing the environmental aspects of an organization's activities, products and services. Indeed, both the term "environmental aspects" and the phrase "activities, products and services" were popularized through the development of ISO 14001 standard. The discussion below will emphasize how ecosystem services can be infused into corporate environmental management by rethinking an organization's environmental aspects across the range of its activities, products and services.

[1] This working paper is based largely on a workshop segment led by the author in March 2010 in Paris. The workshop was convened by UNEP and the World Resources Institute (WRI) to explore how the Corporate Ecosystem Services Review (ESR) tool developed by WRI might be used in conjunction with, or potentially integrated with, other strategic environmental management standards, protocols and principles, such as ISO 14000, the Global Reporting Initiative (GRI) and the Global Compact. Dr. Eberhard Seifert was a special invited guest at the Paris workshop. Other ISO workshop segments were led by the author at events convened by UNEP and WRI in 2010 in Nairobi, Sao Paulo, and Washington. A full report is being developed by WRI.

[2] President and Senior Counsel, greentrack strategies. The author and Dr. Eberhard Seifert worked together, as US-ANSI and Germany-DIN Experts respectively, in the development of ISO 14031 on Environmental Performance Evaluation (EPE), and as members of the metrics working group in the drafting of the Global Reporting Initiative's (GRI) Exposure Draft.

1. Introducing the ISO 14000 series

First, it is important to grasp a few basics about ISO 14001, the international standard for environmental management systems. The ISO 14001 standard is sometimes called the "mother standard" in the ISO 14000 series of standards. The original ISO 14000 series however includes not only the standard for environmental management systems, but also standards for environmental performance evaluation, life cycle assessment, and labeling and product claims.

More recently, other standards have been added to the ISO 14000 series, including a standard on environmental communication, ISO 14063, and one on greenhouse gas inventories, ISO 14064, with additional standards still in development. Presently, there are more than 30 standards in the ISO 14000 series, but only ISO 14001 is a certification standard, i.e., an organization can opt to have a third party verify or certify that its EMS conforms to ISO 14001. An ISO 14001 certificate, with a specified scope of the covered EMS, is granted to an organization by an accredited registrar after an audit to determine conformity to the standard; in most countries there is interchangeable usage of the terms "certification" and "registration" to describe this step.

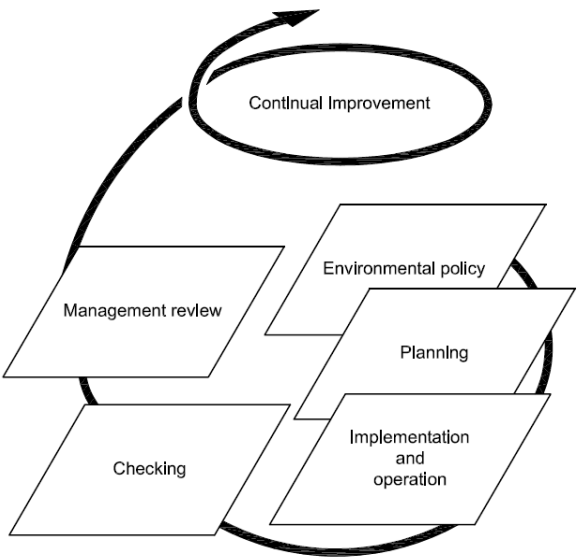
The ISO 14000 Series

- *ISO 14001* Environmental management systems – Requirements with guidance for use
- *ISO 14004* Environmental management systems – General guidelines on principles, systems and support techniques
- *ISO 14015* Environmental assessment of sites and organizations
- *ISO 14020* series (14020 to 14025) Environmental labels and declarations
- *ISO 14031* Environmental performance evaluation – Guidelines
- *ISO 14040* series (14040 to 14049), Life Cycle Assessment, LCA, discusses pre-production planning and environment goal setting.
- *ISO 14050* terms and definitions.
- *ISO 14062* discusses making improvements to environmental impact goals.
- *ISO 14063* Environmental communication– Guidelines and examples
- *ISO 14064* Measuring, quantifying, and reducing Greenhouse Gas emissions.

– *ISO 19011* which specifies one audit protocol for both 14000 and 9000 series standards together. (This standard replaces *ISO 14011* on auditing)

Unlike earlier ISO standards, which were principally technical standards such as specifications for film speed or plate glass thickness, the ISO 14001 standard is a "management systems standard." ISO's success in introducing a management systems standard, ISO 9000, for quality management in the 1980's paved the way for ISO to venture into the environmental management arena after the Rio Earth Summit's call for voluntary action by business and industry. Both ISO 9000 and ISO 14000 management systems standards rely on the "plan, do, check, act" (or "PDCA") model, the continuous improvement cycle, credited to Deming and Shewhart.

Figure 1: PDCA-Circle, Deming and Shewhart



Source: ISO 14001.

The implementation of ISO 14001 worldwide has progressed steadily each year since its introduction, with approximately 188,000 certifications (in 155 countries) known as of 2008.[3] The uptake of the ISO 14001 model cannot be

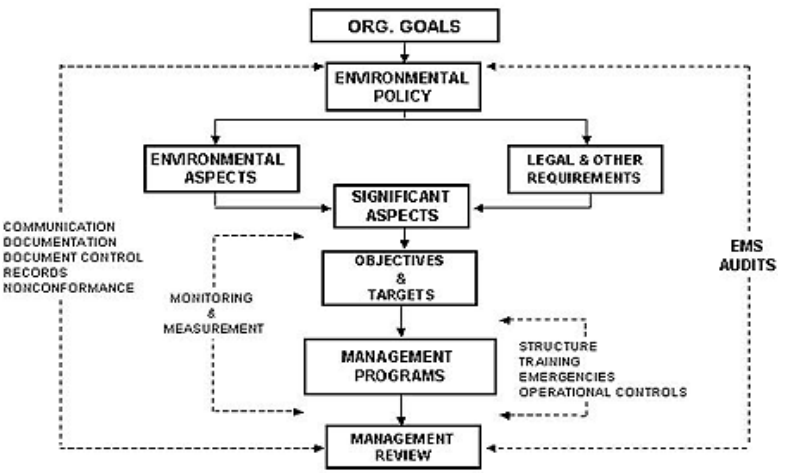
[3] http://www.iso.org/iso/survey2008.pdf

measured by certifications alone, however, because many more organizations have opted to either "self-declare" or limit their use of the standard to second-party (e.g., between trading partners) verification without an ISO 14001 certificate, both of which are legitimate uses of the standard.

2. ISO 14001 – the environmental management systems standard

The ISO 14001 standard itself is relatively short in length (about 8 pages) and it includes only 16 or 17 discrete requirements, but it is often misunderstood and misconstrued. It is generally necessary to clarify that ISO 14001 is a process standard, not a performance standard, so there are no detailed appendices specifying effluent or emissions limits or provisions articulating performance goals to be found in this standard.

Figure 2: EMS Flowchart



Source: used courtesy of the author.

Another source of confusion is, contrary to popular assumption, ISO 14001 does not require the disclosure of performance levels or audit results, nor is any particular form of stakeholder engagement mandated by ISO 14001. The standard does, however, require a procedure for communicating with inter-

ested internal and external parties, but only the organization's environmental policy statement is required to be made available to the public.

The flow chart above provides a useful map of the ISO 14001 process and the interrelationship between the key provisions. Some of these provisions seem particularly relevant to the integration of ecosystem services into the organization's EMS. For this purpose, note especially the thread through the center of the flow chart as follows: Organizational goals > Environmental policy > Significant aspects > Objectives/targets > Management programs > Management review.

3. Specific provisions in ISO 14001

There is no explicit reference to ecosystem services in ISO 14001, though there is no reason why the integration of ecosystem services could not be considered in conjunction with various provisions in the existing text of the standard. The ISO 14001 text does not currently provide a basis for considering "dependencies"[4] on ecosystem services, though impacts are clearly contemplated. Similarly, while "provisioning services"[5] appear to fit in the ISO 14001 framework, there is a much less clear connection to "regulating services."[6]

3.1. Aspects Review

An organization generally approaches EMS implementation by performing an aspects review. When done properly, a cross-functional team identifies the range of impacts that will actually or potentially result from the organization's activities, products and services. The aspects most typically considered

[4] As explained in WRI's Ecosystem Services Review, a company "depends" on an ecosystem service if that service functions as an input or if it enables, enhances, or influences environmental conditions required for successful corporate performance. A company "impacts" an ecosystem service if the company affects the quantity or quality of the service.

[5] According to WRI's Ecosystem Services Review, "provisioning services" are the goods or products obtained from ecosystems such as food, freshwater, timber, and fiber.

[6] According to WRI's Ecosystem Services Review, "regulating services" are the benefits obtained from an ecosystem's control of natural processes such as climate, disease, erosion, water flows, and pollination of plants, as well as protection from natural hazards. "Regulating" in this context is a natural phenomenon and is not to be confused with government policies or regulations.

are those that track regulatory compliance concerns, such as emissions and effluents; waste generation and disposal; and use of raw materials and natural resources.

The term "environmental aspects" was developed to be intentionally broader than the more familiar "environmental impacts" phrase. The standard defines environmental aspect as the elements of an organization's activities, products, or services that may interact with the environment, while environmental impact is described as any resulting change to the environment, whether adverse or beneficial.

Figure 3: Aspect and Impact Example

Activity, Product, Service	Aspect	Impact
Boiler Operations	Air emissions	Air pollution
	Fuel consumption	Natural resource depletion
	Boiler blowdown	Water pollution
	Water consumption	Natural resource depletion

Source: adapted from Julie Woosley, "ISO 14001: Section 4.3.1 Environmental Aspects" (PowerPoint presentation October 2001), www.p2pays.org/ref/32/31053.ppt.

Natural resource depletion is often listed as an impact in aspect reviews, which indicates that the EMS implementation process is conceptually not far removed from linking up with ecosystem services, at least at the provisioning services level.

Once the broad range of aspects are identified, the organization must decide which of these aspects are "significant." The standard does not specify a methodology for determining significance; each organization decides for itself. One approach presented in the chart below is to rank significance by several factors such as legal liability, public concern, frequency, and severity.

The selection of significant aspects is the linchpin of the ISO 14001 process because these are the aspects for which the organization will set objectives and targets and in turn will determine the roles and responsibilities in the environmental management program. The selection of significant aspects affects other provisions as well, for example, the training requirements are linked to significant aspects.

For participants in the UNEP-WRI workshops, the consensus view was that the aspects review is by far the most important provision in ISO 14001 for incorporating ecosystem services. If ecosystem services terminology were to be explicitly included in the aspects section of ISO 14001, the brainstorming exercise by the organization's cross-functional team would likely move beyond the traditional "air, water, waste" consideration to add an ecosystems dimension. In fact, it would not be difficult for the team to conduct an Ecosystem Services Review, using the existing WRI tool, in developing its overall list of aspects.

Figure 4: Example Significance Matrix

Activity, Product, Service	Aspect	Impact	Legal Liability	Public Concern	Frequency	Severity	OSR	Significance (OCR>2.5)
Dissolve Mineral Ore	Water use	Resource depletion	1	3	2	1	1.75	No
	Natural Gas Use	Resource depletion	1	1	2	2	1.50	No
	Natural Gas Use	Air pollution (Nox)	1	2	2	1	1.50	No
	Use of Strong Acids	Spills to land or water	3	2	3	3	2.75	Yes

Source: adapted from Julie Woosley, ISO 14001: Section 4.3.1 Environmental Aspects (PowerPoint presentation October 2001), www.p2pays.org/ref/32/31053.ppt.

3.2. Legal and Other Requirements

Another provision frequently mentioned as a hook for including ecosystem services in ISO 14001 is the obligation to consider legal and other requirements. While this provision can also be viewed as subsumed under the broader rubric of significant aspects, it is worth noting the emerging significance of legal and regulatory issues for ecosystem services. As ecosystem services concepts find their way into policy, legal and regulatory regimes, this provision of ISO 14001 will be an additional basis for the inclusion of ecosystem services in the organization's EMS. In the US, we are already seeing the use of ecosystem services in state-level legislation (e.g., Washington

state)[7] and in case law, judicial decisions relating to the valuation of natural resource damages.[8]

3.3. Scoping

Another opportunity to introduce ecosystem services into the EMS process is at the very outset, when the organization selects the scope of the EMS. With ISO 14001, the organization can select any scope it desires, but generally the scope of the EMS is, by default, everything inside the fenceline. But ISO 14001 does not require such a characterization. Instead, the organization can limit its EMS to a process within the facility; it can track a product line or service across multiple facilities; or, in some cases, an organization will decide to pursue a multi-site corporate certification. Note that this consideration becomes important only when certification is the goal – the third-party verifier will issue a certificate that specifies the scope of the EMS conforming to ISO 14001.

3.4. Policy statement

As noted above, ISO 14001 requires that the organization's environmental policy statement be made available to the public. Often this is the only com-

[7] The State of Oregon took a major step towards integrating consideration of ecosystem services into all state programs in 2009 with the enactment of a law that established a state policy "to support the maintenance, enhancement and restoration of ecosystem services throughout Oregon, focusing on the protection of land, water, air, soil and native flora and fauna." The Act directs all state agencies to adopt and incorporate adaptive management mechanisms into their programs to support enhancement of ecosystem services and to use "ecosystem services markets as a means to meet mitigation needs." 2009 Or. Laws c. 808, § 2, available at http://www.leg.state.or.us/09reg/measpdf/sb0500.dir/sb0513.intro.pdf.

[8] As Karl Coplan notes in his article, "Public Trust Limits on Greenhouse Gas Trading Schemes: A Sustainable Middle Ground?" 35 Colum. J. Envtl. L. 287 (2010), US courts have recognized the ecosystem service values of tidelands and wetlands as a public trust value. Further, as J.B. Ruhl, James Salzman and Iris Goodman recognize in their article, "Implementing the New Ecosystem Services Mandate of the Section 404 Compensatory Mitigation Program: A Catalyst for Advancing Science and Policy," 38 Stetson Law Review 251 (2009), rules from the US Army Corps of Engineers and US EPA for the first time introduced ecosystem services into the mitigation decision-making standards, requiring that "compensatory mitigation [...] should be located where it is most likely to successfully replace lost [...] services."

ponent of the EMS that is disclosed to external stakeholders. The lack of a strong stakeholder engagement requirement is a frequent criticism leveled at ISO 14001.

Since the ESR tool developed by WRI includes a relatively strong mandate for engaging stakeholders, several workshop participants felt that the policy statement in ISO 14001 should explicitly provide mention of biodiversity and/or ecosystem services. Others noted that their organizations had developed freestanding biodiversity policies, but had not to date thought about potential integration with their EMS programs.

Unlike the generic management systems provisions in ISO 14001 and 14031 standards, which are silent on the ecosystems and biodiversity topics, ISO 26000 (the forthcoming ISO standard on "social responsibility," discussed in more detail below) is noteworthy for explicitly mentioning ecosystem services. Therefore, ISO 26000 can be used as a source for "borrowing" appropriate ecosystem services language for use in an organization's policy statement. Several ISO 26000 provisions are especially useful, at increasing levels of detail, as follows:

In Section 6.5, the "Environment" section of ISO 26000, the coverage of environmental issues is structured in four components.[9] The final section, entitled "Protection of environment and restoration of natural habitats," includes a variety of references to ecosystem services.

> – An organization can become more socially responsible by acting to protect the environment and restore natural habitats and the various functions and services that ecosystems provide (such as food and water, climate regulation, soil formation and recreational opportunities).

This section also identifies "key aspects" of this issue including:

> – valuing, protecting and restoring ecosystem services

> Ecosystems contribute to the well-being of society by providing services such as food, water, fuel, flood control, soil, pollinators, natural fibres, recreation and the absorption of pollution and waste. As ecosystems are degraded or destroyed, they lose the ability to provide these services.

> – valuing and protecting biodiversity

[9] The author served as co-chair of the Environment Drafting Team in the ISO 26000 process.

> Biodiversity is the variety of life in all its forms, levels and combinations; it includes ecosystem diversity, species diversity and genetic diversity. Protecting biodiversity aims to ensure the survival of terrestrial and aquatic species, genetic variability and natural ecosystems.

Moreover, the "actions and expectations" most closely related to ecosystem services are identified in Section 6.5.6.2, including the following:

> In relation to all its activities, products and services, an organization should:
>
> - identify potential adverse impacts on ecosystem services and biodiversity and take measures to eliminate or minimize these impacts;
> - where feasible and appropriate, participate in market mechanisms to internalize the cost of environmental burdens caused and create economic value in protecting ecosystem services;
> - give highest priority to avoiding the loss of natural ecosystems, next to restoring ecosystems, and finally, if the former two actions are not possible or fully effective, to compensating for losses through actions that will lead to a net gain in ecosystem services over time;
> - establish and implement an integrated strategy for the administration of land, water and ecosystems that promotes conservation and sustainable use in a socially equitable way;
> - take measures to preserve any endemic or endangered species or habitat that may be adversely affected;
> - incorporate the protection of natural habitat, wetlands, forest, wildlife corridors, protected areas and agricultural lands into the development of buildings and construction works;
> - consider adopting sustainable agricultural, fishing, animal welfare and forestry practices as defined in leading standards and certification schemes;
> - consider that wild animals and their habitats are part of our natural ecosystems and should therefore be valued and protected;

Thus, it is clear, at least in the context of social responsibility, that the ecosystem services concept has been introduced into the world of ISO standards. Accessing the language in ISO 26000 can also serve to infuse ecosystem services into the organization's EMS policy statement.

3.5. Measuring and Monitoring

A separate set of considerations can be construed as part of the monitoring and measuring provisions of ISO 14001. The ISO 14001 standard does not specify metrics. For now, the question of appropriate metrics and indicators may be better addressed by other environmental management tools. Metrics loom large in sustainability reporting protocol of the Global Reporting Initiative (GRI) for example. Within the ISO 14000 series, however, there is a standard that is directly on point. That standard, ISO 14031, is briefly considered next as source material for building an EMS.

ISO 14031 on Environmental Performance Evaluation (EPE) has been largely overlooked in the US, and there is only anecdotal information regarding implementation of ISO 14031, especially from Japan and Germany. Nonetheless, ISO 14031 is an existing international standard and, with minimal adjustments, it could become a significant vehicle for introducing ecosystem services into corporate environmental management.[10]

The focus of ISO 14031 is on a method to evaluate environmental performance of organizations, with an annex providing the definition and detailed discussion of types of indicators that may be used to support environmental management. The EPE standard, set on a "plan, do, check, act" as well as a clear input-output (or "eco-balance") framework, establishes three categories of metrics: Management Performance Indicators (MPI's); Operating Performance Indicators (OPI's); and, Environmental Condition Indicators (ECI's). (See Table below for examples).

The selection of indicators should be based on: significant environmental aspects; environmental performance criteria, including internal criteria as well as regulatory standards; and the views of interested parties. A review of environmental aspects should be undertaken whether the organization has an environmental management system in place or not.

The potential utility of ECI's for incorporating an ecosystem services perspective was well-received by workshop participants. A likely driver for the further development of such metrics is the emergence of functioning markets for ecosystem services.

[10] Unfortunately such proposed changes to ISO 14031 have not yet been introduced by any national delegation or liaison organization into the ongoing revision process. Noteworthy, however, is a "sectoral methodology," proposed first by Seifert during Cairo annual ISO-meeting of TC 207/SC4 2009 (nominated as chair of a task group for developing a proposal to integrate in ISO 14031-revision), which also would allow for better integration of biodiversity and ecosystem services. Specific sectoral indicators could be required as 'should' indicators for all organizations of particular sectors, similar to current sector-specific efforts under the latest iteration of EMAS (EMAS III).

Table 1: Examples of Performance Indicators and Metrics

Operating Performance Indicator (OPI)	**Management Performance Indicator (MPI)**	**Environmental Condition Indicator (ECI)**
Raw material used per unit of product (kg/unit)	Environmental costs or budget ($/year)	Contaminant concentrations in ambient air (µg/m^3)
Energy used annually per unit of product (MJ/1000 L product)	Percentage of environmental targets achieved (%)	Frequency of photochemical smog events (#/year)
Energy conserved (MJ)	Number employees trained (% #trained/to be trained)	Contaminant concentration in ground- or surface water (mg/L)
Number of emergency events or unplanned shutdowns (#/year)	Number of audit findings (#)	Change in groundwater level (m)
Hours of preventive maintenance (hours/year)	Number of audit findings addressed (#)	Number of coliform bacteria per liter of potable water
Average fuel consumption of vehicle fleet (L/100 km)	Time spent to correct audit findings (person-hours)	Contaminant concentration in surface soil (mg/kg)
Percentage of product content that can be recycled (%)	Number of environmental incidents (#/year)	Area of contaminated land rehabilitated (hectares/year)
Hazardous waste generated per unit of product (kg/unit)	Time spent responding to environmental incidents (person-hours per year)	Concentration of a contaminant in the tissue of a specific local species (µg/kg)
Emissions of specific pollutants to air (tonnes CO_2/year)	Number of complaints from public or employees (#/year)	Population of an specific animal species within a defined area (#/m^2)
Noise measured at specific receptor (dB)	Number of fines or violation notices (# ?/year)	Increase in algae blooms (%)
Wastewater discharged per unit of product (1000 L/unit)	Number of suppliers contacted about environmental management (#/year)	Number of hospital admissions for asthma during smog season (#/year)
Hazardous waste eliminated by pollution prevention (kg/year)	Cost of pollution prevention projects ($/year)	Number of fish deaths in a specific watercourse (#/year)
Number of days air emissions limits were exceeded (days/year)	Management levels with specific environmental responsibilities (#?)	Employee blood lead levels (µg/100 mL)

Source: Chart adapted from David Putnam, "ISO 14031: Environmental Performance Evaluation," September 2002 (draft paper submitted to Indian Confederation of Industry), http://www.aipa.org/Adobe_Files/Conservation_Efficiency_Productivity_Etc/2002_09_ISO_14031_Environmental_Performance_Evaluation_David_Putnam.pdf.

Whether the organization is certified to ISO 14001 or not, the review of the EPE results should address:

- The costs and benefits of the program;
- Progress towards meeting environmental performance targets;
- How appropriate are the environmental performance criteria;
- How appropriate are the selected environmental performance indicators; and
- Data quality and data collection methods.

In reviewing these factors, improvement efforts may focus on improving data quality, enhancing analytical and evaluation capabilities, developing new or more useful performance indicators, changing the scope of the program, and providing additional, or reallocating resources.

3.6. Interpretation of data

In the WRI-UNEP workshops, participants voiced interesting perspectives regarding the interpretation of data. It was suggested by one participant that new metrics were not needed, but instead the information already being generated by EMS's ought to be reevaluated in light of a greater appreciation of ecosystem services.

Others suggested that new tools and technologies could be brought to bear; in particular spatial management tools and GIS technologies might be useful for the integration of ecosystem services. Still others regarded the key challenge as "measuring change," or identifying the appropriate tools to assess ecosystem variables.

4. Beyond ISO 14000

4.1. Life Cycle Assessment

Although beyond the scope of the workshops, several workshop participants suggested that the ISO 14040 standards on Life Cycle Assessment (LCA) were also worthy of attention. LCA could serve as a potential vehicle for introducing ecosystem services into corporate decision making in various ways. One participant observed that LCA examines the impact of companies rather than dependencies. Others pointed to the value of LCA in product develop-

ment. The suggestion was to integrate dependencies by evaluating the potential benefit of avoided impact, or by performing a sensitivity assessment.

4.2. Social responsibility

Numerous voluntary codes and standards already are available to deal with various aspects of corporate social responsibility (CSR). Among these are the principles set forth by the UN Global Compact and in the Organization for Economic Cooperation and Development (OECD) guidelines; the workplace rights and sustainability guidelines found in the SA 8000 and AA1000 standards; and the reporting protocol developed by the Global Reporting Initiative (GRI).

ISO entered the CSR arena in 2002 by forming a strategic advisory group to consider whether ISO should develop a CSR standard. ISO declared that its initiative would focus on "social responsibility" – CSR without the "C" – as a signal that the ISO 26000 guidance will address the social responsibility of all organizations, not just business corporations. ISO's stated objective for its new guidance standard is to provide practical guidance related to operationalizing social responsibility, identifying and engaging with stakeholders, and enhancing the credibility of reports and claims made about social responsibility.

The ISO 26000 standard is not intended to be a management systems standard in the "Plan, Do, Check, Act" mode. Rather, organizations are expected to use existing management systems to implement their SR programs. It is not intended to be a certification standard like ISO 14001, i.e., there will be no third party registration/certification (see above) – it is a guidance standard only. Finally, the drafters did not set out to create a set of social obligations or expectations of the type properly defined by governments. ISO 26000 was released as an international standard in late 2010.

In the current draft of ISO 26000,[11] roughly the first third of the document attempts to place the social responsibility concept for organizations in broader context and provides a useful CSR primer.

The second third of the document identifies key SR principles and then outlines the seven "core" topic areas: organizational governance; environ-

[11] At the time of the Paris workshop, ISO 26000 was at the Draft International Standard (DIS) stage. Subsequently, the ISO 26000 standard moved to the Final Draft International Standard (FDIS) stage, and the publication of the International Standard in its final form occurred in November 2010.

ment; human rights; labor practices; fair operating practices; consumer issues; and community involvement/society development. The framework adopted in this section introduces the user to the key substantive areas by explaining the relevance of each topic to SR and by presenting key considerations and recommendations under each provision. As discussed above, the Environment section specifically addresses both ecosystem services and biodiversity, for the first time in any international standard.

The final third of ISO 26000 is devoted to operationalizing an SR program. This section provides illustrative examples and emphasizes communication with stakeholders.

5. Conclusion

The groundbreaking step of introducing ecosystem services in the Environment section of ISO 26000 sets the stage for the future placement of ecosystems concepts in other ISO standards. All ISO standards undergo revision processes. As noted above, ISO 14031 is presently in a review phase and soon, ISO 14001 will be due for reconsideration. A "future directions" working group is already in place to identify priority topics for the revision of ISO 14001.

Unfortunately, as we learned at the Paris workshop in spring 2010 , ecosystem services was not yet one of the identified topics. It is still early in the process, however, and several of the participants expressed keen interest in raising the issue. Instead, it may be that the imminent ISO 14031 review process presents the most immediate opportunity for successful introduction of ecosystem services in the ISO 14000 series. As discussed above, with the category of Environmental Condition Indicators (ECIs) already included in the ISO 14031 standard, that would seem to be a logical and relatively pain-free approach to creating such a linkage.

Several participants agreed, however, that revisions to the existing standards will not fully accomplish the goal of integration. Since ISO 14001 is relatively basic, many companies focus on simple aspects and do not consider ecosystem impacts. For some companies, ecosystem-level thinking emerges only when additional certifications like Forest Stewardship Council (FSC) are sought. Therefore, the concern raised is that, even if space is created in ISO standards to assess ecosystem services, integrating the "know-how" remains to be addressed and is perhaps the most critical challenge. The prospect of moving towards "sectoral indicators" (as discussed above) might ameliorate this concern.

There was no consensus among the workshop participants as to whether facility-level staff could effectively address ecosystem services considerations. Some viewed ecosystem service indicators as a global or corporate-level concern; others viewed ecosystem services as a purely localized issue and relevant to specific operations and facilities. One participant, Dr. Eberhard Seifert, described this divergence in perspective as an example of the "macro-micro" link familiar to the developers of the ISO 14031. It was suggested that at either level of scale the key to understanding integration of ecosystem services was to "transcend the pure organization barrier."

References

ISO 14001 (2004): Environmental management systems – Requirements with guidance for use, ISO, Geneva, Second Edition

ISO 14031 (1999): Environmental performance evaluation – Guidelines, ISO, Geneva, First Edition

ISO 26000 (2010): Guidance on social responsibility, ISO, Geneva, First Edition

Feldman, I., Weinfield, D. (2002): Understanding the Emergence of Environmental Management Systems: Policy, Regulatory, and Management Uses of the EMS Framework, Trends (ABA Environmental Section), Chicago

Feldman, I., Weinfield, D. (2001): Environmental Management Systems: Policy, Regulatory, and Management Implications of EMS and Related Standards, chapter in: M. Gerrard (ed.), Environmental Law, New York

Global Reporting Initiative (GRI) (2011): G3.1 Guidelines, available at http:// www.global reporting.org/ReportingFramework/ G3Guidelines/

Tibor, T, Feldman, I. (contributing eds.) Implementing ISO 14000 (1997): A Practical, Comprehensive Guide to the ISO 14000 Environmental Management Standards, New York

World Resources Institute, "The Corporate Ecosystem Services Review: Guidelines for Identifying Business Risks & Opportunities Arising from Ecosystem Change," March, 2008, available at http://www.wri.org/publication/corporate-ecosystem-services-review