Certifiably Sustainable?: The Role of Third-Party Certification Systems: Report of a Workshop

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CERTIFIABLY SUSTAINABLE?

THE ROLE OF THIRD-PARTY CERTIFICATION SYSTEMS

Report of a Workshop

Committee on Certification of Sustainable Products and Services

Science and Technology for Sustainability Program
Policy and Global Affairs

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Preface and Acknowledgments

Consumption of goods and services accounts for more than two-thirds of economic activity in the United States, and it plays a comparable role in other societies. Shifting consumption toward more sustainable production and use is accordingly a crucial element of a sustainability transition. One approach that has emerged over the past 15 years is third-party certification: Products or services are scrutinized by an allegedly independent body, which then confers the right to advertise and label the product as "sustainable." The basic belief is that consumption of certified products moves supply chains toward sustainability (in terms of environmental, social, and economic outcomes), both in the specific goods or services consumed and by providing incentives to producers and sellers to change their practices. Sustainably caught seafood, green buildings, and carbon offsets for air travel provide examples of goods and services marketed in part on their claims to be more sustainable than competing alternatives.

Certification has been shown to be feasible from a technical and economic perspective within some markets, but tangible movement toward sustainability on the ground has been slow. Moreover, the market penetration of certified products remains small, with few exceptions. *How can scientific and technical knowledge contribute to the success of certification and to the wider goal of moving consumption toward sustainability?* This is a question to which the Roundtable on Science and Technology for Sustainability (see Appendix C) brings significant advantages, with its wide representation from business, government, and academia. In principle, science can strengthen assurance of sustainability to buyers; lower uncertainties faced by producers of certified products; and provide a credible fulcrum for critics

of the producers, organizing a debate that leads to continual improvement of certification standards. How to organize and provide these benefits of science remains unclear, however.

In keeping with its theme of "Linking Knowledge with Action for Sustainable Development," Roundtable members agreed that a workshop could help identify new areas for problem-driven research. To conduct this, a committee was appointed by the National Research Council to organize the workshop and write a report based on the discussions. The committee invited expert practitioners involved with certification and certified products, along with select scholars and policy actors, to hold this initial discussion. The workshop represented an important step in learning from an emergent field of practice. Admittedly, focusing the workshop discussions on a particular tool (third-party certification) meant that discussions of other approaches to reducing negative impacts of consumption (e.g., government regulation) were limited. Background papers, and the opening sessions of the workshop, were both designed to place certification in this context, and the selection of certification as an approach worth examining is not an endorsement over alternative or complementary approaches.

This report has been prepared by the committee as a factual summary of what occurred at the workshop. The statements made in this volume are those of the committee and do not necessarily represent positions of the workshop participants, the Roundtable, or the National Academies.

The workshop and report could not have come together without the help of many dedicated staff members. Derek Vollmer directed the project and coordinated the report. Kathleen McAllister, Jodi Bostrom, and Emi Kameyama provided invaluable support both in writing background papers and in facilitating the workshop.

This report has been reviewed in draft form by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Academies' Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards for quality and objectivity. The review comments and draft manuscript remain confidential to protect the integrity of the process.

We wish to thank the following individuals for their review of this report: Timothy Bartley, Indiana University; Lawrence Busch, Michigan State University; Anne Caldas, American National Standards Institute; Suzanne Lindsay, PetSmart; Robert Stephens, Multi-State Working Group on Environmental Performance; and Tensie Whelan, Rainforest Alliance.

Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the content of the report, nor did they see the final draft before its release. Responsibility for the final content of this report rests entirely with the authors and the institution.

Leslie Carothers (Co-chair) Harold Schmitz (Co-chair)

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Introduction

Consumption of goods and services represents a growing share of economic activity globally. In the United States, consumption accounts for more than two-thirds of gross domestic product (GDP). This trend of increasing consumption has brought with it negative consequences for the environment and human well-being. Global demand for energy, food, and all manner of goods is on the rise, putting strains on the natural and human capital required to produce them. Extractive industries and production processes are prominent causes of species endangerment (Czech et al., 2000). Modern economies, even if information driven (rather than manufacturing or production based) are underpinned by substantial energy consumption, a primary contributor to the current climate crisis. Expanding international trade has led to many economic opportunities, but has also contributed to unfair labor practices and wealth disparities. Consumption is thus an area of fundamental significance to sustainability, defined as meeting the needs of a stabilizing human population while maintaining the earth's life-support systems (NRC, 1999). While certain processes have improved or become more efficient, and certain practices have been outlawed or amended, the sheer scale of global consumption and its attendant impacts continue to be major challenges we face in the transition to sustainability. As we continue our search for tools to shift society toward a more sustainable path, it is crucial that we address the challenges posed by consumption.

There are several mechanisms currently in use as means to increase the sustainability of production processes and consumption patterns. Lebel and Lorek (2008) have identified 11 such approaches, which range from simply consuming less, to influencing industrial and consumer behavior through

complex certification systems. While all of these mechanisms are worthy of consideration, third-party certification[1] systems have emerged over the past 15 years as a tool with some promise. There has been anecdotal evidence of success, particularly in niche markets, but to date the overall impact of certified goods and services (in terms of making a particular market more sustainable) has been small. Moreover, definitions of *sustainable* vary across sectors and markets, and rigorous assessments of these programs have been few and far between. These programs are designed to be market-based interventions, and thus are not specifically designed to target certain root causes of unsustainable practices (e.g., endemic corruption or dire poverty). Still, it seems to be an area ripe for further inquiry, to uncover the potential for certification systems to influence more sustainable consumption.

In order to take a step in learning from this field of practice, the National Academies' Science and Technology for Sustainability Program held a workshop in January 2009. A committee of experts was appointed by the National Research Council to develop the workshop and write a report based on the discussions. The workshop was organized to illuminate the decision-making process of those who purchase and produce certified goods and services. It was also intended to help clarify the scope and limitations of the scientific knowledge that might contribute to the economic success of certified products. The workshop involved presentations and discussions with approximately 40 invited experts from academia, business, government, and nongovernmental organizations (NGOs) (see Appendixes A and B for agenda and list of participants).

The workshop featured a ground-clearing discussion of certification practices and panel discussions. Workshop discussions were focused on four main objectives:

- To identify strengths and weaknesses of certification as an approach to encouraging sustainable consumption
- To identify problem-driven research topics which might be taken up by academia and the analytical community
- To determine whether or not there is an opportunity for a traditional, National Research Council (NRC) consensus study to articulate guiding principles for scientifically reliable certification systems
- To highlight what is needed from the various institutional actors to foster improvement in certification systems (i.e., governments and regulatory bodies, businesses, NGOs, research organizations, public-private partnerships, and the academic community)

[1] The term "certification" will hereinafter be used to refer specifically to third-party certification programs.

This report is limited in scope to the presentations, workshop discussions, and background documents produced in preparation for the workshop. The report does not necessarily reflect the views of the committee or the participants as a group. The appendices to the report include the workshop agenda; a list of workshop participants; biographical information on the speakers, participants, organizers of the workshop; and working papers presented to workshop participants as background information.

PLACING CERTIFICATION IN CONTEXT

Certification has emerged over the past 15 years as a way to differentiate environmentally or socially preferable products from their conventional alternatives, and it now encompasses numerous complex issues, from labor and production processes to end-use considerations. However, like the diverse products and services which exist in today's marketplace, these standards and labels present consumers and buyers with a surfeit of options, which can lead to confusion, described in more detail in Chapter 5. Additionally, existing certification schemes are not always uniform, nor are they immune to competing and sometimes false claims which, at best, contribute to "green noise" and consumer fatigue, and at worst, undermine certification efforts which do contribute to environmental and social improvements. Currently, no precise set of sustainability standards exist. Instead, as this field matures and advances, there is increasing evidence from practitioners of what works and why, and where there is room for improvement. Through expert discussion, this workshop attempted to examine the vast field of certification as an approach to sustainability (Chapter 2), and in particular consider which aspects of sustainability are being certified (Chapter 3); how certification standards are developed and implemented (Chapter 4); impacts to producer communities, businesses, consumers, and the environment (Chapter 6); and future areas for potential improvement (Chapters 7 and 8).

The workshop focused specifically on third-party certification, i.e., products or services that are scrutinized by an independent body of some sort, which then confers the right to advertise and label the product as "green," "sustainable," or some other variant. The theory is that consumption of certified products can move supply chains toward sustainability, both in the specific goods or services consumed and by providing incentives to producers and sellers to change their practices. Sustainably caught seafood, green buildings, and carbon offsets for air travel provide examples of goods and services marketed in part on their claims to be more sustainable than competing alternatives. These claims may underpin premium prices, preferential market access, or new advertising campaigns. In most cases, though, these claims are tenuous and not readily transparent. The situation

hearkens back decades ago to the food industry, when health and nutrition labels proliferated as a response to increasing consumer awareness. Health claims were mostly first-party (producer) claims that were eventually regulated by law, whereas sustainability claims are currently a mix of first-, second- (customer-verified), and third-party claims.

Like nutrition labels, certification provides a voluntary supplement to the price mechanism in guiding choices. A certified product or service bears a label that claims the product has been produced in a sustainable fashion. The definition of "sustainable" practice varies widely, and consequently, certification schemes are not all considered equal. Many labels claim that their products deliver both environmental and social benefits, but in practice, schemes typically focus on one or the other. Instead, every existing scheme has both strengths and weaknesses, leading to a diverse but increasingly confusing marketplace. Within the coffee sector alone, consumers may choose from labels such as "shade-grown," "organic," "fair trade," "bird-friendly," not to mention certified brands like Rainforest Alliance's or Starbucks' CAFE practices. In most cases, these standards are now competitors and were developed in response to perceived weaknesses within other certification schemes.

Despite this wave of activity in the field, even the most prevalent of certification schemes cover less than 10 percent of the market. More important, the impact of certified production on humans and the natural world has been limited so far. Certification has been shown to be feasible from a technical and economic perspective within some markets, but tangible movement toward sustainability on the ground has been slow. These schemes do not exist in isolation either. As Chapter 2 describes more fully, certification is one among many options for influencing behavior and guiding more sustainable consumption. In some cases, certification is favored as an alternative to regulatory or other information-based approaches (e.g., industry self-reporting), but in most cases certification must co-exist with these other options. Thus its true potential may be in how it could be optimized, to maximize its leverage and strengthen its interactions with other policy tools.

CERTIFICATION AS A TOOL

Workshop participants were encouraged to view certification as a tool, or a means to an end. This concept helped frame subsequent discussions about measuring impacts and developing more effective certification schemes. Participants challenged the notion that market penetration constitutes success—as one participant put it, certification programs ought to focus on scaling up their impact, not necessarily their schemes. Therefore, certification is but one tool to aid in a market *transformation*.

To understand where certification can be judiciously applied, one must recognize its strengths and limitations and be frank about its capabilities. It is a tool that can be used to communicate certain attributes and thus influence behavior. Because it is nonregulatory, it can push the boundaries or goals of a program beyond what a government agency might be able or willing to do. This also lends to its flexibility, which in theory makes it easier for the program to adapt as stakeholders change or new information is presented. Flexibility is a double-edged sword, though—industries need to make investments to meet these shifting standards, and having too much flexibility at the lower end of the market (i.e., to accommodate weak performers) can potentially undermine the entire program.

It is also important to make the distinction between a certification system and a label. The label is a symbol indicating compliance with certain standards, and often is the last, or "customer-facing" element of a certification system. The certification system, by contrast, spans the market from producer to end consumer, involves continual interactions among these various stakeholders in the value chain, and entails numerous processes that are not easily communicated by a consumer label. So breaking this system down into its elements is helpful in identifying how a certification program could be strengthened and at which point certain stakeholders could play a role. As Chapter 3 describes, much of certification's potential may be in innovations "behind" the label, further upstream before a product or service even reaches household consumers.

This idea of innovation also suggests that certification systems will continue to improve. In some cases, such as the Leadership in Energy and Environmental Design (LEED) building standards, there is a process for continual improvement as technology and costs change. Some participants referred to this as an opportunity to "ratchet up" the field. However, several other schemes focus on conformity to specific practices, which may challenge the bottom of the market but does not necessarily drive the top. Whether certification systems reward or inhibit innovation is an open question, and likely depends on the specific form of certification and sector to which it is applied.

THE FUTURE OF CERTIFICATION

Given the growing interest in certification schemes, and the emergence of new sustainability-related markets (e.g., biofuels or carbon offsets), it appears that certification as a tool is here to stay. Its flexibility seems to be an attractive attribute, as governments, industries, interest groups, and consumers grapple with these increasingly complex environmental and social challenges. Better monitoring of these schemes may reveal where certification can be most influential. To date, there is limited evidence of

certification programs' impacts on environmental, economic, or public welfare outcomes, but further inquiry like the Committee on Sustainability Assessment's (Giovannucci and Potts, 2008) analysis of the coffee sector can be illuminating. In that regard, certification programs should be willing to fail and be forthcoming with these failures, so that the field can mature, and so that the limited resources devoted to these voluntary efforts are invested wisely and efficiently.

As several workshop participants noted, mature certification programs will likely develop closer relationships to regulatory agencies. Voluntary standards will not always evolve neatly into regulatory requirements, but as the market grows it will become increasingly necessary to cull non-compliant parties (whether through market forces or direct regulation). It is also conceivable that originating stakeholders will eventually withdraw from mature programs, in order to invest in new issue areas. Thus exit strategies, particularly among the donor community, are an important component of certification programs. As experience has shown, it can take decades for programs to reach even a small fraction of the market, and it is not clear that there are tipping points at which they might become self-sustaining.

There is also likely to be a trend toward multi-attribute certification—this could move industries to develop sustainability standards, rather than focus on single attributes (e.g., energy efficient or nontoxic) and then marketing them as "green" or "sustainable." This may also tamp down the green noise that several participants noted as undermining honest efforts and confusing consumers. In some instances, multiple certification schemes may co-exist as part of a larger initiative. Imagine, for example, a sustainable land management program, where the regional ecosystem produces certified forest products, certified biofuels or other biobased products, and carbon offsets, and incentives are tailored to encourage optimal use of the land. Certification schemes may also be used as a form of outsourcing, reducing transaction costs for individual procurers who can instead rely on a credible, third-party verification system.

Finally, there are several areas identified by workshop participants as needing further inquiry and research, to help unlock certification's potential as a tool for addressing the broader issue of consumption and sustainability (Chapter 8). As one participant noted, certification communicates that something was produced sustainably, but it does not mean that it should have been produced in the first place—participants were mindful that more research was needed on overconsumption. That being said, more research into the appropriate guideposts or endpoints for consumption in a particular sector, e.g., fisheries, could help level the playing field for voluntary programs and provide baselines for studying impacts. Existing schemes have hoped for the "pull" of consumers demanding certified sustainable

products, but this segment is limited and it appears that there is much to be gained from investigating the potential to "push" sustainable products, i.e., building demand through creative marketing. Consumers have demonstrated that they are willing to purchase more sustainable products (participants noted that in the past, "green" products were considered inferior) but this does not automatically translate in to demand. Many participants agreed that the end goal of certification schemes is to help transform markets, and so much more knowledge must be generated on how and when certification is the right tool for the job.

2

Certification's Place in the Toolbelt

Societies have promoted control of the negative impacts of resource consumption in a variety of ways influenced by tradition, political values, and the relative efficiency and practicality of using alternative tools. This chapter considers where product and process certification strategies fall in the spectrum of tools, and in particular, how such strategies compare to direct government regulation. For those inclined to analogies, certification could be thought of as a few distinct tools in one's toolbox. It can serve as a level, communicating whether or not something is on the mark, and providing some indication of the direction to move, but less guidance on how best to accomplish this. Certification can also serve as a tape measure. It helps quantify and assess certain attributes, but communities have their own standard units of measure and tend to resist a movement to unify these. Finally, considering that certification provides a way to make that first bit of progress in a field, it can be thought of as a pry bar offering leverage. It is critical in channeling efforts into opening that small gap, but it relies on additional hands to keep up the momentum.

By the same token, there are certain tools that certification is not. One workshop participant cautioned that it is not a hammer—because it is a voluntary mechanism that appeals primarily to the top performers in the market, it tends not to be effective at forcing producers and firms to comply. It is not a saw, either, because it cannot cut out the weak performers. And despite its potential benefits and spillover effects, certification is not a Swiss Army knife. It might stand in for any number of tools, but it will not stand alone in solving complex sustainability challenges. Instead, it seems

to be most effective when it is complemented by other tools, including the traditional hammer and saw of regulation.

Workshop participants identified the following tools to affect consumer behavior:

- Consumer education (general)
- Disclosure (voluntary)
- Self-certification to industry or NGO standards by producer
- Certification to standards by third party
- Accredited certification to standards by a third party
- Disclosure/labeling (government mandated)
- Government procurement standards/programs
- Market mechanisms (incentives or charges)
- Direct government regulation prescribing practices or performance

COMPARISON OF REGULATION AND CERTIFICATION TOOLS TO INFLUENCE BEHAVIOR

National and international law, where it exists, has failed to control wasteful and harmful effects of production of products and services. Certification programs have emerged as a new tool to engage market forces in promoting environmental and social sustainability objectives. These systems "can also increase transparency, accountability, public participation in decision making, legal use of natural resources, and investment in economic and human development." (Parikh, 2003)

The rise of product and process certification programs has coincided with trends toward greater reliance on voluntary and market mechanisms to improve performance. This trend reflects both a lack of confidence in the public sector's willingness or capacity to require and enforce higher standards and a belief, as some participants emphasized, that voluntary and market-based methods promote innovation, cost less, and protect free enterprise from unwarranted intrusion. In the United States., the emphasis on disclosure (e.g., Toxic Release Inventory) and market mechanisms for pollution control (e.g., acid rain controls) in the 1980s and 1990s reflect efforts to influence corporate behavior by mobilizing public pressure in the case of disclosure or facilitating least cost pollution reduction actions to meet performance goals in the case of emission trading. This trend also was a distinction from other industrialized countries' approaches, many of which favored government involvement to set industry standards (USC-OTA, 1992).

STRENGTHS AND WEAKNESSES OF GOVERNMENT REGULATION

Direct government regulation of production processes and some products is the strongest form of control of behavior. Standards are normally focused on problems of public concern, and are set within a framework of legislative policies and goals (see Box 1). The process of setting standards involves public participation. Standards are mandatory and noncompliance is subject to a variety of legal sanctions. This form of governmental action is likely to have the maximum saliency, legitimacy, and credibility (see *Standards* in the Matus paper in this volume).

However, legal tradition, as well as efficiency, have tended to limit the scope of regulation as much as preferences for voluntary or market-based tools. Environmental regulation in the United States and to a slightly lesser degree in Europe mainly focuses on control of the externalities of production, specifically the offsite impacts of polluting processes or the marketing of food, drugs, or pesticides whose consumption and use by people can cause health or safety risks. In the areas of natural resource extraction or harvesting, the U.S. government has been less likely to mandate specific methods of production unless the government acts as a property owner and not solely as a regulator.

This tradition in regulation of focusing on pollution beyond property lines and setting performance-testing rules for sensitive products like food and drugs is supported by considerations of efficiency in regulating production and, indirectly, consumption. Many participants contended that government generally lacks the information and know-how to set detailed standards for all resource extraction or agricultural and manufacturing production. Certain product constituents (mercury) or production processes (clear-cutting) can be banned by regulation, but a regulatory approach is not easily used to codify best practices or product formulas that are likely to need relatively frequent revision to remain up to date.

Finally, several participants emphasized that the process of developing or amending a regulation is cumbersome and very time consuming. Public participation and the opportunity to challenge regulatory decisions strengthen legitimacy but they can add years to the time it takes to promulgate a rule. There are few examples of rules with sufficient flexibility to adapt to advances in production practices without burdensome amendment procedures.

The international legal framework for control of products and production processes has similar features. However, international treaties are very difficult to negotiate, nation states must consent to their prescriptions, and the record of enforcement is spotty in securing compliance with environmental and social standards (Speth, 2004). As many participants remarked, certification programs represent an attempt to compensate for these weaknesses in certain areas and to raise standards beyond legal requirements in others.

BOX 1
Health and Nutrition Labels: Insights from the Past

Although certification of sustainable products is a relatively recent field, it does appear to have many traits in common with an issue with a longer history, that of health and nutrition labeling on food products. The U.S. Food and Drug Administration (FDA) first required nutrition information as part of food labeling in 1941. Beginning in the 1950s, reports emerged which informed consumers about links between diet and health, and by 1973 the FDA had taken the first steps toward establishing a U.S. framework for nutrition labeling of foods. For the most part, labeling was a voluntary effort undertaken by producers, but the framework prescribed a standard format. The one exception was for foods which contained added nutrients, or which made a specific nutrition claim—nutrition labeling was made mandatory for these types of products. By 1990, however, even given the fundamental shift that had taken place in regulatory philosophy and the advances in consumer information, the existing guidelines and framework seemed modest, incomplete, and outdated.

Criticism of food labels grew in the 1980s, as increasing scientific evidence demonstrated important linkages between dietary habits and chronic disease. Evidence also showed that Americans' diets contained excessive amounts of calories, fat, cholesterol, and sodium. This evidence led to American consumers paying more attention to food choices, and producers, manufacturers, and marketers naturally responded to this interest by tailoring their products to reflect these contemporary public health issues. Two landmark reports at the end of the decade, *The Surgeon General's Report on Nutrition and Health*, and *Diet and Health: Implications for Reducing Chronic Disease Risk*, spurred renewed efforts to reform nutrition labeling. Criticisms included concerns that the government was ignoring major segments of the food supply, was focusing on the wrong nutrients, and had tolerated claims in advertising and labeling that were confusing, deceptive economically, and potentially harmful. The U.S. Department of Health and Human Services (DHHS), motivated by a judgment that changes in eating habits can improve the health of Americans, and a conviction that food labeling can materially aid wise dietary choices, took action to improve the system of labeling.

One fundamental challenge at the time was that regulation of labels involved two different federal agencies, the U.S. Department of Agriculture (USDA) and FDA. The agencies regulated labels in very different ways—USDA required manufacturers to obtain prior approval before including any label on meat or poultry, while FDA did not have such legal authority and instead relied on providing detailed, formal regulations and informal advice to producers. The latter approach required attentive monitoring of regulations. FDA chose a numeric format over alternatives, though there is no evidence that is was informed by extensive testing of different approaches. The FDA also tended to encourage manufacturers to provide information even when it was not mandated, whereas USDA's concern was primarily with ensuring the accuracy of information that did appear on products.

Other criticisms of nutrition labeling included a failure to keep pace with current knowledge, lack of uniformity, and inadequate consumer education efforts. By 1990, an average of 12,000 new food products were being introduced annually in the United States (doubling the output from 1980), and products

were increasingly being marketed to a health-conscious public. Marketers view the principal display panel on food packages as "real estate" and thus reserved for sales promotion. Nutrition is recognized as a selling point, but marketers tended to resist government intervention which might disturb consumer perception of product value. While there have been repeated calls for better studies of consumer behavior, dietary patterns, and the influence of nutrition labeling (e.g., NRC, 2003), it has been shown that familiarity is a particularly important factor in choosing foods, and education and income levels have a significant influence on these choices as well. Moreover, increased knowledge is not a guarantor of consumers making dietary changes. Some studies even suggest that consumers often do not comprehend the terms and definitions used on nutrition labels, limiting the influence of this information to inform choices (NRC, 1990).

When the National Research Council reviewed the current state of nutrition labels in 1990, it drew conclusions and provided recommendations that led to further improvements in the system and also have parallels to the current state of environmental and sustainability labels. Among other things the committee concluded that:

- Regulating agencies themselves cannot expect to establish formal definitions for all the terms that inventive marketers are likely to adapt or invent, but should define a core set of terms for the most important components;
- Consumers will not make long-term dietary changes based on information alone, and so educational resources will be required to effect behavioral change, and;
- Public- and private-sector initiatives should be established to help consumers understand and apply information on the nutrition label.

Incidentally, the committee also made forward-looking recommendations, such as suggesting research into the effects of trans fatty acids, which have recently become regulated in many areas.

In late 1990, the Nutrition Labeling and Education Act (NLEA) was signed into law, which mandated that nutrition labels be placed on most food products and provided a nationally uniform food labeling regulatory system. It was also partly a response to the complex national and international systems for food manufacturing and merchandising, which prompted some form of national control. The food industry in fact was particularly concerned about national uniformity in food regulation, and stressed that nonuniformity had an adverse impact on costs. The NLEA provided a national framework, however, state regulation was not preempted, so long as it satisfied one of two conditions: (1) the state requirement provided an avenue for innovative regulatory approaches and testing prior to federal adoption, or (2) in the absence of federal leadership, a state finds it necessary to regulate in the name of consumer protection.

Nutrition labels have continued to evolve since the 1990s, and subsequent efforts to improve the system have included updating standards as the science improves, providing information in terms of percentages of daily values or recommended allowances, and perhaps most significantly, an increasing emphasis on understanding consumer behavior and improving consumer education.

ROLE OF CERTIFICATION STRATEGIES

The virtue of certification programs compared to direct government regulation is that nongovernmental organizations and major producers undertake the task of developing standards and communicating the benefits of buying certified products to purchasers. This is likely to result in a set of requirements based on best-producer practices or a tiered set of standards that should be easier to revise as the state of the art advances. The standards are enforced through supply chain relationships in broad markets, and are not subject to the geographic limitations of national standards.

Cashore and colleagues (2004) define certification schemes as implementing "nonstate market driven" standards characterized as "hard law" because the market provides compliance incentives even though participation in certification of products and services is voluntary. How exactly does this market work?

There was extensive discussion at the workshop of the motivations for companies selling products or services to participate in certification programs. In some cases, participation is believed to have increased revenues (e.g., Chiquita and bananas, as one participant noted). But many significant systems, such as forestry and marine fish certification, do not offer an advantage in selling to the ultimate consumer likely to command a price premium. When the wood or fish product is not inherently better than wood or fish cut or caught in an unsustainable manner, the number of customers willing to pay more for sustainable production or services solely on ethical grounds is small.

The "market demand" in these systems has mainly been the pressure from nongovernmental organizations applied to large corporate producers and purchasers in the supply chain. These entities are businesses who sign on to certification programs and their environmental or social objectives to secure economic advantage but also to demonstrate corporate social responsibility, burnish their reputation or brand, and possibly get ahead of the regulatory curve. Some contend that businesses tend to support certification in areas where government regulations are most prescriptive and the certification rules are an incremental improvement over requirement practices (see *Dimensions and Sectors Being Certified* in this volume).

Since the commitment is voluntary and often is not rewarded by economic benefits or a clear competitive advantage, it is questionable whether the market forces are strong enough to classify many of the current programs as "hard law[1]." If, however, the reputational benefits are perceived as

[1] "Hard law" in this case is referring to "coercive" action within the private sector, based on the authority of the marketplace.

valuable, it may not be easy for a "volunteer" participant in a certification to discontinue participation. Some participants remarked that it would be useful to know the extent to which producers and purchasers believe they are able to end their participation. If in fact, most of them stay the course even where financial economic benefits are not forthcoming, there would seem to be some basis for considering these systems to be comparable to hard law.

Certification programs offer "salience, legitimacy, and credibility" through the choice of the environmental and social goals they want to achieve, the methods of involving stakeholders in setting goals and standards, the scientific and policy content of the standards, and the methods of verifying compliance. The quality and rigor of these goals and processes varies among programs. The test is whether the certification process is "able to relate otherwise unknown information to the consumers, in order to influence their purchasing decisions and create a market for the labeled products." (See *Labeling* in Matus in this volume).

OTHER POINTS OF COMPARISON

Regulatory and certification systems are likely to differ in terms of clarity of goals and measures of effectiveness. Governmental goal setting and metrics are often weak, to be sure; but most binding regulations are based on legislation that defines at least broad goals. Implementing agencies are generally the source of whatever metrics and monitoring processes are adopted.

There was a high degree of agreement that defining goals and measures of success is often difficult for certification programs. Workshop participants noted that some data on market penetration of certified products like coffee or wood are available (Ellis and Keane, 2008). The larger problem is measuring the environmental or social benefits that are the target of these programs. It was noted that in the natural resource conservation area, measuring effectiveness is especially difficult; for example, fish potentially conserved by marine certification standards are hard to count. Many expressed the opinion that defining scientifically sound and persuasive measures of biodiversity protection was an important need for many certification programs.

Considerations in defining the scope of coverage of regulatory and certification systems also differ. Government regulations often attempt to control the behavior of larger producers of natural resources or pollution because their impact is most significant, and the burden of identifying, monitoring, and enforcing against small entities is disproportionate to the benefits. (The exceptions are where small entities may be substantial sources of toxic pollutants, such as uncontrolled metal finishing opera-

tions. Many in this category do not survive as producers after regulations are imposed.)

In the case of regulation, most firms or sources are happy not to be covered on the basis of their size. This may well not be the case for small producers of coffee or other certified materials who may risk being shut out of important markets if they cannot afford the transaction and compliance costs of becoming certified. The choices then are to assume that small producers, especially in developing countries, will not be disadvantaged because they have other markets, or to press the certification program or governmental agencies to provide subsidies and undertake capacity building to enable them to participate. Some stressed that smaller, local participants might be enlisted to help as monitors of the program.

The challenges of building and funding a certification program for a period long enough to see results are greater than they are for government. While regulatory programs must compete for authority and resources in a political process and environmental regulation and especially enforcement often rank low on the scale of priorities, there is nevertheless a set of institutions and processes, in place to frame and fund their activity. Certification programs are generally funded by philanthropy (foundations), by large companies who participate, and by fees for certification from participants. Some workshop participants saw the need to seek ways to share good practices and develop cooperation among the various programs. The growing number of certification programs is itself a challenge in crowding the field of programs in search of funds.

TRANSITIONS FROM VOLUNTARY CERTIFICATION TO GOVERNMENT PROCUREMENT OR REGULATION

In some cases, the government administers public programs akin to certification like EPA's Energy Star program. It provides efficiency ratings based on published criteria for various kinds of products. The government also has the authority to prescribe minimum energy efficiency standards for many products, so the disclosure and labeling program in this case is an adjunct to a regulatory program.

The success of government certification of products and services may be determined by complexity and market demand. This point was illustrated at the workshop by the experience of California in developing a program to certify innovative environmental technologies. The intent was to provide a governmental validation that would aid the deployment of innovations, perhaps reducing hurdles in permitting. In practice, the evaluation process turned out to be complex and involved differing judgments on technologies, resulting in lengthy and costly certifications. Interest in certified environ-

mental technologies by potential adopters was less than anticipated. The program was ultimately discontinued.

More common are the links between independent certification organizations and programs and governments. Workshop participants pointed out that governmental staff may participate in certification standard setting as advisors or observers or may use certification standards in procurement of goods and services. The U.S. government's reference to the LEED standards of the Green Building Council is a well known example of incorporating certification standards into purchasing decisions. Depending on budgetary impacts or the sensitivity of product selection based on environmental or social criteria, these procurement policies may or may not require legislative sanction. Since the U.S. government is the largest purchaser in the United States, and states and localities may also adopt these policies, procurement preferences can provide powerful leverage to the spread of compliance with privately sponsored certification standards.

In several situations, a certification program or programs can evolve into a governmental program established by rule. These cases include proliferation of standards leading to public confusion in an area of growing public concern as in the shift to governmental standards for organically grown food. Another is governmental decisions to control or prohibit practices considered unacceptably "brown" and needing to be proscribed for a larger group of producers than are covered by voluntary certification standards. A third is where information produced voluntarily through a certification or other optional program is no longer considered sufficient to support regulatory decisions, as in the case of greenhouse gas inventories established by NGO and industry groups. These are now being supplanted by a mandatory greenhouse gas registry. In all of these cases, the work of organizations involved in certification of practices or information disclosure protocols aids the development of regulations and speeds the achievement of public benefits. As later chapters explore, certification programs may need to evolve to have a closer relationship to governments and public regulatory programs, where each plays a complementary role in developing standards, rewarding compliant parties and eliminating noncompliant parties through regulation.

3

The Landscape of Certification Schemes

The field of certification programs, sustainability standards, and ecolabels has grown substantially since the early 1990s, and it now encompasses several complex and often interrelated issues ranging from labor and production processes to end-use impacts and recycling considerations. New terms have entered the lexicon, such as "fair trade," "product take-back," and "smart packaging," while other terms, e.g., "environmentally friendly" have started to play a more prominent role in marketing campaigns. Certification is an effort to communicate information to purchasers (including business-to-business transactions), and though it is a useful tool in highlighting potentially desirable but unseen attributes, it has also contributed to green noise and confusion in the marketplace. As certain standards gain market share, it is not clear whether they are contributing to a market transformation, or certifying a small parallel universe at the top of the market. This chapter highlights some of the key issues participants raised in regards to the emergence of certification schemes, specifically, the recent proliferation of standards, the uneven application across and within sectors of the economy, the experience of leading programs, and some of the impacts and unintended consequences of these programs.

PROLIFERATION OF STANDARDS

Certification standards and the labels they underpin are a response to consumer expectations about products. Therefore it is no surprise that an increase in social and environmental awareness on the part of consumers has led to this concomitant increase in efforts to communicate socially and

environmentally preferable attributes. All of this activity in the marketplace is sometimes mistaken for consumer demand, but as Chapter 5 explores further, the demand for certified sustainable products is not nearly as concrete or pervasive as some might think. Instead, the rise of certification can be traced to the efforts of NGOs, industries, and sometimes governments, to develop voluntary, market-based mechanisms that help reduce adverse social or environmental impacts.

The donor community has invested hundreds of millions of dollars to establish and support certification programs around the world. This has been a critical factor in establishing many certification programs, but it also points to some vulnerability in these programs. There tends to be a prejudice within the donor community towards innovation, and thus certification programs represented the "cutting edge" a decade or so ago. Donors, including philanthropic foundations and large NGOs like the Rainforest Alliance and WWF, have continued to support these programs and fund new programs in other sectors. However, several participants questioned the staying power of the donor community if programs take decades to achieve tangible impacts. Other participants emphasized that in almost all cases, the roles for government and the private sector have not been well defined. In other words, the process has been initiated by NGOs without fully considering how government and industry could help scale up impacts.

Several participants described the resultant field of certified products as a cluttered landscape. Given the apparent success of some certification programs in terms of penetrating the global market, certification is now a tool that is being considered in more and more industries. However, producers do not always know where to begin when searching for a credible scheme, or when seeking to establish one in industries not currently certified. The International Social and Environmental Accreditation and Labelling (ISEAL) Alliance is one body that has emerged as a "hub" for different standards systems. It was established in 1999 as a way for certification organizations to collaborate across systems, recognizing the high degree of overlap and complementarity among their individual efforts.

Despite this degree of overlap, the field is still highly variable, and there are substantial differences across certain sectors (e.g., fisheries as compared to electronics) and within sectors, particularly as competing standards develop. Many participants noted that the energy being devoted to establishing new and competing standards systems could be more effectively applied to enhancing the impact of existing programs, or taking a broader, industry-wide approach. In some sectors there does appear to be convergence—the Common Code for the Coffee Community (4C) was cited as one example where stakeholders throughout the coffee value chain have been working together to raise the bar throughout the industry, rather than con-

tinue supporting and marketing competing standards. This does not suggest that each industry ought to promote one particular set of standards, or, as one participant proposed, market one label that could be applied across industries. It does, though, highlight the desire for overarching principles, or basic rules of the game, to help establish the baselines for standards systems and separate the wheat from the chaff.

SECTORAL COVERAGE

Certification of sustainable products has emerged sector by sector, often as a response to conditions within a segment of an industry, rather than some collective movement or demand for certified goods. The Forest Stewardship Council (FSC) came about after other approaches to improving environmental management failed. Boycotts on forestry had proven unsuccessful because they did not distinguish between responsible and irresponsible producers. NGOs then attempted to negotiate a set of sustainability standards that the International Tropical Timber Organization could adopt and enforce, but this also faltered (see Box 2). Thus the FSC was created as a private initiative to implement the voluntary standards that had been created.

The market penetration of certified products remains small, with few exceptions. There are examples, such as the Underwriters Laboratory[1] label for electrical appliances or prescription pharmaceuticals, where certification has achieved essentially universal acceptance in the United States. The harmful material consequences of purchasing uncertified products in those cases fall directly on purchasers, however, unlike products claiming benefits to the environment, human rights, or future generations. It is this claim of unseen benefits that a certification system attempts to convey. The business case for certifying products as sustainable is important, because a firm's engagement in private, voluntary programs is strategic.

As a result, certification has enjoyed the most success in sectors with large-volume producers and large-scale purchasers. These large-volume producers have tended to be in vertically integrated primary industries, like forestry or commoditized agriculture, sectors vulnerable to public pressure, with firms that are able to bear additional costs to certify their products. More recently, standards and certification systems have been developed for a host of manufactured goods and services. This may be influenced by retailers, who are constantly assessing risk on consumables. Incidences of contamination and other events have caused many retailers to be more proactive in addressing supply chain risks, and moving upstream to work

[1] UL has established UL Environment (*http://www.ulenvironment.com/ulenvironment/eng/pages*) as a source specifically for validating environmental claims.

BOX 2
Sustainable Forestry Certification

The forest sector has arguably developed the most extensive certification schemes, nationally and globally. This has occurred, in part, because of the engaged efforts of many governments, nongovernmental organizations (NGOs), and forest industry representatives over the past 15 years. Forest certification schemes are implemented in order to achieve a variety of goals such as preventing deforestation, forest degradation, and the maintenance of biodiversity. Additionally forest certification efforts attempt to guide the forest sector toward a more holistic concept of sustainable forest management (SFM), with emphasis on the analysis of global environmental, economic and social implications of management practices (Rametsteiner and Simula, 2003). Over time, one program, the Forest Stewardship Council (FSC), has emerged as the most well-documented sustainability certification program.

Though the FSC is the often-cited industry leader, many other forestry certification efforts exist worldwide. Some worth noting include The Canadian Standards Association (CSA), the American Forest and Paper Association's Sustainable Forestry Initiative (SFI), the African Timber Organization (ATO) and the Program for the Endorsement of Forest Certification Schemes (PEFC, formerly the Pan European Forest Certification). Additionally, countries such as Malaysia (FSC member, but not endorsed) and Indonesia (in accordance with PEFC criteria) have attempted to adopt their own certification standards.

After observing the reluctance of the International Tropical Timber Organization (ITTO) to adopt sustainable certification and labeling standards, the World Wildlife Fund (WWF), along with a host of other environmental NGOs, began to develop a private initiative to adopt standards, rather than general principles or guidelines for SFM. This ultimately let to the creation of the Forest Stewardship Council (FSC) in 1993. Not only did the WWF and environmental NGOs take part in the creation/development of the FSC, but additional stakeholders were involved, including representatives of the timber industry, indigenous peoples' groups, organizations representing forest workers, etc. (Auld et al., 2008b).

with their suppliers. Retailers also have the leverage to push back on their suppliers and demand that products be certified as a means of reducing their exposure. So consumers' desire to "go green" could be a short-term preference, but firms are also considering the longer-term eventualities, from labor protests to greenhouse gas regulation.

Participants were quick to point out, though, that even in sectors where certification is achieving a tangible market share, it does not indicate that the market is transforming, or that it is approaching a tipping point. Instead, existing programs tend to benchmark the best practices for a sector without penalizing the worst performers. Top performers may find an incentive to pursue certification to differentiate their product from less sustainable competitors. But rather than changing the market by crowding

The FSC comprises three "chambers," each of which represents one-third of the generally assembly—which is charged with approving and recommending changes on various forest certification standards, both at the national and subnational level. The three chambers, economic, social, and environmental, represent stakeholders from developed and developing countries and a variety of sectors. The FSC uses global criteria which includes 10 principles and 56 criteria. These criteria/principles relate to a various SFM issues, including land-use rights, protecting high conservation value forests (HCVFs), and the use of forest products and services. Because global standards may not adequately meet each country/state's needs to sustainably manage forest land, the FSC approves national and local forest certification schemes so long as they adhere to the general principles of the FSC's global certification scheme (Auld et al., 2008b).

Sustainable Forest Management (SFM) schemes, such as the FSC criteria and principles, attempt to bring together various interests among stakeholders. Stakeholders' values often diverge, especially within the forestry sector, where interests can derive from very different sides of the SFM equation. For example, environmental NGOs may be interested in biodiversity/conservation of forests, while timber companies may be interested in achieving high profits from the sale of forest products.

Stakeholders also differ based on cultural and geographic differences. The SFM of tropical rain forests in Brazil differs greatly from sustainable management practices within the boreal forests in Russia (Rametsteiner and Simula, 2003). The challenge for certification schemes and organizations like the FSC is marrying very different, and sometimes oppositional, stakeholder interests. Incorporating social, environmental, and economic principles into the design of certification schemes is crucial to bringing various stakeholders together in agreement on implementing the most sustainable forest management practices.

out noncompliant parties, these standards systems may instead be creating a "parallel universe," whereby the top performers continue to raise the bar for only a small segment of producers. This does not diminish the importance of those improvements, but it calls into question whether or not certification alone can transform entire markets.

LEADING AND EMERGING STANDARDS

Though the landscape of certified products is crowded, and environmental claims abound, there are but a handful of certification programs that have emerged as industry leaders. The FSC is perhaps the best documented, as it has been in existence for over 15 years and now claims to

certify a tangible share of the market for certain products, e.g., 24 percent of industrial roundwood. However, most FSC coverage has been in the United States (32 percent) and Europe (52 percent), with a much smaller share being covered in tropical forests in the developing world (Ellis and Keane, 2008). This seems to suggest that FSC has served as a benchmark for industry leaders in the temperate forests of the developed world.

Nonetheless, the FSC offers a model to its competitors in the forestry sector, and to other sectors. Most notably, the Marine Stewardship Council (MSC) was based on the FSC model as a way to certify sustainable fisheries management. Like its predecessor, though, the MSC has been criticized for exhibiting uneven geographical coverage (e.g., 89 percent of MSC-certified exports contain Alaskan salmon or New Zealand hoki [Ellis and Keane, 2008]). Chapter 4 discusses how the implementation of these sorts of standards systems has not had the desired effect of dramatically changing practices in many parts of the world.

The International Organization for Standardization (ISO) 14000 series is another set of well-known environmental management standards. It is not a market-driven tool in the way that other certification programs are, because firms can determine their own baselines for performance, and then implement an environmental management system to reduce their environmental footprint. An external audit is conducted by an accredited body, and compliant firms receive a certificate. Products and processes themselves are not certified, nor is there typically consumer demand for ISO certification, but participants noted that ISO-14000 is becoming a necessary part of doing business in many sectors worldwide.

Additionally, larger firms are establishing their own, internal certification programs which are distinct from third-party programs. Examples include GE's Ecomagination and S.C. Johnson's Greenlist. Such programs are often accompanied by a marketing campaign, though they are not necessarily developed in response to consumer demand. Because these internally developed schemes are not transparent, it is difficult to assess their impacts. Large retailers, who deal with a bevy of products sourced from all over the world, are now developing their own "scorecards" in an attempt to put pressure on their supply chains. These scorecards may make use of existing certification standards, such as requiring all seafood products be MSC-certified, or they may be based entirely on a retailer's preferences. It should be noted, however, that a product-by-product certification approach would not necessarily indicate that a retailer's sourcing practices overall are sustainable.

IMPACTS AND UNINTENDED CONSEQUENCES

Unintended consequences of certification programs have been both positive and negative. On the positive side, participants mentioned that

there is anecdotal evidence that having the bar raised in a sector motivates other actors, even if they do not pursue certification as a means to improve their performance. It will not guarantee that all actors improve their performance, or that these changes amount to measureable social or environmental outcomes. It can, however, provide a bit of leverage and then momentum, as was the case of 4C in the coffee industry (Keunkel et al., 2009; NRC, 2009). LEED's standard for green buildings has been a contributing factor in developers giving more consideration to building performance. Several participants highlighted LEED as an example where developers saw incentives in building green and were taking steps to build green, even if they opted to avoid the additional expense of being formally certified.

However, participants also remarked that many certification programs are based on weak theories of change—the logic models that are used to design and evaluate long-term programs. When developing certification programs, stakeholders must make some critical assumptions about the outputs and impacts of a standard, if implemented, and the outcomes that would be achieved over the long term. Chief among these assumptions is the size and shape of the market for certified products. Programs have focused on delivering certified sustainable products to the market, with considerably less consideration of who the targeted consumers might be, how added costs might be distributed, and how this emerging market might grow. Household consumers, as one participant pointed out, do not get to internalize the benefits of buying green because many of the benefits accrue to a distant ecosystem or the global commons. Therefore they are merely being economically rational by not doing so.

Programs are also criticized for not using a wide enough lens when considering the problem they are intended to address. They tend to overlook cumulative effects of a certification program, because they are product or producer oriented. Such a temporal and spatial scale misses the longer-term and ecosystem-wide effects. This has been a fundamental challenge for these programs to measure their impacts. At best, most programs are focused on obtaining an increasing share of the market. Several participants pointed out that this may be used as a proxy for environmental and social improvements, but without more work to connect these programs to measureable, on-the-ground changes, market share alone is an imperfect metric.

Certification also does not provide guidance on the appropriateness or need for a product in the first place. The relevant debate in fisheries, for example, is in how countries can sustainably manage their resources to avoid overexploitation. This does not suggest that certification programs should be designed to address every problem associated with consumption, but it does highlight the need for these programs to be linked to other, macro-scale efforts, such as sustainable land-use policies or recycling cam-

paigns. Moreover, certification programs typically do not have exit strategies. As Chapter 7 explores further, this has serious ramifications because most programs are heavily dependent on subsidies, and are expected to eventually be able to scale up to cover global markets.

One additional consequence of certification programs is that they tend to, unwittingly, favor developed countries. From a consumer's perspective, this might not be surprising, since certification seems to be favored by societies with a high degree of consumer awareness and ecological sensitivity. However, from a production standpoint, new standards have also been perceived in the developing world as yet another barrier to international markets. In the developing world, many livelihoods are dependent upon some degree of exploitation of a local resource. This complicates efforts to reduce exploitation, because it is perceived as being in direct conflict with sustaining livelihoods. Certification programs then face a conundrum—requirements cannot be so high as to put potential supporters at a disadvantage, but so low as to allow everyone to easily achieve and thus diminish the authority of the standard.

4

Standard Development and Implementation

Within any certification program, much effort is devoted to developing and then agreeing upon the standards. These standards become the rules of the game, and they are important because certification is a voluntary process—entities determine that it is in their best interest to participate, to access a market, secure long-term contracts, or exercise a competitive advantage. However, standard setting is not routinely a transparent or inclusive process. As such, some programs are criticized for being exclusive or discriminatory—at the same time, more flexible programs are criticized as being "watered down" or so permissive that they lose credibility. Some of the key issues workshop participants identified when considering standard development are stakeholder engagement, flexibility and credibility of the standards, implementation obstacles, and compliance costs. Other issues, such as third-party audits, were not discussed in detail but were acknowledged as being important parts of a credible process.

STAKEHOLDER ENGAGEMENT

The way that many certification programs have developed is analogous to creating a new game, albeit based on and adapted from existing rules. Imagine a group deliberating for many hours about a game called "Save the World," and then inviting the entire neighborhood to play. They would like everyone to join in, but there are a few complications. First, several of the others in the neighborhood are frustrated that they were not initially invited to help decide on the rules. So they go off to invent their own game. Second, the game requires equipment that only some people have—the rest

are forced to figure out how they might afford to play. Third, the rules are rather complex, and so for those who have played a similar game before it is not a problem, but many others are left to try and learn as they go, even though the rulebook is thin and not always accessible. Inevitably, there is cheating which undermines the game. Finally, and perhaps most frustratingly, the originating group intends to start playing this game in *everyone's* yard throughout the neighborhood. The game will not realize its full potential if confined to a single backyard, but they understandably meet resistance, confusion, and frustration as they have to go from backyard to backyard trying to teach the game. Some neighbors are asked to stop playing older games, others are eventually crowded out of their own yards as the new game takes hold.

This illustrates, in a nutshell, the key criticisms of existing certification programs, including the claim that standards tend to be set without substantial input from diverse stakeholders. Conversely, involving a broad range of stakeholders often means pitting contentious viewpoints against one another—for voluntary mechanisms this can mean resorting to less-stringent consensus-based goals. Many participants emphasized that certification networks are driven by politics and power—scientific knowledge has a place, but it is not the key driver. Instead, standard setting is often a political process that at best is *informed* by science.[1] Additionally, certification programs do not always transfer well across different climatic zones or ecosystems. Singapore established its own green building program, Green Mark, in part because it considered the LEED standard inappropriate for tropical climates.

Certification has traditionally been viewed as an exclusionary process. Programs may be considered "global" but must be implemented and adopted locally. This is problematic for several reasons, chief among them is that such meta-standards do not adequately reflect local needs or goals. One participant remarked that, especially for the developing world, a certification program must demonstrate that environmental concerns are not trumping social concerns. Even certification programs that focus on social concerns, such as reducing child labor, need to answer to the criticism that the approach is not simply being imposed from afar, or that local entities are incapable of sustainably managing their own resources and production practices.

Most participants agreed that a multistakeholder, collaborative approach to third-party certification may be the most effective way to identify sus-

[1] The term "science" was not explicitly defined during the workshop, and so participants likely had different perceptions of what the term encompassed. For the purposes of this report, science, unless otherwise noted, refers to a systematic knowledge base that includes the natural, social, and applied sciences.

tainable outcomes for certification programs. Practically, this might mean an increasing reliance on public-private partnerships. To that end, there is likely much to be gained from a better understanding of partnerships. One of the key lessons from existing multistakeholder partnerships is that engaging the right stakeholders at the outset is critical to long-term success (NRC, 2009). Failing to do so has resulted in programs that mischaracterize the problem to be addressed, are vulnerable to competing efforts, and have difficulty scaling up. There are existing forums to hold these sorts of multistakeholder discussions. The American National Standards Institute (ANSI) hosts multistakeholder policy and position-related workshops and panels (e.g., a 2009 workshop *Toward Product Standards for Sustainability*) that are not intended to result in specific standards, but are held to facilitate dialogs on issues of national importance and to potentially develop related recommendations.

FLEXIBILITY AND CREDIBILITY

There appears to be a disconnect between, on the one hand, the desire for credible standards that can be grounded in scientific knowledge, and on the other hand, flexibility within the standards system, to allow for some local interpretation, regional differentiation, or learning curves. One participant pointed out that having consensus-based standards (e.g., where all stakeholders must agree on the terms) may sound appealing, and may be viewed as politically legitimate, but that science is based on evidence, not on consensus. It is both a body of knowledge, and a process, and in that regard it must also be recognized as being dynamic. Several participants suggested that certification systems could benefit from following scientific principles, such as having empirically verifiable results, and a peer-review process.

Most systems allow for slight variations based on regional conditions (e.g., the FSC differentiates between the Pacific northwest and the northeastern United States) but the more dramatic variation may be between prescriptive standards and systems-based standards. In the latter, the emphasis is on fostering continual improvement within a company's or producer's management system, but the baselines and goals are typically defined by the user. While there was disagreement on the proper role for science in setting voluntary standards, it seems that taking a scientific approach, i.e., adopting a rigorous (peer-reviewed) process informed by science and agreed-upon guide posts, could be the most effective way to encourage and verify meaningful progress. As one participant put it, "we need a common yardstick, not necessarily just a height requirement."

Several participants remarked that science can be useful in setting the "gold" standard, or an aspirational standard to certify top performers. However, participants also pointed out a number of trade-offs between a

program designed to cherry pick from the top, and a program designed to improve performance at the bottom. Stringent, prescriptive standards can be a useful tool to benchmark the most sustainable products or practices. But within a certification system, there is no mechanism to eliminate the worst performers. As a result, existing standard systems appear to be contributing to a market differentiation, but not exactly a transformation. Market forces alone do not seem to be capable of compelling noncompliant producers to change practices or leave the marketplace.

As one participant put it, the strengths of certification as a tool are also its weaknesses. A reliance on science-based standards might make the system mobile (e.g., to govern fisheries in New Zealand or Namibia) but inflexible (the principles are established without much local input). Schemes are generally product based so that they can influence markets, but from an ecological standpoint, this is not desirable—several participants noted the body of literature on natural resource governance and community-based management. Another participant pointed out that, in the textiles and carpet industry, it has been crucial that science underpins many of the environmental standards developed, so that compliance can be verified and so that firms' investments in upgrading their practices do indeed contribute to environmental improvements. Others suggested that discussions of standards ought to begin with "what does the evidence tell us about . . ." but this is rarely the case since these processes are political. Still others noted that standards are not static, and should evolve as the science improves, and as the notion of "innovative" changes over time. Conversely, some standards systems may become lax over time to incorporate more of the market, but this causes problems from a consumer confidence perspective.

Credibility means different things to different stakeholders, with regards to certification standards and programs. Some of the general themes include:

- Is the label meaningful? What value differentiation is a business attempting to communicate with a particular label?
- Is the label consistent? Does it mean different things if applied to different products, and if so, are there appropriate disclaimers?
- Is the label verified? There may be disagreements on the role of a "third party" (i.e., independently creating the standard vs. certifying and auditing a multistakeholder standard) but in general, credibility will depend on having a neutral body verify the process before awarding a certification.

A few participants remarked that the most credible schemes and labels are the ones which are developed and certified by independent bodies. As some participants noted, if the private sector is the primary stakeholder

group, develops its own standards, or serves as the primary verification body, then a standards system will have a credibility problem. However, many participants countered that broad stakeholder engagement is crucial to the success of certification programs. Though this invites inquiry into potential conflicts of interest, many schemes have developed structures to guard against this, such as the FSC's three chamber governance which separates economic, environmental, and social interests with the intention that no single interest dominates the process.

There is also an important question of who determines what is "credible." Standards are thought to be grounded in science, but there are few provisions for local people to conduct monitoring and evaluation. MSC may be the most credible existing system for certifying fisheries, but it does not address social concerns (see Box 3), and it is difficult to achieve sustainable management systems if these concerns are not taken into account. Within the United States, ANSI plays a leading role in facilitating the development of voluntary consensus standards and conformity assessments. ANSI creates a venue where all stakeholders may participate when discussing standard development. It routinely audits programs to strengthen the integrity of the programs and their associated deliverables. It is also asked to conduct peer evaluations, such as its review of USDA's compliance with international requirements during implementation of the National Organic Program. ANSI is a process organization, not a technical organization—it accredits certifiers of products and systems—it does not get involved in evaluating the technical content of or establishing leadership standards. The National Institute of Standards and Technology (NIST) focuses more on working with industry on innovation and raising the bar for performance. Instead, ANSI's focus has been on uniformity within the United States, not a differentiation, suggesting that it can play an important role in supporting a uniform sustainability standard, but not a differentiated standard. To that end, ANSI has facilitated national conversations on product sustainability standards and legal issues with ecolabeling. Participants did point out that certified standard setters might be using their ANSI accreditation (awarded on a case by case basis) to enhance their credibility, and that this might deserve more scrutiny. In other cases, organizations may characterize their program as being "accredited" even though the accreditor is not a globally recognized or independent body.

It seems imperative that green noise be reduced, to sharpen the top and eliminate nonsense background noise which confuses consumers and undermines honest efforts. Most participants suggested a need for fewer claims, and more standards upon which claims can be credibly based. In many respects, the current situation resembles the state of health and nutrition claims for foods in the 1980s, where so-called healthwashing led to food labeling and regulation. Claims in this segment of the industry are closely

BOX 3
Marine Stewardship Council and Sustainable Fisheries

History and Mission

The Marine Stewardship Council (MSC) was created in 1997 as a result of two global organizations, the World Wildlife Fund and Unilever, wanting to tackle the issue of seafood sustainability. Together they founded MSC to:

- Recognize and reward good fishery management
- Work with fishery and commercial partners to build a market for sustainable seafood
- Provide an easy way for buyers and consumers to identify sustainably caught seafood

MSC's mission is to use the ecolabel and fishery certification program to contribute to the health of the world's oceans by recognizing and rewarding sustainable fishing practices, influencing the choices people make when buying seafood, and working with partners to transform the seafood market to a sustainable basis. To this end, it is collaborating with fishermen, retailers, processors, consumers, and others to popularize its program.

Additionally, MSC's certification program adheres to the following environmental principles for sustainable fishing:

- A fishery must be conducted in a manner that does not lead to overfishing or depletion of the exploited populations and, for those populations that are depleted, the fishery must be conducted in a manner that demonstrably leads to their recovery.
- Fishing operations should allow for the maintenance of the structure, productivity, function, and diversity of the ecosystem (including habitat and associated dependent and ecologically related species) on which the fishery depends.
- The fishery is subject to an effective management system that respects local, national, and international laws and standards and incorporates institutional and operational frameworks that require use of the resource to be responsible and sustainable.

Stakeholders

MSC's stakeholders include fisheries, retailers, brand manufactures, foodservice providers, restaurants, other businesses, and the consumer. Currently, there are 30 certified fisheries in the MSC program. During the 2007/2008 year, approximately 59 retailers, 40 food service providers, and 550 business-to-business providers took part in the MSC program. Additionally, nearly 100 manufacturers' brands were part of the program as well. Unfortunately, no consumer involvement numbers could be found.

Other nonprofit organizations' opinion of MSC is varied. For example, the Marine Conservation Society has stated that they agree with most of MSC's practices but have concerns with how some of the fisheries have been certified. Greenpeace remarked that MSC has done a good job consulting industry but has to work on its involvement with the environmental sector.

Competitors and Parallel Certification Efforts

MSC appears to have no fisheries certification competitors. There is some competition with consumer education regarding seafood watch lists, which

advise consumers on what is sustainably best, acceptable, and worst to eat. The Monterey Bay Aquarium, the Blue Ocean Institute, the Marine Conservation Society, and the Environmental Defense Fund (and possibly others) publish online and "pocket" seafood and sushi watch lists; while MSC's guides are less consumer-friendly and only online. Additionally, some organizations coordinate with MSC for various reasons. One example is the World Wildlife Fund, which provides sustainable seafood and MSC information on its web site to share outreach and education efforts.

Market Share and Impact

The number of fisheries taking part in the MSC certification program has increased 4 times over since 2004, and each year, more fisheries express interest in getting certified. (Currently, 72 fisheries are in "full assessment," and 20-30 others are in "pre-assessment.") At the end of 2007, MSC-certified fisheries were catching more than 4 million tons of seafood or approximately 7 percent of the world's edible marine fish catch.

Globally, MSC-certified product availability is increasing. For example, the number of products (currently 217) available in the United States grew 101 percent from 2006/2007 to 2007/2008. The North American supply chain (including the United States and Canada) is extensive, with more than 150 companies meeting the MSC Chain of Custody for seafood traceability, which ensures the MSC label is only displayed on seafood from a MSC-certified sustainable fishery that meets the MSC environmental principles for sustainable fishing. In 2007/2008, the global retail value of MSC-labeled seafood was close to US$1 billion. This marks an increase on the previous year's figure of nearly 100 percent.

MSC feels that their certification program brings a range of potential benefits to stakeholders in the supply chain, including the following examples:

- Fisheries—Secure contracts, access to new markets, potential price premiums, good reputation, improved relationships, economic stability, and confidence in the future.
- Retail and brands—Customer loyalty, enhanced brand, improved corporate reputation, promotional opportunities, staff training, and new product development.
- Food service and restaurants—Assurance of provenance, communications opportunity, customer and staff loyalty, enhanced reputation, and evidence of sustainable sourcing.
- Supply chain—Unique selling point, preferred supplier status, improved traceability, new contracts, and stable supplies.
- Consumer—Knowledge that purchase is sustainable, advocacy for a cause, and opportunity to influence businesses' purchasing.

Overall, consumer familiarity with MSC and MSC-certified seafood seems limited. MSC has done a good job consulting industry and working with fisheries, but consumer knowledge and participation are generally minimal. It seems that this is a key area of growth necessary for MSC to be truly successful. However, MSC has involved large, well-known retailers, such as Costco, Kroger, Safeway, Sam's Club, Target, Wal-Mart, and Whole Foods, and this is likely to increase consumer awareness in the future.

regulated now, though several participants pointed out that the increase of credible information did not necessarily lead to healthier behavior (or people) overall.

The U.S. Federal Trade Commission (FTC) now examines certain claims, such as "renewable" and "sustainable." Other leading claims that are currently adding to consumer confusion include "natural," "carbon-neutral," "nontoxic," and "environmentally safe." The FTC encourages claims that are verifiable and enforceable, and to that end, it publishes "Green Guides," FTC-approved guidelines which offer a safe harbor for companies to reduce their liability. When a company is found to be noncompliant, it may be subject to fines or injunctive relief (e.g., taking its products off the market). Noncompliance claims are mostly brought by industry competitors, or by states on behalf of their citizens. One participant noted that the number of registered complaints against environmental labels is low, but it is unclear why this is the case.

IMPLEMENTATION CHALLENGES

Certification programs, like many innovations, have run into the most challenges during the implementation phase. As several participants noted, existing schemes either underestimate or do not understand the complexity of the issue before they jump into it. As a result, resources are devoted to creating the standards, but there is insufficient attention to the acceptance, adoption, and implementation of these standards. It is important to recognize that standard *systems* are what should be credible.

Implementation will be slow, and this may be a difficult proposition for stakeholders eager to demonstrate short-term impacts. As a participant noted, one must strike a balance between a program with a 5 year impact, and a 30 year research project. Another participant suggested that programs consider the idea of a one year trial period to implement a new standard, but acknowledged that some groups do not want to give the impression that they cannot get a standard going without a trial phase.

Participants remarked that many programs lack sufficient business skills and schemes have poor business models. Certification programs have been developed as market-based approaches, but existing programs tend to be heavily subsidized (typically by NGOs and foundations). Some participants suggested that there has been insufficient attention paid to making these programs cost-effective over the longer term. Subsidies are to be expected, particularly in the early stages as a market develops, but many participants (some of whom represent organizations and agencies supporting existing programs) indicated that continual financial support is not guaranteed. Especially as these programs scale up to reach new constituencies, it is not a given that current supporters can maintain or increase their financial sup-

port. This could signal a need for more government involvement, but that in turn will raise the question: Are certification programs the most efficient use of government resources?

Additionally, highly technical standards systems do not easily lend themselves to many developing country scenarios. As a feasibility study of ecolabeling fisheries in Senegal reveals, most constraints relate to low levels of organization, insufficient regulatory and enforcement procedures, limited availability of reliable data, and insufficient monitoring capacity (Blueyou and ENDA, 2007). In other words, in spite of potential willingness to participate, and the desire to access the market for certified products, many developing country producers are constrained by systemic challenges. Finally, as the next section describes in detail, complying with a new standards regime entails costs that can be burdensome to individual producers.

ASSESSING COMPLIANCE COSTS

The costs of complying with a certification program are often cited as a key barrier to widespread implementation. Since these programs are voluntary, firms understandably must evaluate support for certification as being in their self-interest, and not putting them at an economic disadvantage. As a participant pointed out, certification's impact is contingent on both stringency and rate of adoption, and there is a trade-off between the two. Thus, the expected value calculus is fundamental. In addition to costs associated with a particular scheme, firms are devoting resources to sifting through competing standards, and producers must often comply with multiple schemes, driving up their own transaction and compliance costs. Therefore, an important first step in assessing compliance costs entails an evaluation of the assorted costs and economic benefits of certification programs.

Currently, most certified products do not command a price premium, nor has there been a demonstrated willingness to pay such a premium for most products. There are notable exceptions for organic produce and fair trade products, and an emerging market for green building practices. This latter market helps illustrate a participant's remark that compliance costs must be measured against the potential benefits—the green building sector appears to be enjoying growth thanks to its ability to communicate (and quantify) savings to developers and occupants. However, such savings are not passed on to consumers of most other types of products. Instead, they may be asked to pay a premium for a product so that the producer, located elsewhere, can comply with a higher set of social and environmental standards. The benefits of this can be substantial, but are diffuse. Organic produce commands a higher price in the marketplace to help offset producers' higher costs associated with avoiding chemical fertilizers and pesticides, and

though such methods benefit the surrounding ecosystem, research indicates that most consumers prefer organic products due to the perceived health benefits (NMI, 2008).

Price premium is not the only incentive for producers to change their practices, as evidenced by the fact that most certified products do not yet command a higher price. When evaluating the range of costs and benefits of a certification program, one could also consider increased productivity, market access, and improved efficiency. Some of these benefits will be longer-term prospects and thus require up front investment that will be recouped over time. Other benefits, notably market access, are viewed as a critical lever, particularly if a standard is backed by consumer demand. As the experience of the ISO 14000 standards indicates, improving performance and certifying this improvement may become a typical cost of doing business. Before this occurs, however, large-scale purchasers are still able to exert some influence here by demanding that the products they source be certified. In this respect, they are able to offer large, stable, and long-term contracts to producers who can commit to meeting their certification requirements. Even in the absence of a price premium, this sort of market access can help producers justify up front costs of becoming certified.

It is also useful to identify the specific parts of the value chain where costs are incurred, where savings or value accrue, and which actors have a stake. Each part of a certification system tends to be funded separately: standard development, accreditation of certifiers, on-the-ground verification of practices, and any changes in practices in order to become compliant. This may be complicating efforts to establish a more effective standards system. One participant pointed out, for example, that accrediting certifiers is one of the most difficult, but least sexy, tasks, and thus is sometimes overlooked in favor of more visible elements of the certification scheme. The costs of compliance tend to be borne by producers, excluding some and reducing the scale of a scheme's impact (Ellis and Keane, 2008). Even if these costs may be justified by the benefits described above, some producers may simply not have access to the capital, technology, or information to comply. Included in these transaction costs are mundane but substantial costs associated with data gathering, document management, and report preparation. Loan programs were suggested as a way to bring compliance costs down, and the Rainforest Alliance is now working with the International Finance Corporation on programs to help offset one-time costs. Some participants noted that efforts to simply subsidize smallholders have not been sustainable. Schemes may pass some costs on to retailers, like Fair Trade, which charges for use of its logo, though these fees are not necessarily reinvested into upgrading producers.

Financing seems to be needed on two levels: to the accreditation/certification process, and to producers to help them upgrade their practices

and come into compliance. The original hope for certification schemes was that market forces would favor those producers willing to improve their performance, but experience has shown that the existing market is not sufficient to drive this transformation. If financing is concentrated on developing standards but not to helping producers meet the standards, certification schemes may have a real difficulty moving beyond their current niche applications.

5

The Market for Certified Products

Certification is a market-based tool, and so it is critical that the market for certified products is well understood. This involves giving up front thought as to why a certification program might be important, who would support it, and whether there is a need to create or stoke demand. Since the entire process is voluntary, and tangible consumer demand is not yet apparent, this area bears more careful consideration if certification is to play a role in transforming markets. Workshop participants discussed the various aspects of the current marketplace, and identified several themes that reveal opportunities to enhance certification's impact: differentiating between business-to-business and consumer markets, recognizing the limits of consumer demand, tapping the potential of large-scale purchasers, and identifying rewards in the marketplace to help build the market.

TWO MARKETS FOR CERTIFICATION

Voluntary certification programs derive their primary authority not from governments or regulations, but from the marketplace. In theory, there are market incentives for a producer to comply with standards and become certified. However, most participants asserted that there are two distinct markets for labels, each with different informational needs that are also communicated differently. Household consumers typically want a simple, emotional connection to products. They do not need to understand the science, or be fully cognizant of production practices, but they want to feel good about what they purchased (e.g., Fair Trade products, Box 4). The commercial and business market, on the other hand, is different. There

BOX 4
Fair Trade Certification

In an effort to reverse the negative impacts imposed on small farmers and artisans due to the nature of the globalized economy, the Fair Trade certification scheme attempts to "undo" what the market has done through an alternative market mechanism—certification. Specifically, fair trade certification, attempts to create socially and environmentally just global trade relationships (Jaffe, 2007). The Fair Trade system uses labeling to certify that products and trade practices are, indeed, socially and environmentally just/responsible. The "Fair Trade" label, certifies that consumers can buy sustainably produced and traded coffee, tea, herbs, cocoa and chocolate, fresh fruit, flowers, sugar, rice, and vanilla. While the main goal of Fair Trade labeling has much to do with regulating production, Fair Trade certification through alternative trading organizations (ATOs), attempts to improve international trade relations, as well as foster the complex interactions among producers and consumers (Raynolds, 2002).

The Fair Trade certification movement began in the late 1980s with the first standard, the Max Havelaar label, certifying fair trade standards for Mexican coffee growers. Most Fair Trade initiatives operate within the regulations of Fair Trade Labeling Organizations (FLO) International. TransFair USA is one of 20 members of FLO. Some of the main principles of TransFair USA include, environmental sustainability, fair prices for farmers, fair labor conditions, direct trade, community development, and democratic and transparent organizations. Before certifying a product, TransFair USA follows a product from farmers to importers to manufacturers to distributors in order to assure that all Fair Trade principles have been met. There are many environmental, social and economic dimensions that arise among various stages of the Fair Trade certification process. For example, economic and trade agreements are one of the many hurdles that small famers must overcome before certifying their products in the market.

Stakeholders

As Fair Trade practices attempt to foster sustainable relationships between producers and consumers, it is not surprising that stakeholder relationships are very crucial to long-term sustainability. Due to the globalized nature of agricultural production, stakeholders along a supply chain can exist across many different geographic regions. Such stakeholder groups include small farmers, advocacy groups, importers, manufacturers, retailers, etc. Fair trade not only protects farmers from commodity price fluxes in the market, but it also offers small farmers the opportunity to engage in sustainable farming practices by keeping those commodity prices at a manageable level. This protection is particularly important for farmers in the developing world who sell their products to distributors and manufacturers in the developed world (Jaffe, 2007).

Competitors and Parallel Certification Efforts

In addition to Fair Trade Labeling Organizations (FLO) International, four additional Fair Trade "umbrella" certification organizations exist. Those include the Network of European World shops (NEWS!), which mainly provides certification of Fair Trade retail products across Europe, the European Free Trade Association (EFTA), the Fair Trade Federation, which supports products with the TransFair label in the United States and Canada. Another organization, Shared Interest, also acts as an umbrella organization for producers of Fair Trade products, but is not a trade organization. Last, supermarkets, worldwide, are beginning to engage in their own certification of fair trade products without the involvement of trade organizations or umbrella organizations, such as the FLO, bringing the Fair Trade movement into mainstream consumer purchasing (Moore, 2004).

Rainforest Alliance (RA), while similar in structure to TransFair USA, certifies coffee, cocoa, and bananas as well as citrus, flowers and timber, while TransFair USA certifies coffee and cocoa, fresh fruit, tea and herbs, rice, sugar, flowers, honey and vanilla. A main difference between the competing certification schemes deals with the guarantee of above-market prices for producers.

Market Share and Impact

It is difficult for nonregulatory agreements such as Fair Trade to achieve success in the market. Without more stringent national and international laws, which emphasize minimum standards for economic, environmental and social practices, the sustainability of the Fair Trade label will continue to be questioned (Jaffe, 2007). Importers of Fair Trade products are generally paying the costs to provide certified goods to consumers.

According to TransFair USA, the increase in Fair Trade prices is not always used to increase crop production. TransFair USA has found that farmers often invest Fair Trade revenues into improving their homes, sending their children to school, and on farming methods and equipment that improve crop quality, rather than increasing production. In contrast to government mandated pricing or subsidies, Fair Trade is a voluntary, market-based mechanism, by which farmers only receive Fair Trade minimum prices and premiums when buyers express a demand to buy Fair Trade products at the associated price. This affords producers, companies, and consumers an opportunity to choose to participate in the Fair Trade supply chain or use conventional market mechanisms.

Fair Trade, as a movement and market mechanism, asks consumers to change their purchasing behavior and demand that Fair Trade products be offered in the market. Requesting that consumers exhibit a demand for Fair Trade products means that they must feel a sense of "social responsibility." Many certifying organizations and Fair Trade advocacy groups attempt to elicit this response through public outreach campaigns and awareness programs (Levi, 2003).

is a need for more credibility, information, and sophistication with regards to a certification program.

Retail is described as being "customer-facing," and what this means practically for certified products is that retailers are focused on communicating with their customers, and the communication must be simple. For many products, participants pointed out that label space is of concern because the number of messages it can communicate is limited. Advertisements are short, and packaging is relatively small, so retailers think about communicating "in 5 seconds at 5 feet." This sort of thinking may favor something like a seal or symbol that is easily recognizable (and marketed), but that also directs interested consumers to other sources of information. Still, retailers generally need and want detailed information about certifications they support even if they do not convey all of that information to consumers.

While the mass consumer market may not think long-term or strategically about sustainability issues, major companies often do. They may see a potential competitive advantage, they may be concerned with the viability of critical resources, and they may include sustainability concerns in their long-term thinking about vulnerability. This scenario applies not only to resource-intensive industries, but also to certain tertiary industries like banking and tourism. Private firms have a vested interest in reducing risk and liability (e.g., a boycott over labor practices) and so service industries, from insurers to retailers, are paying more attention to ways that they can manage this sort of risk.

WEAK CONSUMER DEMAND

The state of consumer demand might be summed up by one participant's response, "Demand? What demand?" Consumers may be demonstrating more interest in and awareness of sustainability issues, but as many participants emphasized, price and convenience do still seem to be the top factors driving decisions on consumption. Customers may expect a certain level of performance from retailers they support, but they may not expect to pay extra for it. Price premia for certified sustainable products are not regulated, and the value is not standardized, making it difficult to discern what sort of value consumers might place on such goods. Put another way, there appears to be *willingness* but not concrete *demand* from consumers. A primary concern for retailers is still whether or not certified sustainable products will sell.

Research on consumer attitudes suggests that consumers buy 'sustainable' labels for health reasons (NMI, 2008). This might mean that consumers care less about the environmental and social outcomes that their purchases support, but it might also mean that health is the point of differentiation

that marketers look for. It is unclear that "sustainability" as a general term is a point of differentiation which could be branded. Many participants suggested that more consideration be given to health concerns and connecting those to the potential benefits of green products.

As a few participants pointed out, the value proposition is an important consideration, and beyond the small market segment that is primarily concerned with the welfare of "the commons," the value to an individual consumer buying sustainable products can often be too diffuse to be easily identifiable. Health is a personal value, whereas many of the impacts of sustainably produced products relate to distant ecosystems, producer communities, or the global commons. In areas where certification seems to enjoy more uptake, e.g., business-to business transactions, the value is more related to reliability and risk reduction than to concern about the commons. Typically value of the commons is the subject of collective decisions, meaning government. This may suggest that if the consumer market is to be significantly changed, some type of government intervention will be required through mandates, tax structures, or incentives.

Finally, there may be an information deficit influencing consumer preferences. Still, whether through marketing or simply better information disclosure, certification systems could be doing a better job in communicating the benefits of purchasing sustainable products and services. Most certification schemes are focused on the "push" element, i.e., working with producers to enact and support a standard, but what is probably needed are schemes with a "pull" element, educating consumers to specifically demand sustainable products and provide clear incentives for producers to pursue certification. While marketing can be used to tell consumers what they "need"—an example being the fabricated "demand" for ruffled potato chips—many participants voiced concerns over having complex issues boiled down to marketing campaigns. The FTC, though, does focus on what consumers *think* about a company's claims on a product, and it does have jurisdiction to regulate claims that are deceptive or overstated.

ROLE OF LARGE-SCALE PURCHASERS

Market share for certified sustainable products has been built not on consumer demand, but on negotiated agreements with companies, governments, and other large-scale purchasers. This approach does offer several advantages, most notably that the commitment of several large firms can allow a certification program to reach scale rapidly. Governments, for example, are large procurers and have taken a lead in requiring sustainably sourced products and mandating LEED-certified government buildings. Retailers, too, are playing a substantial role in supporting or even mandating that the products they sell be certified. Wal-mart is the oft-cited example

of a company that has the leverage to essentially require its supply chain to "go green," and certification is an important tool in managing this.

The reality for large businesses is that their supply chains must be sustainable, whether or not their consumers care or are willing to pay. Large retailers are practicing stewardship—they are not waiting for their consumers to demand sustainable products. Some retailers, such as Whole Foods, are also creating their own brands which they can market as being sustainable. However, participants noted that retailers are often as confused as consumers, and so despite the potential to move the market, there is still a steep learning curve for large companies seeking to become engaged. Some participants remarked that the entire process to green supply chains is not consumer driven, it is retail driven, but retailers are still struggling with how to green their supply chains. Certification certainly has a role to play, but it is not the only tool available.

Many corporate efforts to green their supply chains or become more sustainable as a business have been an outgrowth of their corporate social responsibility (CSR). As firms document and report their progress in reducing environmental impacts or improving social outcomes, they have sought to identify more of the impacts that they can have outside the four walls of their facilities. Almost by necessity, this has required cooperation with outside entities, more transparent reporting, and lifecycle assessments for certain products. Existing certification standards have, in some instances, become a useful proxy to report on these activities. A participant noted, though, that existing certification programs are not necessarily compatible with CSR efforts—the Fair Trade scheme, for example has not fit into companies' CSR strategies well because it is perceived as being weak on environmental issues.

BUILDING ENDURING MARKETS

While there will continue to be interest in building or expanding the market for certified sustainable products, several participants emphasized that the most important question is: How can these become *enduring* markets? Producers will often need to invest in process improvements in order to obtain certification, and this can be a risky proposition if the market changes course rapidly, or disappears altogether. Marketers typically emphasize a single message, such as price or effectiveness, as the point of differentiation among products. Many participants expressed skepticism that conventional marketing would be sufficient to communicate the nuanced information behind a certification standard. It would also require marketers to emphasize sustainability attributes at the expense of advertising price or efficacy attributes. Other participants pointed to the experience with health information and food labels—providing data and information

makes consumers more aware, and may influence purchasing decisions, but it is much more difficult to link this to behavioral changes or positive health impacts.

That being said, the marketplace today is different than it was fifteen or twenty years ago. There are new drivers, such as climate change, that have entered the public consciousness and raised awareness, to some degree, of how consumption patterns affect the environment. Participants also noted that generational differences may explain, in part, the rising demand for some certified sustainable products. Companies are now seeking to build sustainability into their brand attribute. This eliminates the need for a company to market a "sustainable" product versus its own conventional product. Though competition for sustainability credentials may lead to more greenwashing, it also signals a possible shift in consumer values.

Social marketing may also be a valuable tool in shaping consumer preferences to favor sustainable products. Some participants pointed out the efficacy of social marketing efforts to reduce cigarette smoking or encourage HIV testing. This sort of marketing does not rely on differentiating one product from another, but involves routinization and tapping into consumers' core values. Social marketing is not the domain of private industries, but if it were effective, it could lead to longer-term shifts in consumer preference to favor more sustainable products, thereby contributing to an enduring market.

To understand what might motivate producers to elevate or improve their practices, it is helpful to think about the various rewards in the marketplace. As has been noted, in some instances certified sustainable products could command a price premium. This is an obvious incentive, but it is not yet demonstrated for most products, and it may also make a product vulnerable during an economic downturn. Beyond a price premium, producers may also be able to access new markets, and retailers carrying certified sustainable products may be able to expand their market share (e.g., drawing in more "LOHAS"[1] consumers). Less tangible incentives include increased public acceptance and visibility if producers are perceived as being good corporate citizens.

Much of the discussion of the market for certified sustainable products focused on consumers in the United States and other developed nations. However, as several participants pointed out, consumerism is growing rapidly in the developing world, but demand for certified products is not. Therefore, over the longer term, it will be important to find ways to incentivize developing countries to adopt and purchase certified products.

[1] LOHAS is an acronym for Lifestyles of Health and Sustainability and is used to describe a segment of the consumer market that focuses on, among other things, personal health and the natural environment.

Currently, domestic demand appears to be a limiting factor in developing countries' uptake of certification schemes—a stronger domestic demand could act as insurance for producers against volatility in the global market. Moreover, in some instances certification is perceived as a new constraint on access to developed-world markets. These voluntary standards are not considered globally accepted standards, and so participants noted that some developing-world producers consider certification a new "hoop" they must jump through in order to export their products to the United States and Europe. The World Trade Organization (WTO) does discourage member countries from using environmental standards as trade barriers, but, certification schemes have typically been exempted because they are considered voluntary, rather than government-imposed requirements. There is likely to be much more investigation into how third-party certification regimes may act as technical barriers to trade as defined by the WTO.

6

Measuring Success

It is difficult for any current certification program to claim "success" in terms of demonstrating significant improvements in human well-being or environmental conditions. This appears to be a major deficiency of certification programs. Participants noted the dearth of peer-reviewed analyses of individual programs and of the field as a whole.[1] Without more rigorous analysis of what is working on the ground, what has not worked, and why, it is difficult to envision these voluntary certification programs being widely adopted and truly transforming markets. In particular, many participants suggested the need for improvements in the baselines for measurement, the impacts measured, and the scale at which programs are analyzed. It will also be important to take a look back at experience to date, to better unpack some of these unintended consequences (positive and negative) that typically go unmeasured.

DEVELOPING A BASELINE

One fundamental challenge for most certification programs is that, despite the fact that they are designed to address specific problems of poorly regulated production practices, the baseline for measuring progress is rarely being defined. Existing conditions are described in general terms and are not always adapted for regional differentiation. There are exceptions, of

[1] This is a rapidly expanding field, though, and Rainforest Alliance provides a compendium of recent analyses, available at *http://www.rainforest-alliance.org/resources.cfm?id=research_analyses*.

course, particularly for custom-tailored, performance-based standards (ISO or LEED for buildings) but in general, these voluntary standards systems have emphasized changes in production *practice*, and their baselines and performance measures relate to this. The most straightforward way to measure success, then, has been to use existing market share or number of compliant producers as a baseline, and focus on expanding the program's reach.

As some participants noted, most existing programs would have a difficult time backing up their claims of success (in terms of on-the-ground sustainable outcomes) because little is actually being measured, especially at scales of importance to sustainability, namely ecosystems and communities. Even if the particular standards are considered rigorous and based on sound science, certification programs rely heavily on their "theory of change" with the belief that, by changing certain practices through prescriptive guidelines, production will become more sustainable. However, the programs rarely conduct baseline assessments against which they could measure improvements in performance. Doing so would be a valuable way to demonstrate how effective, and efficient, certification programs are at enhancing positive outcomes, relative to alternative approaches. If the majority of compliant producers were top performers to begin with (as has been the case with several leading standards), this begs the question as to whether alternative approaches could have more "bang for the buck." As some participants noted, though, a direct comparison of approaches would be difficult to carry out, akin to conducting an experiment without being able to isolate variables.

Participants pointed out that success is still not well defined in any sector or particular certification scheme. Defining sustainability for each and every sector would be a daunting task, and would seem counterproductive for individual certification programs to do. Most programs have a notion of the direction they must head, but as many participants emphasized, the bar will likely need to be raised and continually adjusted as programs mature and knowledge accrues. Perhaps more importantly, even when programs are directionally correct, they may need to expend more effort determining their starting point to help assess how far and how fast they will need to progress to achieve sustainable outcomes.

Data availability is a critical limiting factor. As was emphasized at other points throughout the workshop, outside observers would like to see data-driven approaches. Supporters of certification schemes, however, generally want to see on-the-ground changes. With resources being limited, it is difficult to apportion a large amount of up front costs to field work and data gathering before a certification program even commences. Data collection and additional bookkeeping is often cited as a significant transaction cost for producers participating in a certification program. One participant

emphasized, though, that this would be an area where local people and institutions could be meaningfully engaged.

By recognizing that certification is but one intervention that can take place, and that it will necessarily be interacting with other forces, it may be easier to identify an appropriate baseline for performance and determine how and where certification can contribute to raising the bar. Focusing on a select set (e.g., 6-10) of impacts for a given sector may be one way to begin. These might act as guideposts for competing schemes in a sector. Participants noted that there is also a need for wider agreement on metrics—costs of compliance, for example, do not sufficiently account for bottom line impacts or costs to producers.

WHAT TO MEASURE

Certification programs often do include some performance indicators, but as many participants pointed out, these indicators focus on *management* performance. In other words, they are measuring process changes but typically not their environmental and social outcomes. The primary exception is Fair Trade, which sets economic benefits for producers as its main objective. It should be noted that there is often a substantial time lag between process changes and their intended outcomes or impacts. Still, given the amount of time that some of these programs have been in effect, participants noted the lack of evidence of demonstrated benefits to the environment or to producing communities.

It seems that there is a need for more standards that measure impacts, in terms of positive environmental or social outcomes. Social impacts in particular are not well monitored. One participant noted that some certification bodies are moving in this direction, and giving more thought to measuring their programs' impacts. If this is done well, and the methodology is transferable, then over time fewer resources would be devoted to individual standard systems sifting through best practices on impact measurement. Some participants advocated for a "trial phase" of a year or more, to start measuring social or environmental results. Progress in impact measurement should also help create incentives for governments, banks, and insurers to adopt the standards. Many participants noted that there would be methodological hurdles, having to do with data availability (since private regulators are not required to disclose their information), the difficulty of making the right comparisons (to uncertified firms, for instance), and the costs of gathering longitudinal datasets.

Programs must be clear about whether they are focused on market penetration or on-the-ground results—this will help define success and determine appropriate metrics. As participants noted, most programs focus on process changes and thus encourage compliance rather than innovation.

On the positive side, this can provide a blueprint or step-by-step approach for producers to improve their practices. However, it does also run the risk of locking producers in to a particular paradigm. In the absence of demonstrated long-term positive outcomes, proscriptive programs may become increasingly difficult to justify, particularly if they are perceived as hampering innovation. By focusing instead on the *performance* of a standards system (e.g., LEED standards, Box 5), there is room for and even incentives to innovate and exceed standards.

WIDENING THE LENS

Given the amount of activity taking place, it is critical that we begin learning from these ongoing "field experiments" and clarify how standards systems are contributing to sustainable outcomes. Some participants remarked that there is a lack of peer-reviewed, analytical literature on certification programs, specifically with regard to their impacts. This is not surprising given that, as many participants pointed out, these programs are implemented by people who care deeply about the subject and may find it difficult to face facts about what works and what does not.

One participant shared the experience of commissioning a peer-reviewed analysis of a new program, so that the organization could determine how effective its investments had been in terms of promoting more sustainable outcomes in its sector. The analysis revealed that, despite spending over $100 million on interventions under the program, it was not achieving the desired results and might in fact be counterproductive. This is difficult information to accept, but it did allow the organization to retool the program and make wiser investments in the future.

Existing certification programs tend to limit their scopes to a particular segment of a market or sector. This is not unreasonable, since the programs are experimenting with new approaches, requiring some amount of trial and error, and ultimately being traceable back to the intervention. The programs are a response to specific problems, usually on the production end of the value chain. However, this is distinct from *problem-driven* approaches to sustainability, which would focus more broadly on the entire value chain, or the production-consumption system (e.g., Lebel and Lorek, 2008).

As a number of participants pointed out, certification programs have not been designed to be research projects. They are practical responses to deficiencies of prevailing norms in a given industry. At best, they are providing some certainty that a particular certified product was produced and sourced responsibly and therefore did not contribute to environmental degradation or harm social well-being. In other words, these programs are not designed to "end" the big problems of unsustainable production and consumption.

Still, many of the stakeholders engaged in certification programs do have broader interests in promoting sustainability and addressing these large challenges. It is important to consider, for example, the complexity of manufactured or processed goods. Illegally harvested wood can be purchased by a factory in China, assembled into office furniture, and then exported to the United States. Manufactured goods may also contain toxic or otherwise harmful components and thus require special attention during *and* after their useful life. Certification may in fact be a useful tool in communicating more desirable attributes, if there is a market for such. Lifecycle analyses (LCA) have been critical in identifying some of these important features, such as embedded energy, or downstream pollution effects following disposal of a product.

Participants also discussed the social side of sustainability, which is not typically reflected by an LCA. Certification is widely used to communicate that a product was not produced with child labor, or that the producer received a legal minimum wage. Less consideration has gone into how and where certification could be used to also advance workers' rights, or support the interests of small-scale farmers and other producers. In short, certification and standards systems are not currently being employed to address all of the sustainability challenges associated with a given sector.

The complexity and systemic nature of these challenges requires a range of interventions rather than a silver bullet, but existing certification programs have rarely sought to integrate themselves into more holistic efforts. There are recent instances of converging interests, such as the Sustainable Tourism Council working with the UN on a global standard. Many participants also mentioned alternative approaches, particularly supply chain and global value chain approaches, to fostering sustainability within a given sector. They suggested that focusing on the bottom percentile of producers (i.e., those who would be most "out of compliance" with a certification program) could yield more marked improvements than a comparable investment of resources at the top of the market. By the same token, though, the sheer volume of production by large firms (who are more likely to be near the top of the market) provides leverage that small-scale producers do not. Though large firms often contract out aspects of their production to smaller firms, they at least have a mechanism to, on the one hand, impose requirements on their suppliers, and on the other, certify the chain of custody of component products. Thus, certification supporters may need to evaluate which segment of the production market could yield the greatest impact on environmental and social outcomes.

For any certification program, there is an apparent paradox between setting the bar high in terms of compliance, and lowering the bar to bring less compliant producers on board and increase the market share. However, the programs do not have any authority to make noncompliant producers

BOX 5
Green Building: Leadership in Energy and Environmental Design

The LEED® (Leadership in Energy and Environmental Design) green building certification system is a feature-oriented certification program that awards buildings points for satisfying specified green building criteria. The six major environmental categories of review include Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality and Innovation and Design. Certified, Silver, Gold, and Platinum levels of LEED green building certifications are awarded based on the total number of points earned within each LEED category. The first LEED Pilot Project Program, known as LEED Version 1.0 was launched at the U.S. Green Building Council (USGBC) Membership Summit in August 1998. After extensive modifications, the LEED Green Building Rating System Version 2.0 was released in March 2000. This rating system is now called LEED for New Construction and Major Renovations, or LEED for New Construction.

As LEED has evolved and matured, the program has undertaken new initiatives to address the many different stages and sectors of the U.S. building market aside from LEED for New Construction. In total, the USGBC now oversees nine certification initiatives, involving:

- New Construction (NC)
- Existing Buildings Operation and Maintenance (O&M)
- Commercial Interiors (CI)
- Core and Shell (CS)
- Homes
- Schools
- Retail (in pilot)
- Healthcare (in pilot)
- Neighborhood Development (in pilot)

In 2007, LEED Registrations and Certifications doubled compared to the previous six years and in 2008 they doubled those of the previous seven years. LEED New Construction Registrations and Certifications continued their growth, but not at the doubling rate. The Core and Shell system grew 13-fold compared with 2006, while LEED for Existing Buildings Operations & Maintenance expanded nearly 20-fold (Watson, 2008).

LEED NC certified projects represented 5.8 percent of new U.S. commercial construction and new registrations represented approximately 30 percent of the market in 2008 (Watson, 2008). 1,082 new buildings have been certified as of July 2008. California leads the United States with 129 total buildings certified in the new construction category. Pennsylvania follows with 69 certified buildings (DOE, 2008).

In 2004, LEED began to certify the sustainability of ongoing operations of existing commercial and institutional buildings. This program is open to owners and operators of existing office and retail buildings, institutional buildings, hotels and residential buildings of four or more habitable stories. Already, the floor area of new registrations has nearly caught up to that of LEED NC, though as a percent of the annual addressable market, certifications remain insignificant.

Also beginning in 2004, LEED started to certify high-performance green interiors that are healthy, productive places to work; less costly to operate

and maintain; and have a reduced environmental footprint. This program was designed to work hand-in-hand with the LEED for Core & Shell, which became available in July 2006. This program covers base building elements such as structure, envelope and the HVAC system, and like the LEED Interior program, it establishes green building criteria that can be used by developers, building owners, and tenants.

These commercial programs have a market share approaching 12 percent of new commercial starts, though they lag significantly behind LEED NC in submarket share and absolute terms. Certified LEED CS projects represent only about 0.5 percent of new construction starts (Watson, 2008).

In December 2007, LEED developed criteria for individual homes, to promote the design and construction of high-performance green residences. Also in 2007, LEED developed a special rating for new construction and major renovations to K-12 school facilities. This new rating system addresses issues such as classroom acoustics, mold prevention, and environmental site assessment.

LEED has continued to expand into new and differentiated markets. It has developed several pilot programs, often in close collaboration with other partners. LEED Retail is currently creating criteria to recognize the unique nature of the retail environment and to addresses the different types of spaces that retailers need for their distinctive product lines. LEED's Healthcare pilot is similarly assessing the unique needs of the healthcare market. This program represents a culmination of four years of close collaboration between the Green Guide for Healthcare (GGHC) and USGBC, addressing issues such as increased sensitivity to chemicals and pollutants, traveling distances from parking facilities, and access to natural spaces.

Finally, LEED is attempting to take its design criteria to the neighborhood scale, integrating the principles of smart growth, urbanism and green building into the first national system for neighborhood design. This program is a collaboration among USGBC, the Congress for the New Urbanism and the Natural Resources Defense Council. The post-pilot version of the rating system, which will be available to the public, was launched in 2009.

Though the USGBC has been successful in partnering with other organizations, and even references existing certification programs (namely ENERGY STAR) in its own criteria, it still faces competition in a number of its markets. ENERGY STAR focuses exclusively on energy performance, but since this is such an important aspect of building performance, it has become a leading competitor to LEED for new buildings, commercial and residential structures, as well as schools and healthcare facilities. As the USGBC acknowledges, there are more than 70 highly regarded local or regional green home building programs in the U.S.—LEED attempts to distinguish itself by its ability to certify *leaders* in green building, and help builders (or owners) differentiate their work.

Internationally, LEED is active in dozens of countries. However, its popularity has also led to countries developing their own criteria, tailored to their regional conditions and development goals. LEED itself continues to evolve as well. LEED v3 debuted in April 2009 as the next major evolution of the existing LEED rating systems for commercial buildings. LEED 2009 incorporates regional credits, extra points that have been identified as priorities within a project's given environmental zone. This will increase the importance of green building as a means of contributing immediate and measurable solutions toward energy independence, climate change mitigation, and other global priorities.

either improve or disappear. Instead, they are relying on the market to convey this authority; without strong demand for certified products, the programs have tended to focus on incentivizing and rewarding top performers. Standards systems could be more widely applied in value chain approaches, as one component of a broad effort to improve performance within a sector. Or as one participant put it, certification programs might be more useful as a yardstick than as a height requirement. Still, there will inevitably be a trade-off between raising the floor and, for example, preserving marginal, low-standard producers as a matter of social policy.

MORE ANALYSIS OF UNINTENDED CONSEQUENCES

Sustainability as a general concept is still not well understood, and the impacts of certifying sustainable products can be far flung. General concepts of sustainability do not provide sufficient guidance on specific questions, e.g., what is a fair price for sustainably harvested Senegalese octopus? While more attention could be paid to measuring a program's intended impacts, there also seems to be a need for careful consideration of the unintended consequences, positive and negative. Some of these impacts have been alluded to, such as the potential hampering of innovation, or the burdensome costs for small-scale producers. Still, these are generally anecdotal rather than evidence based. When there are unanticipated impacts, we need to understand if they are caused specifically by certification as an approach, or by more systemic challenges.

One of the more comprehensive studies of certification in a sector is the Committee on Sustainable Assessment (COSA) report on sustainability initiatives in the coffee industry (Giovannucci and Potts, 2008). COSA put forward what they considered to be a scientifically credible framework to assess the impacts that standards systems were having on environmental, economic, and public welfare issues. The COSA approach is still in its pilot phase, but some early findings, like the tendency of higher compliance costs to yield higher net income for farmers, appear worthy of further study. Cost distribution in general is an issue that is beginning to attract attention, given that certification programs entail costs that are neither uniformly distributed nor universally recouped.

Geographic coverage is another issue that had until recently not been widely studied. In general, existing certification programs have built their market share not by becoming increasingly global, but by focusing and intensifying efforts in certain markets (e.g., Ellis and Keane, 2008). From a consumer's standpoint, this may not matter, but it has important implications if these programs intend to increase their coverage. Africa in particular has not been a significant party to certification programs, despite

its prominent role in export markets. It is unclear what the longer-term implications of such a trend might be.

Finally, in thinking through the lifecycle of a certification program itself, some participants remarked that most programs are not giving due consideration to their long-term or exit strategies. The existing market share of some certification programs has been dependent upon subsidies from the donor community, but this is not often acknowledged. These subsidies are not likely to continue into perpetuity, and it remains to be seen whether any current system is ready to stand on its own, supported primarily by the market.

7

Optimizing Certification as a Tool

One theme that resonated throughout the discussions was the notion that certification is a tool, and that to make it more effective, or to "optimize" it, one must take a more holistic look at the system within which it is meant to operate. A participant likened this to essayist Wendell Berry's (1981) concept of "Solving for Pattern" which reads, in part:

> A good solution is good because it is in harmony with those larger patterns. . . . A good solution acts within the larger pattern the way a healthy organ acts within the body . . . it does not 'give' health to the body, is not exploited for the body's health, but is a *part* of its health.

Participants identified some potential steps to make certification more effective, and discussed the relative strengths and weaknesses of certification as an approach. They also highlighted roles for various actors in supporting a certification regime. Suggestions covered the evolution of a certification scheme, from conception to its eventual "sunsetting" or handoff to a regulatory agency. In particular, discussions focused on improving our understanding of what certification can and cannot accomplish, introducing systems that could be more inclusive while promoting innovation, and thinking through the interface with complementary programs and institutions.

RECOGNIZE CERTIFICATION'S LIMITS

To employ certification effectively, one needs to understand the limits of certification. Chief among these appears to be the fact that certification programs do not have enough authority to eliminate weak performers. While no one suggested that certification programs must somehow become more authoritative (through regulation or otherwise), a number of participants did emphasize that certification does not appear to be the right tool to raise performance at the bottom of a sector. Moreover, compromising compliance standards in order to capture more of the market seems likely to have a negative effect on the standards' credibility. However, participants did point out that some certification programs are linking to complementary initiatives like a legality verification in the case of the FSC, and to a baseline standard in the case of 4C and the coffee industry.

On a related point, certification programs are relying on markets which are not yet robust enough to provide the authority to "force" producers into compliance. Sustainability as an issue appears to have marketing potential, as evidenced in part by the rise of "green" and "sustainable" claims. However, public education on sustainability needs further attention if it is going to become that point of distinction influencing a consumer to select a certified sustainable product over a conventional alternative. Several participants also remarked that international trade will not be a sufficient lever to impose sustainability. To date, certification schemes have focused on northern export markets, primarily the United States and the European Union. Producing countries, many in the global south, exhibit almost no demand for certified products, making them more vulnerable if overseas demand decreases. Trade between southern countries is also growing (e.g., China trading with African nations), but certified products have not been a focal point for these markets. In any case, government can play a catalyzing role in shaping markets and demand for certified products by requiring certification in its procurement mechanisms.

There is also a yet unanswered question regarding the scalability of certification schemes. Many of them were created in the belief that they could function as an incubator for what might eventually become industry standards. This trend, though, has been hampered both by competition among schemes in a given sector, and by the fact that schemes have focused on the top performers in the market. Most participants agreed that more thought may need to be given to where certification programs provide leverage to start moving the market, and at what point they may need to give way to regulation or other alternatives to mainstream sustainability standards.

Certification might be best viewed as a learning tool. A certified seal is shorthand for consumers, but it is also shorthand for merchants and buyers in business-to-business transactions. Certification could help merchants

justify either higher costs or other changes in their purchasing and sourcing practices, because it communicates how merchants are reducing their own risk or enhancing their brand. Many participants emphasized that certification will be crucial to greening supply chains, but that it will require transparency and sound science to bolster its credibility. In the case of organic products, national governments have played an increasingly visible role in supporting organic standards. Governments have not taken over farming, just management of the organic standard—consumers still decide to support organic or not, and this is important to recognize. As one participant summarized, the real goal of many engaged in standards systems is market transformation, and certification is a tool to help achieve this.

CLEARLY DEFINE GOALS

Markets and labels are ultimately means to an end, and so the question for those engaged in certification is: What is that end? If it is an aspiration to change processes that are destructive to the world we live in, then certification can play an important but not singular role in achieving this. Certification as an approach appears to have matured to the point that we can now more clearly identify where and how it will be most effective. It will also be important for schemes to be strategic and focus on what certification is best suited to achieving.

There was wide agreement that, in order to achieve sustainability goals, producer and consumer markets will need to undergo a transformation in which less destructive production practices (in terms of ecological and social well-being) are rewarded in the marketplace. While this transformation is a goal to which any certification program might claim to contribute, certification alone may not be well suited to transforming entire markets. As a result, the positive gains a program makes in raising the bar in the "parallel universe" of top performers will be undermined by slow or negative progress at the bottom. If programs can more sharply define the segment of the market that they are hoping to transform, then they might be more widely incorporated into broader initiatives or complementary schemes.

Certification schemes' theories of change (i.e., their notions of how a scheme will logically lead to preferable outcomes) likely deserve more scrutiny. It is becoming increasingly evident that certification programs are relying on some corollary improvements—namely market demand and capacity building—that fall outside the domain of the typical certifying scheme. As one participant put it, certification schemes need an intention with clear goals and due consideration of potential impacts, trade-offs, and sound (or at least transparent) assumptions. Participants also discussed the end game for certification systems, and specifically the economic advantages that certified products might present. These include price premia, lower insurance

rates (due to decreased risk), increased market access, and preferential tax rates or loan terms. All of these provide important leverage in moving the market, but they are not sufficient to bring about a transformation.

By clarifying the scope of the problem being confronted, it may be easier to determine where one draws the line for a hand-off from certification to regulation. For example, several participants pointed out that the social impacts of certification regimes are not being monitored well. Some of the leading standards systems have emphasized environmental protection, but have not attempted to integrate social concerns such as access to markets. Also, from an ecological standpoint, product-based approaches may not be the best tool to address the problem. Consider the example of biofuel production—certifying that a certain feedstock is sustainable may ensure that the product did not contribute to environmental degradation. But this does little to address the other uses for a feedstock (which may not have a market for certified products) or the trade-offs among different land-use types in a given area. Biofuel production has become a contentious international issue in part because it may be encouraging or accelerating unsustainable land-use changes elsewhere. In other words, many sustainability challenges are not product-specific and so not adequately addressed by product-based certification programs.

TIERED APPROACHES

With some exceptions, certification schemes have been pass/fail systems—producers making the grade receive a certified seal, and those who do not meet the requirements are left out. The LEED standard for green buildings is an example of a tiered approach, where there is a performance baseline, but above that there are three ascending levels of compliance (silver, gold, and platinum). Within this system, projects receive points in several categories, and the total score determines their level of achievement. Project developers, corporations, and even governments have started to use this system as a benchmark to encourage or require a certain level of compliance. Tiered approaches within a scheme can provide a pathway to sustainability—there is robust consensus building at the bottom, to bring as many on board as feasible, but still room for improvement at the top.

Individual schemes may have their own mechanisms for reaching out to and incorporating weaker performers, but in general their emphasis has been on defining the top and encouraging producers to comply. As several participants stressed, this approach has not been successful in motivating or providing guidance to weaker performers. It seems that a stepwise approach, including different tiers for compliance, and perhaps phased standards (allowing a limited amount of time to come into compliance) would offer more incentives at the bottom of the market. The most evocative

image participants used was that of a ladder being yanked upwards—weak performers could climb on at the bottom rung, and would have the ability to ascend with some prescriptive guidance, but would also be compelled to climb as the standards were periodically raised. This may be a more effective way to raise both the bar and the floor for performance in a sector.

There has been a trend towards multi-attribute labels, which in theory encompass some of the single-attributes (e.g., dolphin-safe) that were pioneers in product labeling. This trend has made certification and compliance more complex, but it also opens up opportunities to craft standards systems that bundle values, rather than highlight individual traits. Bundling values allows, for example, a product to convey its social benefits (living wage for workers) along with health (nontoxic) and environmental benefits (minimal impact). Participants also discussed the possibility of establishing modular approaches, so that a standards system could be more readily transferred across countries or industries. Industry standards and local norms are not static, and stakeholders tend to shift and change. One of the benefits of a certification program is that it can allow for this flexibility. Several participants stressed, though, that at some point a line must be drawn and those who do not merit certification ought to be removed from the marketplace. This may be a role best left to regulation, but it does seem that certification could be more judiciously applied to encourage a higher degree of compliance.

BUILDING CAPACITY THROUGHOUT THE VALUE CHAIN

One criticism of existing certification schemes is that they provide for little if any capacity building to aid producers in becoming compliant. As participants noted, certifiers are often prohibited from offering advice or assistance. The simple response is that producers must be able to adapt to the changing and more competitive marketplace. However, for a variety of reasons, the majority of producers in any given sector have resisted or failed to come into compliance with voluntary sustainability standards. Fundamental requirements for data collection and reporting have stymied some smaller-scale producers. One-time and large up-front costs have continually been an impediment for producers who might otherwise consider participating in a certification program. As an example, the MSC was designed to certify the best-managed fisheries, which happen to be in countries with money, strong science, and adequate data. While the standards systems have evolved and matured over time, the capacity and infrastructure required for them to thrive is lagging.

Capacity building is a tool to complement certification systems—the key is in determining who is responsible for it, and then linking it to the implementation of a program. Some certification programs do not even allow for

BOX 6
Organic Foods in the United States

In 1990, Congress passed the Organic Foods Production Act (OFPA) as part of the Farm Bill. This Act established the creation of the National Organic Program and cited the U.S. Department of Agriculture (USDA) as the responsible authority, specifically the Agricultural Marketing Service (AMS). The Act also gave the Secretary of Agriculture the authority to appoint a fifteen member Board to assist the agency in developing organic production standards. The National Organic Standards Board (NOSB) is structured according to specific subcommittees and task forces, such as the task on organic pet food and the committee on organic handling procedures. NOSB members include farmers/growers, handlers/processors, retailers, scientists, consumer/public interest advocates, environmentalists, and USDA accredited certifying agents. As an advisory arm to the National Organic Program at the USDA, the NOSB makes recommendations on a regular basis, with its most recent recommendations issued in November 2008.

The USDA accredits private and state certification agents who monitor producers, processors, and handlers of goods to ensure that they are meeting the standards set forth by the National Organic Program. In order for a product to be labeled "USDA Organic," 95 percent or more of its content must meet organic production standards (Wellson ed., 2007). The purpose of the organic labeling program is to increase consumer confidence in organic products, facilitate international trade of organic products, and increase the market supply of organically produced products (Johnson, 2008).

Stakeholders

Stakeholders within the organic certification process include, but are not limited to, farmers/producers, processors, handlers, state and private certifying agents, retailers and consumers. As with other certification/labeling schemes, controversy often arises among stakeholders. Often, more senior stakeholders—those who have been involved in the organic market for a number of years—are interested in tightening/increasing regulations within the industry, while newer players in the organic-product supply chain are more in favor of a free market approach to organic agricultural production (Johnson, 2008).

According to a 2002 USDA report, organic products were, at that time, "available in nearly 20,000 natural foods stores, and are sold in 73 percent of all conventional grocery stores" (USDA/ERS, 2002). As such, supermarkets and other retail megastores also play an important stakeholder role in the organic-product supply chain. Because supermarkets see an increasing demand for organic

capacity building, and so the burden falls back to governments (many of which were deemed ineffective to begin with) to provide support. Several participants suggested that NGOs could take a more innovative, long-term strategic approach to how they support certification schemes. The challenge is that NGOs, and the philanthropic community in particular, have exhibited a preference for innovative solutions—some participants questioned their

products on their shelves, more pressure is placed on the organic production industry (Johnson, 2008).

Competitors and Parallel Certification Efforts

Within the United States, the USDA National Organic Program label is the primary standard for sustainable organic agriculture production. Many European Union (EU) countries have recognized the importance of the ecological sustainability associated with organic farming practices and have thus adopted policies to encourage organic farming/product labeling. For example, some EU countries offer financial support for farmers who use organic farming practices, as well as financial support for research and educational programs (Thilmany, 2006). While the USDA National Organic Program standards attempt to certify sustainable organic products, correct and effective application of these standards depends heavily on stakeholders, such as private and state certifying agencies.

Market Share and Impact

United States famers increasingly use organic farming methods to attempt to lower input costs, decrease reliance on nonrenewable resources, capture high-value markets and premium prices, and boost farm income. To increase U.S. organic production, the 2008 Farm Bill provides subsides to organic producers and handlers through the "Organic Certification Cost-share Program." This program grants producers and handlers up to $750 in federal assistance with a maximum coverage limit for certification costs of up to 75 percent (Johnson, 2008).

Organic labeling reduces transaction costs by signaling, to consumers, that a product was produced in a sustainable manner. Organic agriculture is also one of the fastest growing sectors in U. S. agricultural production. Since the adoption of the USDA National Organic labeling scheme, U.S. exports of organic products into international markets had been increasing. However, in 2002, organic imported products exceeded U.S. exports, reflecting in increase in U.S. consumer demand for organically produced agricultural products (Thilmany, 2006). European Union (EU) countries and the United States are both large-scale consumers of organic products. According to a 2005 report by the USDA, consumer purchases from EU countries and the United States made up "95 percent ($25 million) of world retail sales in 2003" (Dimitri and Oberholtzer, 2005). Additionally, a 2007 survey by the Organic Trade Association, noted that the U.S. organic industry expanded 21 percent with a total of $17.7 billion in consumer sales in 2006 (OTA, 2007).

staying power if the capacity building component turned into a decades-long endeavor.

Some participants wondered if new institutions are necessary to support certification efforts. The International Social and Environmental Accreditation and Labeling Alliance (ISEAL) is one such institution that has emerged to fill this void. ISEAL works with a range of voluntary standards systems,

providing services, advocating in trade and policy circles, and developing tools on some of the more mundane issues (e.g., auditing requirements) common among certification programs. In the coffee sector, the Common Code for the Coffee Community (4C) has emerged as an alliance of public and private stakeholders, to reconcile the various competing sustainability standards and move the industry forward. Part of 4C's mission is to provide support mechanisms to farmers and put them on a path of continual improvement, bolstered by an extensive outreach network and training modules.

Who takes responsibility for knowledge extension in this emerging field remains an open question, and in all likelihood it will differ across sectors. The important point is that these programs will need that extension agent, if they are going to be able to scale up and enter new regions and constituencies. On a related point, the tent will need to be bigger for these schemes to succeed. As participants noted, schemes are generally not engaging enough of the right stakeholders, further complicating efforts to scale up.

MULTIPLIER EFFECTS AND COMPLEMENTARY APPROACHES

Certification programs have met with some success, in terms of identifying and establishing markets for more sustainable products, but there appears to be much greater potential if they could be incorporated into other regulatory and voluntary approaches. Regulatory agencies do not like ambiguity—certification processes may be a means to navigate complex issues, explore and experiment with new standards, and then hand them off to regulators to scale up or make mandatory. Given the increasing interest in reducing greenhouse gas (GHG) emissions, it seems certain that certification will play an important role in managing offsets and establishing national and international markets for energy and carbon trading. At a broader level, certification networks have emerged as a bridge connecting different sectors, and this in itself can be valuable to sustainability efforts.

The demonstrated viability of green or sustainable products begs a normative question: Should communities continue to allow unsustainable products in the marketplace when sustainable alternatives exist? As stakeholders on all sides grapple with this, certification schemes have been able to move ahead and demonstrate how markets could be transformed, without waiting for a regulatory mandate. For regulators who are engaged in these sorts of voluntary programs, though, the exercise can be an important testing ground. In California, for example, certain programs have eventually rolled into mandates. Governments are able to play several supporting roles, in fact, as large-scale procurers of certified products, as managers of standards, and possibly as regulators if voluntary standards

begin to represent the norm. Firms may also invest in certification schemes as part of a risk management strategy, to guard against imminent regulation on certain issues like GHG emissions. There may also be lessons from experience with integrated product policies (e.g., procurement, substance restrictions, product takebacks), whereby firms are attempting to green their value chains and have cooperated with regulators like EPA to manage some aspects.

Many participants emphasized that there ultimately must be a business case for certification schemes. Compliance costs are expected, and not insurmountable, but should be put alongside considerations of product quality improvements and potential as a "customer-facing" innovation designed to help move products. Others pointed out that buyers (in firms and retail stores) like not having to evaluate or approve several sets of criteria. Certified labels can be helpful here, and can also provide additional data for CSR reports. Information disclosure can also be a powerful tool, as evidenced by earlier experience with EPA's Toxics Release Inventory (TRI). No corrective actions were mandated as part of the TRI, but the information disclosure alone forced many industries to react.

Finally, certification's stakeholder engagement mechanism provides an opportunity to bring in elements and considerations that might not be included in regulatory or industry-led approaches. This can actually provide the leverage to move larger parts, e.g., setting standards which governments take over; bringing industries on board; coordinating stakeholders across a value chain. Certification schemes can function as a boundary organization (see NRC, 2006) in a knowledge system—they create opportunities to improve management, resolve conflict, and share promising practices. Whether this evolves into a collaborative, multistakeholder partnership or remains a loosely coordinated alliance depends on the players. However, to be effective, a certification system must be able to engage the right group of stakeholders (including adverse parties) and work to ensure its own financial sustainability. It is not clear yet that any certification scheme has identified a sustainable financing structure, but over the long term this will be fundamentally important.

8

Future Research Directions

Like other policy tools, one would expect that certification programs will continue to improve, as producers gain experience, knowledge is passed on, and consumer awareness increases. However, this process of improvement could take decades to unfold, in the absence of more targeted research and guidelines for enhancing the effectiveness of certification. More importantly, if certification programs begin reaching a tangible share of consumer markets, it will be critical to identify how and where these programs are leading to positive environmental and social outcomes. Given the pressing need to mitigate the negative impacts of global consumption, and recognizing that certification is one means to this end, workshop participants were asked to identify some of the top areas in need of improvement or innovation if certification is to become an effective tool for more sustainable development. Participants attempted to identify some problem-driven research tasks, and also discussed the potential for a cross-sector assessment (to be carried out by the NRC or a similar body) to help articulate some guiding principles.

Many participants pointed out that there is a great deal of activity already underway to study certain aspects of certification programs. However, some of this research is agenda driven, and little of it is coordinated in a way that learning can take place across sectors or industries. Three specific areas identified were measuring impacts, establishing credibility, and mainstreaming standards. Participants also noted the need for additional forums, such as this workshop, in order to keep up the open exchange of ideas and potential paths forward.

IMPACT INDICATORS AND BASELINES

There is a keen interest in understanding where and when certification programs are delivering on their promise of moving markets towards sustainability. Sustainability may be a moving target, but the general feeling among participants was that certification programs could nonetheless be doing a much better job in demonstrating and communicating their effectiveness. Further independent research on endpoints, in terms of land use, human health, environmental quality, and other factors could serve as guideposts for more effective certification programs. This would be useful in developing more meaningful metrics within a system, and could also be broadly applied across systems. Monitoring and evaluation are key components of certification programs, but as participants noted, they are not benchmarked well. Standards are being developed without set goals, and are based on theories of change that are untested.

Given the amount of experience within the field of certification, there is also an opportunity for some external evaluations of current programs. Understandably, certification programs have not generally taken a critical look at their impacts. Often times a program focuses on scaling up its *efforts*, but, as many participants noted, scaling up the *intended impact* is much more effective at advancing sustainability goals. Science can play a role in evaluating the impact of previous certification program outcomes and contribute to developing future baseline criteria. With cooperation from certification programs, it might also be possible to conduct long-term impact assessments.

One of the challenges to identifying and then measuring impacts is that certification never occurs in a vacuum. More work is needed to understand how voluntary standards are interfacing with policy and regulations. Progress here could shed light on how to measure impacts and unintended consequences, and most importantly, identify the contexts in which certification seems to be the appropriate tool. This may be a way to identify some of the unexpected impacts, both positive and negative, resulting from certification efforts. These include outcomes, such as multiplier and spillover effects of certifying specific products and services.

OUTLINING A CREDIBLE PROCESS

Earlier discussions of credibility focused more on the certified label or seal, and whether or not it was meaningful or merely contributing to green noise. Credibility from a consumer standpoint is one issue, but credibility also matters to NGOs, businesses, and governments who support certification schemes. Many participants emphasized that credibility should apply

to the entire process, from initial development of the standards all the way to point of purchase. This might also include more focus on *delivery* of certification programs, e.g., how they are financed and governed.

Some of the questions participants identified include:

- Are current certification programs delivering a sustainable product?
- Are programs well-organized?
- How does a certification program fit in a particular regulatory structure?
- How, if at all, does the certification program evaluate free riders and cheaters?

Given the diversity of certification regimes, and their rich experiences, a compilation of comparative case studies could prove useful. As several participants pointed out, the literature in this area is expanding and could be usefully mined, though it currently exists in several different disciplines. One approach several participants suggested was to study both manufactured products and resource management schemes (e.g., agriculture) and examine proven outcomes, that is, asking if the certification programs are making a difference and delivering on their stated goals. Comparative case studies could look at "what works and why," revealing the processes that lead to success or failure of a certification program.

This sort of work could also contribute to the discussion of what a credible certification process looks like. Though there will continue to be experimentation and "reinvention of the wheel," deeper analytical work could contribute to templates or blueprints to make certification more efficient, and ultimately more effective. Some of the key points deserving exploration include tipping points (e.g., the market share at which demand actually drives the process) and other variables that can affect those outcomes or goals. An assessment may not necessarily reveal universal standards or definitions of "success," but should highlight the importance of following a credible process. Such an analysis may also evaluate the *mechanism* of change (not simply the theory) in a few certification programs.

Participants noted that government agencies such as the FTC may be open to advice on when and/or where to regulate nonsensical claims of "sustainable" products and services, thereby helping to remove falsely labeled items from the market. Furthermore, agencies such as NIST, who focus on technology standards and measurement, and FTC, who focus on consumer protection, could benefit from more rigorous analysis of the proliferating standards and claims of sustainability.

MAINSTREAMING AND MARKET TRANSFORMATION

Mainstreaming, as participants defined it, refers to the process of moving sustainable production and consumption from niche or competing markets into industry standards. It does seem possible that standards can be mainstreamed, possibly industry by industry, and several participants referenced the coffee sector, where much work has been done, and standards appear to be converging. If the goal of a particular scheme is to become mainstream within its sector, the goal of those promoting certification is ultimately one of market transformation, so that markets adequately reflect the full environmental and social costs of production and consumption.

Participants noted that certification programs could play a vital role in market transformation, but they should not be created and implemented in a universe parallel to government policies. Put another way, certification should not be considered as an alternative to or substitute for regulation. Potentially, certification programs can be developed alongside complementary government regulations/standards, with the idea of mainstreaming concepts and performance standards. In the developing country context, several participants noted that certification has been proposed as a mechanism to fill the void of lax or nonexistent regulation in some sectors. However, experience so far has shown that certification has been slow to take hold in developing countries. These countries have sometimes raised concerns that their interests are not being represented by certification programs—this becomes problematic when a program then needs to rely on developing country participation in its capacity building or scale-up efforts.

Some participants suggested that environmental health and nutrition concerns may be a vehicle for mainstreaming certification programs and changing the markets. There is some emerging evidence that, for example, consumers buy organic products primarily for reasons of personal health, even though these alleged benefits are minor compared to the benefits to local ecosystems and agricultural workers. In fact, the USDA makes no claim that organic foods are any safer or healthier than conventional alternatives.

Many participants suggested that more work be done engaging economists and social scientists who research firm behavior as it relates to science and certification standards. Social marketing is another field that warrants further study in the context of promoting behavioral change. An examination of such marketing strategies may include an analysis of the "push" element of certification standards used by industry to help "pull" consumers into a market.

Although some research exists, many participants noted that more work is needed to understand how to build consumer preference for sustainable products and what the market impact will be if consumer demand

for certified products increases (e.g., Will consumers begin expecting more products to be certified?). Participants noted that the research community can help consumers understand lifecycle issues for particular products—especially if current research models or tools are marketed for use by the general public. For example, Earthster, an open source, web-based lifecycle assessment tool, offers lifecycle analysis (LCA) to companies so that they can record, assess, and market their environmental and social performance. Many participants questioned whether or not certification programs can be built to drive the demand side and not simply the supply of products and services.

AREAS FOR FURTHER INQUIRY

In general, workshop participants felt that many more questions needed to be answered to address the optimal implementation of certification programs. In order to better understand their role, it is critical to examine not only the certified portion of the market, but to analyze the market as a whole. To do this, one should look at the drivers affecting the larger portion of the market that is not certified (approximately 95 percent), and conduct a comparative analysis examining multiple variables that need to be cumulatively moving in the same direction in order to advance the sustainability agenda. A rigorous, hypothetical reduction might need to be carried out to help identify these dependent variables. How effective was a particular certification program or approach at tackling a particular problem as opposed to regulation or education or other mechanisms? How does the performance of certified products compare to their uncertified competitors, in terms of environmental or social impacts?

Among certification programs, there are also some comparative studies that could shed additional light on effective approaches. Some specific comparative research questions put forward by participants include:

- Does a performance-based standard that focuses on measureable impact reductions (e.g., LEED for green buildings) lead to more significant outcomes than a standard that focuses on changing practices (e.g., Forest Stewardship Council or Marine Stewardship Council), or is this more a function of one being quantitative while the other is mostly qualitative?
- What has been the experience of tiered systems (e.g., with a gradient for compliance at different levels) versus pass/fail systems?
- What role has power dynamics played in the implementation and success of certain certification programs? How have certification programs worked in specific country contexts, and with existing configurations of political power? How have certification programs worked in conjunction

with more targeted programs to address root causes of unsustainability, such as poverty or corruption?

There are also topics that might be researched and analyzed in a "myth or fact?" format—a challenge in building the knowledge base on certification systems is that certain myths seem persistent, and certain truths remain undiscovered. One such example is to analyze several existing schemes to understand net costs and benefits, and to where they accrue. This could add clarity to discussions of barriers to adoption, compliance costs, and viable financial models to sustain a program.

Overall, participants did not agree on a single methodology to address these questions. Several participants suggested that a small set of case studies would be illustrative, and that certain sectors, such as the coffee industry, were already well documented. Other participants noted that fisheries, for example, are such a distinct and complex case that they might need to be studied separately—lessons drawn from other sectors' experiences may not apply.

Participants emphasized that there is much to be gained by assembling and assessing what has been done, or is already underway, and outlining a methodological approach to answer the core questions on certification's effectiveness. Some industries suggested for analysis included agriculture, marine fisheries, timber and tea. Several participants suggested learning from the rural sociology literature, which is rich on impacts and implications of standards programs. Furthermore, while acknowledging that standards setting is often a political process, participants wondered how evidence-based knowledge could be better integrated at the formation of a standard, so that it is meaningful and effective at achieving results that contribute to sustainable development.

Finally, consumption, in general, is an issue area in need of additional research attention. A number of participants suggested that a follow-on forum could look more broadly at the role certification and its alternatives might play as we sustain a human population of 9 billion by 2050. As many noted, certified products do not offer guidance on how much we can sustainably consume. Developing world economies are beginning to promote and experience more domestic household consumption, and the ramifications of this trend are poorly understood. Knowing more about global consumption and opportunities to reduce or more equitably distribute it may help address overconsumption in developed countries and help developing countries as they transition to less resource-intensive economies.

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SELECTED WEB SITES

4C Association for a better coffee world
http://www.4c-coffeeassociation.org/en/

American National Standards Institute—ANSI
http://www.ansi.org

Forest Stewardship Council, Global
http://www.fsc.org/

ISEAL Alliance
http://www.isealalliance.org

Marine Stewardship Council
http://www.msc.org

TransFair USA
http://www.transfairusa.org/

USDA National Organics Program
http://www.ams.usda.gov/nop

U.S. Federal Trade Commission "Green Guides"
http://www.ftc.gov/opa/reporter/greengds.shtm

USGBC LEED Rating Systems
http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222

Background Papers

Standardization, Certification, and Labeling: A Background Paper for the Roundtable on Sustainability Workshop January 19-21, 2009

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INTRODUCTION

The use of standards, certification, and labeling has been growing in a number of areas, as consumers demand more information about the products that they use. From a consumer perspective, they have become increasingly common in relation to information regarding nutrition, safety, and most recently, the environmental impact of a range of products. Certification has become a popular tool in environmental policy, and is widely seen as one method to influence purchasing behavior, and through the power of markets, reputation, and branding, the environmental behavior of firms.

While there are many environmental certifications and labels that have grown in visibility and popularity (LEED for buildings and USDA Organic for foods, among others), they are not a policy panacea. There are a variety of issues that need to be addressed regarding their effectiveness, ranging from how they are developed, who ensures their veracity, and whether they actually produce a positive impact. This background paper will start by looking at general public policy theory, to help explain how standards, certification and labeling function as compared to other potential policy tools. Then it will address some key issues that have emerged both from the underlying theory and actual empirical experience. Understanding both the theory and the reality of these efforts to date are key to developing a deeper understanding of when and how standards, certification, and labeling can be used with the greatest positive impact.

TABLE 1 Definitions

Term	Definition
Standard	Specifications and/or criteria for the manufacture, use, and/or attributes of a product, process, or service.
Certification	The process, often performed by a third party, of verifying that a product, process or service adheres to a given set of standards and/or criteria.
Labeling	The method of providing information on the attributes, often unobservable, for a product, process or service.

THEORY

The first step in building the theory behind standards, certification, and labeling is to understand that these three terms, while often used (nearly) interchangeably, are actually different aspects of a process that is meant to increase the amount of information available to the consumer/user of a given product or service. Table 1 gives a definition of each of these three terms.

These three tools are interdependent. For example, certification requires some set of criteria (standards) against which a process, product, or service is being judged. And labels refer, at the very least, to some implied (though not necessarily explicit) criteria. Therefore, efforts to understand how this kind of information provision works as a policy tool have to take each of these aspects separately, while still understanding how they interact with each other.

Implicit in the entire process of standardization, certification, and labeling is a set of underlying goals. Standards are not set arbitrarily—they are used to address a specific problem. A basic example is the electric wall socket. All electric wall sockets in the United States have the same shape, and deliver the same 120V AC current. This is a standard—but the underlying goal is to have a system in place so that any electric device can be plugged into, and run off, any electric wall socket in the country.[1] This also illustrates another important point—there is usually more than one standard that will solve the same problem. In Europe, wall sockets have a different configuration and deliver 240V of AC current. But for each region, the underlying problem was solved through the creation of a set of criteria for the delivery of electric current for common use. A highly simplified process diagram is shown in Figure 1, where the identification of a problem

[1] For this example, there is also an associated certification and labeling program. Most electrically powered devices sold in the United States are inspected, certified, and labeled as being approved by the Underwriters Laboratories (UL), an independent company that works with industry to develop appropriate product safety standards. These products are certified and labeled, so that consumers know that the devices can be used safely.

FIGURE 1 Simplified process diagram from goal to label.

leads to the setting of a goal, which in turn influences the development of a standard, which can, if needed, be certified and labeled. As will be explored, standards are not necessarily designed with a singular goal in mind. The details of the standard will influence the appropriate process for certification, as well as the most effective method of labeling.

In questions of policy, broadly speaking, one common pitfall occurs during the process of goal setting, when it is easy to get confused between "means" and "ends." Goals should always be "ends." Some examples of ends are improved air quality, drinkable water, and an improved standard of living. The setting of a standard, or the development of an environmental regulation is not an end, or goal, in and of itself. These are means—the tools which are used to reach society's goals. This distinction should be kept in mind throughout the discussion of standards, certification and labeling, where it is easy to fall into the trap of believing that these tools are ends in and of themselves, and not just one of many methods for accomplishing a set of goals.

Before delving into the details of the entire process, it is useful to take a step back and look at the family of problems that can be addressed using these policy tools, and the potential alternatives.

What Is the Problem? The Economic Perspective

To understand some of the basic theory behind the need to use any kind of policy, including standardization, certification, and labeling, one starting point is economics. In classic micro-economics, economists make a series of assumptions that, while convenient for solving mathematical models, are in reality nearly always violated. These in turn lead to market failures—situations where a decentralized competitive market does not result in the most optimal allocation of goods. From an economic perspective, the justification for public policy is to correct these market failures. The four traditional market failures are public goods, externalities, natural monopolies, and information asymmetries.[2]

[2] D. L. Weimer and A. R. Vining, *Policy Analysis: Concepts and Practice*, Prentice Hall, 1999; pg. 71.

One of the challenges of environmental policy is that many environmental problems are the result of a combination of two or more of these types of market failures. Thus it may take several approaches to effectively address any particular environmental challenge.

For example, take the case of agriculture. Agricultural production can result in negative environmental impacts on those other than the individual farmer engaging in production (externalities). The consumers of the farmer's produce are often geographically separated from the farm, and thus have no way of knowing whether their food was produced using more or less environmentally responsible methods of agriculture (information asymmetry). For the farmer, even if he wants to engage in a more responsible use of an input, say electricity, he most likely has a choice of only one supplier, due to the nature of electricity production and supply (natural monopoly). And finally, a new, environmentally friendly technique may be a public good. In economic parlance, that means that they are nonexcludable (there is no way to prevent others from benefiting from using the new method) and nonrivalrous (the use of the new method by one farmer does not impact the availability of the same method to other farmers). This deters firms from investing in developing new techniques, since there may not be enough of the benefits of their efforts to cover the cost of the innovation.

Each of these market failures requires different policy approaches. Table 2 shows some of the typical, "generic" policy tools that are typically used to address market failures.

Going back to the case of agriculture, for the farmer who is investing in a new innovation, the ability to patent a new seed type or technique can overcome some of the hurdles presented by the public good nature of the product. Classical government regulation on emissions and run-off can be used to deal with the externalities of farming practices. Governments also regulate certain natural monopolies, such as the provision of water or elec-

TABLE 2 Generic Policy Solutions

	Market Mechanisms	Incentives	Rules	Nonmarket Supply	Insurance and Cushions
Traditional Market Failures					
Public Goods	X	X	X	X	
Externalities	X	X	X	X	
Natural Monopolies	X	X	X	X	
Information Asymmetries			X	X	X

NOTE: Adapted from Weimer and Vining, 1999; pg. 260.

tricity, to make sure that optimal levels of these inputs are provided. And finally, there are a variety of techniques that can help overcome the problem of the information asymmetry between the producers and consumers, like the USDA's "Organic" label. Standards, certification, and labeling are a set of policy tools which fall under the "Rules" category in Table 2, and are most appropriate for dealing with the problems that arrive from information asymmetries and negative externalities.[3]

Understanding Information Asymmetries and Negative Externalities

The problem of information asymmetries was most famously addressed by Akerlof's "Market for Lemons."[4] In one of the classic papers in microeconomics, Akerlof laid out the case where there are two kinds of cars being sold—cherries (good cars) and lemons (bad cars). The sellers of the cars know which type they are selling, but the buyers have no way of telling before they purchase the car whether it is a lemon. In the absence of any policy intervention, Akerlof showed mathematically that the equilibrium solution is that no cars are sold—a complete breakdown of the market for cars. However, when information is available to the buyers, the result is an efficient market for cars. This analysis is obviously a simplification, but it is a great illustration of how the provision of information from the sellers to the buyers can be used to establish a market, in which all parties end up better off.

This result is important for thinking about the hidden qualities of products. For example, if a consumer is looking at an apple in a store, there are certain qualities that are visible. The consumer can judge the color, the firmness of the fruit, external evidence of damage or bruising, and even the smell. There are some qualities that are temporarily hidden, but can be determined post-consumption, called unobservable quality attributes.[5] For apples, these are qualities like hidden damage, and of course, taste, which are not knowable before a decision is made to purchase a particular piece of fruit. And finally, there are some qualities which cannot be observed, even after the product is consumed, such as the environmental impact of the apple's cultivation and transport. Goods that have qualities that are unobservable even after consumption are called post-experience goods[6] or credence goods.[7] In addition to being used for pre-consumption and pre-experience goods (e.g., size and variety of an apple), standards, certification and labeling are useful for dealing with post-consumption and

[3] Ibid., pg 235 (Table 10.3).

[4] G. A. Akerlof, "The Market fir "Lemons1J: Quality Uncertainity and the Market Mechanism," *The Quarterly Journal of Economics* 84 (3):488-500.

[5] J. McCluskey, *Agricultural and Resource Economics Review* 29(1):1-9.

[6] Weimer and Vining, "Policy Analysis: Concepts and Practice."

[7] McCluskey, 1-9.

post-experience goods. They allow customers to have more information regarding impacts of their consumption that would otherwise be unobservable to them.

Negative externalities occur when the actions of one party (the actor) negatively impact others, but this negative impact doesn't actually cost anything to the party performing the action, and the impacted parties have no say in the economic decisions of the actor. Because the actor does not bear the cost of his actions, the result is that more than the socially optimal amount is produced. Pollution is a classic example. When a factory releases waste into a river, it can harm the environment and the residents downstream from the factory. In the absence of policy, releasing the waste into the river costs the factory nothing—the costs of this behavior is borne out by those downstream, and more pollution is produced than is socially optimal. Economic theory proposes several possible solutions to the problem of externalities. The most basic solution is that the affected party can pay the actor to change his/her behavior.[8] In reality, this is very difficult, and not particularly practical. A second approach that is popular in economic theory is to find ways to internalize the cost of the action that creates the negative externality, often through policy mechanisms like taxes, fees, and fines.

A great deal of environmental policy involves finding ways to mitigate the negative externalities of environmentally harmful behaviors through the use of regulations, economic incentives, and other tools. Some systems of standards, certification, and labeling can be used to deal with negative externalities by making it clear to consumers which products and processes are incurring fewer harmful externalities. Given this information, consumers can incorporate it into their consumption decisions—with the hope being that the market will reward those products that result in less harmful impacts. USDA Organic food works on this principle. Organic farming standards are meant to be less environmentally harmful, so foods labeled as certified organic should create fewer negative externalities than conventionally grown foods.

What Is the Problem? The Policy Perspective

Economic theory underscores that the availability and dissemination of information is required for markets to function properly. While this is a valuable perspective, policy makers are required to take a pragmatic view of the world. Instead of finding ways to fix models with nonoptimal solutions, policy makers are faced with the (often literally) messy world in front of them. If you ask a policy maker the question "What is the problem?" you would not expect to hear, "I believe that the market for

[8] R. H. Coase, "The Problem of Social Cost," *The Journal of Law and Economics* 3,(1):1.

environmentally benign cleaners is inefficient due to information asymmetries." You would be much more likely to hear, "We need to find a way to encourage more production of environmentally friendly cleaning products," or even, "There's new information that many cleaning products are bad for people and the environment."

Once policy makers identify the problem, they can formulate an associated goal. With a goal in place, then they can work to decide what the proper policy approach is to meet that goal. What are some of the policy options available? While some of the problems for which standards, certification and labeling may make sense are cases of information asymmetry, there are other examples where the rationale may be technical interoperability (gasoline additive content, UL, internet protocols), or the need to improve a certain quality (labor standards, environmental impact) that may be difficult to completely address using other policy methods.[9]

In order to understand when standards are an appropriate step, a whole inventory of other options also needs to be considered. Often, in order to reach a goal, more than one tool has to be employed, since policy problems usually involve complex systems, with many interconnected elements. Table 3 (opposite page) gives more examples of policies in each of the five generic policy types from Table 2.

Obviously, there are always more options available to creative policy makers, but this list covers the most commonly used approaches to dealing with policy problems of all types. Policy makers, unlike economists, do not always have the option of spending large amounts of time developing theory. They are problem based, and constantly have to balance the viewpoints of a number of constituents. They have to deal with the competing interests of stakeholders, which can make policy making contentious and confrontational. The challenge for effective policy makers is learning how to select the proper policy, or combination, and then get them implemented.

Policy Trends: Voluntary and Self-Regulation

Historically, different types of policies come in and out of vogue. In the 1970s, with the Clean Air Act and the Clean Water Act, rule-based policies on point-source emissions were popular. In the 1990s and 2000s, a variety of market-based regulations, like auctions and the allocation of property rights (in the form of cap and trade systems) were used as new methods for addressing the same problems.

[9] Depending on the kind of standard, they may be mandatory (regulated and required by the government, such as certain emissions standards), or they may be voluntary (like USDA Organic). The mandatory versus voluntary nature of standards will be addressed later in this paper.

TABLE 3 Policy Examples[a]

Market Mechanisms	Incentives	Rules	Nonmarket Supply	Insurance and Cushions
Deregulate	Output taxes	Civil laws (ie liability rules)	Bureaus	Mandatory Insurance
Legalize	Tariffs	Criminal laws	Government Corporations	Subsidized Insurance
Privatize	Matching grants	Price Regulation	Special Districts	Stockpiling
Allocate through property rights	Tax expenditures (business deductions and credits)	Quantity Regulation	Direct Contracting	Transitional Assistance
Create new marketable goods	Commodity taxes/ user fees	Direct information provision (disclosure and labeling)	Indirect Contracting (nonprofits)	Cash grants
Auctions	In-kind subsidies	Indirect information provision (registration, certification and licensing)[b]		
	Vouchers			
	Tax expenditures (personal deductions and credits)			

[a] From Weimer and Vining, "Policy Analysis: Concepts and Practice," Chapter 10.
[b] The standard/certification/labeling policies fall into this category.

The recent increase in standards, certification, and labeling is part of a trend towards voluntary rules and self-regulation, as opposed to government imposed mandatory rules. This method of regulation, which has also been referred to as "civil regulation," tends to deal with social and environmental impacts.[10] It is closely related to the rise in corporate social

[10] D. Vogel, "Private Global Business Regulation," *Annual Review of Political Science* 11 (2008).

responsibility (CSR).[11] Firms engage in self-regulation in areas in which other regulation is weak or absent, as well as in areas where strong regulatory systems are already in place.

For example, in the early 1990s, the U.S. EPA ran the 33/50 voluntary reporting program, which was aimed at reducing emissions of a list of 17 key toxic chemicals, all of which were firms were already required to report as part of the Toxics Release Inventory (TRI). Participation began in 1991, and involvement in 33/50 was voluntary on the part of firms, who were invited to participate by the EPA. They committed to publicly self-report on their progress towards reducing a variety of emissions. Firms set their own goals, and while most set specific, numerical targets, a number did not. The EPA did not require any particular reduction goal for participation, and there were no penalties for those that did not meet their pledges. In the end, participating companies exceeded their reduction goals, and showed greater reductions than companies that did not participate. The EPA's own goals (33 percent reduction in the first two years, reaching 50 percent by 1995) were met a year early.[12] Firms, in fact, voluntarily overcomplied. These seem to be impressive results given that participation was voluntary, and that there were no penalties for firms that were not able to reach their goals.

This naturally leads to the question of what is driving the turn towards voluntary regulation. There are a large number of policies that would benefit firms. Why is this particular approach gaining in popularity?

There are a number of potential explanations. An important aspect is the dynamics that result from globalization.[13] Supply chains are spread out across the world. Even a firm that manufactures and sells its products in a single jurisdiction may have to deal with suppliers that are geographically distant, and about whom information may be difficult to verify. Multinational firms have to come up with strategies that allow them to deal with variety in standards, norms, business practices, laws and regulations in the places where they do business. Table 4 lists some of the challenges addressed by voluntary regulation that occur in global supply chains. While the forces of globalization have been very successful at promoting a more efficient use of resources for production, they have also increased the complexity of the systems, and produced more difficulties with information asymmetries.

[11] G. Auld, S. Bernstein, and B. W. Cashore, "The New Corporate Social Responsibility," *Annual Review of Environment and Resources* 33(1) (2008) defines the new CSR as the internalization of negative externalities that are the result of a firm's core business by addressing these issues directly through the promotion of behavioral standards.

[12] United States Environmental Protection Agency, "33/50 Program The Final Record," EPA-745-R-99-004 (1999; accessed Dec. 19, 2008).

[13] Vogel, "Private Global Business Regulation."

TABLE 4 Challenges to Firms from Globalization

Challenges to Firms
1. Credibility of information on the practices of geographically distant business partners
2. Differences in regulatory standards: Labor, Environment, etc.
3. Worldwide visibility of business practices
4. Diversity in customer demands
5. Diversity in acceptable norms for doing business
6. Increased number of stakeholders (i.e., NGOs, governments, consumers)

Voluntary regulations, including internal and external standards, are one way for firms to cope with the complexity of a global marketplace.

Changes in technology have also resulted in the ability for information to move around the globe very quickly. This means that the bad acts of firms can be publicized globally. A firm that causes environmental damage in one location may find itself facing the displeasure of consumers thousands of miles away. This has increased the power available to consumers, and society more generally, to demand certain levels of behavior from firms.

Voluntary regulation has been popular as a way of reducing risk to individual firms in sectors where the negative behaviors of one or two actors could have severe impacts on a multitude of firms. This is seen to be one of the driving forces behind the American Chemistry Council's requirement that members participate in the Responsible Care program. After the tragedy at Bhopal, it was clear that in the case of catastrophic chemical accidents, the whole industry would be "tarred with the same brush." In order to counter negative publicity, and the potential for onerous, restrictive regulation, it was in the interests of chemical industry firms to develop their own standards for safety and environmental impact.[14] Similar concerns have driven other industrial trade organizations to set up their own standards in the areas of labor and the environment.

Another driver has been the increase in the power and activity of civil society groups.[15] Civil society, usually in the form of nongovernmental organizations (NGOs), has been very active in pressuring firms to change their behavior. While one tactic of NGOs has been to influence governments, others have chosen to focus on the private sector.[16] For example, when their attempts to pressure national governments to enact forestry standards failed, NGOs turned to the private sector. This change in strategy

[14] A. A. King and M. J. Lenox, "Industry Self-Regulation Without Sanctions: The Chemical Industry's Responsible Care Program," *Academy of Management Journal* 43(4):698-716.

[15] Vogel, "Private Global Business Regulation."

[16] Ibid.

eventually led to the creation of the Forest Stewardship Council (FSC).[17] Pressure from NGOs can create a powerful incentive to engage in voluntary regulation. Working with NGOs can increase the legitimacy of a firm's actions; those who ignore them risk becoming the targets of negative campaigns and boycotts.

Voluntary regulation is also useful in areas where more traditional regulation would be difficult, or is absent. Setting, monitoring, and enforcing mandatory, rule-based regulations can be time consuming and costly, and fraught with bureaucratic challenges. Voluntary regulations move the burden of the rule making and enforcing business away from the government and onto an array of private, NGO, and academic stakeholders. This makes it attractive in nations that may not have the expertise and funding available for other, traditional methods of regulation

Finally, voluntary regulation may also be useful for emerging areas of environmental interest, where government regulation may move much more slowly, or where the organizations in charge of government standard setting are diffuse. For example, standards for green buildings (like LEED) have moved in advance of government in setting building codes and standards. Since in the United States, most building regulation is promulgated, monitored, and enforced on a state and local level, it was far less costly for stakeholders to develop a single, voluntary LEED standard, which was then available for local regulators to use, either as the basis for their own codes, or whole cloth as a part of their own regulatory schemes (such as Boston's requirement that all new commercial projects over 50,000 square feet size adhere to LEED standards).[18]

Voluntary Regulation: Why Firms Choose to Participate

From the example of 33/50 and others, such as Responsible Care and ISO 14000,[19] one of the first questions to emerge is why a firm chooses to participate in voluntary regulatory programs. One explanation is that despite the short-term costs of participation, firms are able to reap real economic gains. For more than a decade, scholars have demonstrated that there is a link between superior environmental performance and financial performance.[20] Growing out of the empirical evidence, there are a number

[17] Ibid., Graeme Auld, Lars H. Gulbrandsen, and Cosntance L. McDermott, "Certification Schemes and the Impacts on Forests and Forestry," *Annual Review of Environment and Resources* 33 (2008):187.

[18] Palmer, Thomas C., Jr., "Boston ready to go green Private developers face 1st-in-nation rules for buildings," *The Boston Globe* (2006): D1.

[19] ISO 14000 is an international Environmental Management System standard promulgated by the International Standards Organization

[20] G. Dowell, S. Hart, and B. Yeung, "Do Corporate Global Environmental Standards Create or Destroy Market Value?" *Management Science* 46(8):1059-1074.

of other reasons presented in the literature to explain why firms choose to participate in voluntary regulation of various types. A list of the most important reasons is presented below.

1. *Firms may engage in voluntary regulatory programs in anticipation of future regulation.*[21] They may hope that participation will convince policy makers that mandatory regulation is unnecessary. Or, they may anticipate stricter regulation in the future, and choose to adhere to voluntarily higher standards in advance, in order to gain a competitive advantage. They may even choose to amplify this advantage by lobbying for stricter mandatory regulations in the future.[22]

2. *Firms may engage in voluntary regulatory programs to protect their reputation and/or brand.*[23]

3. *Firms may engage in voluntary regulatory programs to gain exposure to practices that improve operations.*[24]

4. *Firms may engage in voluntary regulatory programs as a signal to consumers and/or business partners.*[25] Certain certifications convey a message about the quality of a firm's product or business practices which would otherwise be unknown to the market. This signal may also allow them to extract a price premium, like that associated with organic foods or free trade coffee.

In summary, firms participate in voluntary regulation because they believe that there is a real benefit to be accrued, or, conversely, that there is a potential for a very large cost if they do not.

STANDARDS, CERTIFICATION, AND LABELING: EMPIRICAL CHALLENGES

In the typology of policy tools, standards, certification, and labeling can be seen as a subset of voluntary regulation. There are obviously cases

[21] S. Arora and S. Gangopadhyay, "Toward a theoretical model of voluntary overcompliance," *Journal of Economic Behavior & Organization* 28(3):289-309; Vogel, "Private Global Business Regulation."

[22] Arora and Gangopadhyay, "Toward a theoretical model of voluntary overcompliance," 289-309.

[23] Vogel, "Private Global Business Regulation."

[24] E. Ostrom, R. Gardner, and J. Walker, *Rules, Games, and Common-Pool Resources,* University of Michigan Press, 1994; M. J. Lenox, "The Role of Private Decentralized Institutions in Sustaining Industry Self-Regulation," *Organization Science* 17(6):677.

[25] Ibid., A. A. King, M. J. Lenox, and A. Terlaak, "The Strategic Use of Decentralized Institutions: Exploring Certification with the ISO 14001 Management Standard," *The Academy of Management Journal* 48(6):1091-1106; M. Spence, "Job Market Signaling," *Quarterly Journal of Economics* 87(3) (1973):355-374.

TABLE 5 Empirical Challenges

Challenges
1. Determining effectiveness
2. Establishing Credibility
3. Unintended Consequences
4. Competing Standards and Target Audiences
5. Sustainability
6. Finding the Good-Enough

where the three are mandatory (such as food labeling rules in the United States), but in the case of environmental policy, the appeal of certification and labeling for many actors has been its voluntary nature. At least in theory, firms have a choice in whether or not they participate in a particular program. And policy makers have the choice of whether to engage with these types of policy tools, or to use other options at their disposal. Theory has provided some guidance, but there is also emerging empirical evidence regarding how and when standards, certification and labeling are (or are not) effective, some potential traps, and ideas that need to be kept in mind in their development and use. Table 5 summarizes these challenges, which are explained in more detail below.

Determining Effectiveness

Empirical evaluations of certification programs have raised a host of important questions, and have highlighted a variety of ways in which these programs can fall short. One of the first and most important questions is whether this approach is actually effective at addressing the underlying environmental problems. Can the certification programs be empirically linked to actual progress towards goals? This can be very difficult to ascertain. In the case of ISO 14000, there is evidence that in the United States, firms that participated demonstrated improved compliance with government regulations as compared to nonparticipants, even when controlling for past compliance history.[26] In the case of forest certification, Auld et. al reported that there is evidence that forestry practices are changing as a result of certification requirements. But these changes in practices have yet to be linked to actual changes in deforestation and forest degradation.[27] So the impact of forest certification on actual conservation remains unclear. This does not

[26] M. Potoski and A. Prakash, "Green Clubs and Voluntary Governance: ISO 14001 and Firms' Regulatory Compliance," *American Journal of Political Science* 49(2):235-248.

[27] Auld, Gulbrandsen, and McDermott, "Certification Schemes and the Impacts on Forests and Forestry," 187.

necessarily mean that certification is not working, or will not work in the future. But it does highlight that it can be very difficult to measure progress towards goals, especially in areas, like forests of fisheries, where large geographical areas are involved, and the number of participants is relatively small.[28] It also illustrates a second point, which is that certification is not linearly correlated with impact. As King, Lenox, and Trelaak point out, there is a difference between the decision to adopt an environmentally beneficial practice and the decision to certify. Firms that do not certify may still adopt; and certification does not always indicate adoption of the underlying practices (especially in cases, like ISO 14000, where the certification refers to management systems, and not the actual production).[29]

Establishing Credibility

Another question that needs to be raised in empirical evaluations of certification programs is the credibility of the standard, and also of the certification. The first part is whether the standards are constructed in such a way that they address the underlying goal. Standards can be scientifically and technically complex. The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ (LEED) standard for new buildings (New Construction Version 2.2) has 69 different categories in which buildings can earn credits, and the overall rating depends on the total number of credits.[30] This is just in one version of one of eight current rating systems. The LEED rating system has a great deal of technical knowledge embedded in its standards, and, as evidenced by the number of versions and specific ratings standards, also evolves over time.[31] The popularity of LEED indicates that there is a perception that these standards are scientifically sound. According to one member of the Green Building Council (the group that establishes the LEED standards) they have achieved a level of credibility in defining what "green" means in the case of building construction and maintenance.[32]

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[28] One thing to consider is whether natural production systems (fisheries, forests) present special challenges for monitoring when compared to man-made production systems (farms and factories); in the first, the problem is how much we are removing, while in the second, the focus tends to be how much we are emitting. Is there a difference?

[29] King and Lenox, "Industry Self-Regulation Without Sanctions: The Chemical Industry's Responsible Care Program," 698-716., A. A. King, M. J. Lenox, and A. Terlaak, "The Strategic Use of Decentralized Institutions: Exploring Certification with the ISO 14001 Management Standard," *The Academy of Management Journal* 48(6):1091-1106.

[30] *http://www.usgbc.org/DisplayPage.aspx?CMSPageID=220#v2.2*; accessed January 4, 2009

[31] *http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222*; accessed January 4, 2009

[32] Barnaby J. Feder, Environmentally Conscious Development," *The New York Times* (2004):

There is also a level of credibility that must be attached to the certification process. One common method to increase the credibility of certification is the use of third-party certifiers, though it should be noted that even third-party certifiers can be self-interested actors in the process. This is the approach used by the Forest Stewardship Council, LEED, and ISO 14000, among others. There is a greater skepticism about the validity of certification when it is either internal to a firm, or part of an industry association,[33] perhaps because of a perception that it is easier to cheat in these circumstances.

The issue of cheating is at the heart of credibility when it comes to certification. There are multiple ways that a firm can cheat. One is if the standard itself is not particularly stringent, or if there is no monitoring or reporting required. In that case, certification is just an example of "cheap talk." These are also the circumstances under which it would be easiest for firms to become free-riders. If they use the same (or deceptively similar) certifications as more trusted actors who have actually invested in environmentally positive practices, they can gain benefits with little or no cost to themselves. For example, imagine the case of a cleaning products manufacturer with a solid environmental reputation and a history of producing detailed, credible environmental reports. The company invests in the production of a line of "all-natural" cleaners, for which they get favorable press. One of their competitors, without the same reputation or investment, could come to market with its own line of "all-natural" products. There is no way for consumers to verify the self-certified claims of the second firm. They may choose the second product, in which case, the firm has managed to benefit, at much less cost, from the investment of the first. Of course, the danger is that when too much of this occurs, and when there are too many unsubstantiated or suspect certifications in the market, consumers will trust none of them, and allegations of "green washing" will negatively impact all of the firms. In fact, the potential for the negative behaviors of one firm to impact a broader sector is argued to be one of the factors that induces continued participation in efforts like Responsible Care.[34]

There is a third possibility for cheating, beyond the cases where lax or self-certification reduces credibility. That, of course, is when firms actively cheat, even in cases where the certification is stringent, and undertaken by third parties. This is the kind of behavior that has been reported in cases where firms require adherence to certain labor or environmental codes from their suppliers. The firms can only inspect their suppliers so often, which opens the door for subterfuge—for example, making sure that no underage

[33] Vogel, "Private Global Business Regulation,"King and Lenox, "Industry Self-Regulation Without Sanctions: The Chemical Industry's Responsible Care Program," 698-716.

[34] Ibid.

workers are present during inspections, even if they usually make up a portion of the workforce. That means that methods for sampling and measuring have to be developed so that they are able to detect cheaters. Often, a criticism of certification systems is that it's just too easy for bad behavior to be halted long enough to pass inspections, after which it is resumed. Since constant monitoring is expensive, the challenge is to find the optimum level of monitoring to disincentivize bad actors.

Unintended Consequences

The next challenge that is addressed in evaluation of certification schemes is whether there are unintended consequences. These can be both positive and negative. The process of creating standards and certification can create and strengthen networks of stakeholders. They can provide a venue for industry and government to work together constructively, instead of adversarially. On the flip side, some certification schemes, like the Forest Stewardship Council, have been controversial enough to encourage the creation of competing certification schemes. Competing certification schemes can be confusing, can make it more difficult to assess impacts, and require an increased use of resources for their operation.[35] There can also be other kinds of unintended consequences.

In sustainable development, attention has to be paid to the development aspect, not just environmental sustainability. Some of the analyses of certification schemes have rightly brought forward questions of the distribution of costs and benefits, as well as justice and fairness.[36] One unintended consequence of certification could be the imposition of costly requirements on entities that have no say in their creation (e.g., producer communities), and because they are nongovernmental, have little or no political recourse. It may be easier for large, multinational firms to only do business with firms or producers that comply with certain standards. The motives behind these decisions may be well-intentioned—certification provides a credible source of information to consumers throughout the supply chain. But it can devalue other methods used to encourage improved environmental impact, such as community regulation, which in some areas could be equally effective at much lower cost.[37]

[35] Auld, Gulbrandsen, and McDermott, "Certification Schemes and the Impacts on Forests and Forestry," 187.

[36] P. Vandergeest, "Certification and Communities: Alternatives for Regulating the Environmental and Social Impacts of Shrimp Farming," *World Development* 35(7):1152-1171; J. Guthman, "Back to the land: the paradox of organic food standards," *Environment and Planning A* 36, no. 3 (2004):511-528.

[37] Vandergeest, "Certification and Communities: Alternatives for Regulating the Environmental and Social Impacts of Shrimp Farming," 35(7):1152-1171.

For issues on a global scale, often the countries with the ability to participate and become early adopters are the richer participants. For the FSC, this led to a disproportionate level of certification uptake in areas with temporal or boreal forests in the North. In the case of agriculture, certification often favors larger, more technologically advanced farms. It can take several years for a farm to transition to compliance with organic standards—a time frame which can put this valuable certification out of reach for many small farmers. In the case of marine standards, technical requirements for aquaculture may be impossible for small farmers in poorer nations, where many of the standards may not even be the most appropriate way to protect the local environment. But the inability to certify could block many small producers from selling on the world market, with negative economic and development impact.[38]

The question that needs to be carefully asked as certification progresses is what the consequences, both good and bad, have been. In the case of negative consequences, on balance, are they more problematic than the original problem being addressed? Are there ways that they can be mitigated? And finally, are there other policy options available that could achieve the same result in a less harmful way? These kinds of evaluations are difficult, but are an important consideration in any kind of policy analysis, not just in certification.

Competing Standards and Target Audiences

One problem that has emerged is that the increase in popularity of voluntary regulation has led to an increasing number of standards, often in the same or overlapping areas. The Auld et. al paper[39] on the FSC gives a good example of a case where there are multiple competing standards. The same phenomenon has developed in fisheries, and also in food and consumer products. There might be very good reasons to have more than one standard in a particular area. But it will impact the effectiveness of both, and can present a challenge. One question that emerges from the proliferation of certifications is whether there is a risk that consumers will get label fatigue. For example, a trip to the grocery store to get eggs can quickly become a complicated exercise. Labels commonly found on eggs in American grocery stores include "Organic," "cage free," "certified humane," "vegetarian fed," and "all natural" (and all of this in addition to size, color, and omega-3 added or not). Certification is likely to be less effective if it is undertaken in an area that is already crowded. However, not all certification and label-

[38] Ibid.

[39] Auld, Gulbrandsen, and McDermott, "Certification Schemes and the Impacts on Forests and Forestry," 187.

ing is aimed at end consumers. There is also a place for certification within the supply chain—ISO 14000 being one example. So another challenge for effective certification is identifying the best target audience so that the information being provided isn't quickly crowded out.

Sustainability

One last challenge that has come to light in the evaluation of certification schemes is the sustainability of the programs themselves. The groups that come together to form standards and certification schemes can be temporary institutions, or may be more permanent. Responsible Care and ISO 14000 originated in existing organizations (the American Chemistry Council and the International Standards Organization). They are relatively stable institutions, and are likely to persist. They also provide a venue for the continued development of the standard and certification process, as well as for monitoring as needed. On the other hand, other certifications originate from more ad hoc processes. The Forest Stewardship Council and the LEED building standards began as voluntary partnerships between groups of stakeholders that have evolved into structured, permanent arrangements.[40]

In either case, for the standard and certification to be effective, it requires continual attention. Like other policy institutions, the organizations that create and certify standards need to be able to learn and to adapt. Technical standards need to be adjusted to take into account advances in science and technology. There must be a way to deal with any issues of credibility or legitimacy that arise, as well as negative impacts. And, of course, there has to be a way to adapt to changes in the problem itself.

Sustainability of the program is fundamentally impacted by the ability of the institution to bring benefit to participants and society. As soon as the costs of participation outweigh the benefits, it becomes difficult, if not impossible, for participants to continue to certify. Defection will increase if free-riding and "cheap talk" become viable alternatives with relatively low potential penalties. If the certification program undermines sustainability broadly, such as creating severe negative economic impacts in less developed areas, it will be difficult to maintain. And if it is captured (or perceived to be) by a set of strong interests, the effectiveness and long-term sustainability could suffer.

Finding the Good-Enough

All of these challenges are important to keep in mind in the development and execution of any certification effort. Certification is difficult, and there

[40] The dynamics of these partnership institutions was examined in some depth at a recent NAS Roundtable on Sustainability Workshop.

are many ways that any effort could fall short. There are other methods that may be faster, less expensive, or more effective. Certainly, policy makers and stakeholders need to take this into account when choosing between policy options. But as the saying goes, "the best is the enemy of the good." In other words, certification, for all of its pitfalls, may be the best option available. And it's also important to remember that however popular, voluntary regulation does not have to be undertaken in the absence of more conventional regulatory approaches. The study showing that ISO 14000 participants had better environmental performance than nonparticipants was conducted in the United States, where all of the firms in the study are subject to emissions limits and other regulations stemming from, among other things, the Clean Air Act. Looking back at why firms choose to participate, the anticipation of stricter regulation can have a large influence. Regulatory "floors" provide both a base level of environmental protection, and also help create incentives for firms and government to engage in higher levels of compliance. Marine Stewardship Council certifications may be an important tool to help manage fisheries sustainably, but they are not a replacement for international fisheries agreements. Rarely is any one policy tool perfect on its own. Choosing to engage in voluntary regulation, like standardization and certification, may not be a silver bullet—but it may be an effective part of a well-thought out set of policy approaches.

POLICY IN ACTION—CHOOSING AND CREATING SYSTEMS OF STANDARDS, CERTIFICATION, AND LABELING

Once a group of stakeholders decides to move forward with standardization, certification, and labeling, with an understanding of its strengths and its challenges, they confront the difficult task of actually creating and implementing an effective system. From a practical standpoint, what are the steps in the process and the considerations that need to be taken? Who should be involved? How much attention needs to be placed on the process of development, not just on the actual content and requirements? These are messy challenges, and from the empirical literature, there are examples of many ways for this to be done—and it usually involves a certain amount of trial and error.

Institutions and Process

The first question to be addressed is who needs to be "at the table," and at what point in the process? Problems of sustainability involve large numbers of diverse stakeholders, who in many cases are geographically separated, and who may not even recognize their involvement in a certain issue. NGOs often take on the task representing groups in society that

might otherwise be left out of decision making. But even the decision of who participates in setting initial goals can be contentious. How much of a say do NGOs get? Governments? Industry? Are underlying issues of justice and fairness taken into consideration?[41] There are cases that show that process matters a great deal in the eventual acceptance and effectiveness of a standard.[42]

One helpful way to conceptualize the groups that come together to create standards, certification, and labeling regimes is to think of them as an example of a boundary organization that bridges the gap between environmental knowledge and the actual behaviors of firms and consumers. If standard-setting groups are boundary spanners, then, like other boundary organizations, they can be guided by work that has shown that to be effective, they must ensure three factors: salience, legitimacy, and credibility.[43] There is a whole literature on institutions and organizations that addresses how to work out processes and procedures for cases such as these, and while outside of the scope of this paper, it should be taken into account. The example of the Forest Stewardship Council shows that participants and structure matter—criticism of the ability of NGO and environmental interests to outvote economic ones led to the development of competing regimes.[44]

Goals

This institutional step precedes even a formal statement of goals, although there is obviously a shared conception of a specific problem that brings participants together. Goal setting itself can be difficult. This is where the theory gives way to the messiness of the real world. At their best, a system of standardization, certification, and labeling is based on credible scientific and technical knowledge, and is designed in such a way that the results of the program effectively address the problem at hand. This is complicated by the fact that different stakeholders have different conceptions of the exact nature of the problem, have very different interests, and there may be significant differences in desired goals that will need to be negotiated.

Still, standards need to have an underlying goal, and for the entire system to be ultimately successful, that goal should be something that is

[41] Vandergeest, "Certification and Communities: Alternatives for Regulating the Environmental and Social Impacts of Shrimp Farming," 35(7):1152-1171.

[42] Auld, Gulbrandsen, and McDermott, "Certification Schemes and the Impacts on Forests and Forestry," 187.

[43] D. W. Cash et al., "Knowledge systems for sustainable development," *Proceedings of the National Academy of Sciences* 100(4):8086-8091.

[44] Auld, Gulbrandsen, and McDermott, "Certification Schemes and the Impacts on Forests and Forestry," 187.

eventually quantifiable and measurable, with appropriate metrics attached. At the same time, a properly constructed goal avoids the "ends-means" problem. The metrics have to be kept separate from the goal as such. For example, what is the goal of a global climate agreement that stabilizes atmospheric CO_2 at 550 ppm? Counterintuitively, it is not to cap atmospheric CO_2 at 550 ppm. The goal is stabilize atmospheric CO_2 at a level where science tells us that the probable impacts will be within a range that we, as a society, will be able to accept—and not to push our environment to a point where we are likely to be faced with catastrophe.

Standards

Once a goal has been agreed upon, the next step is to work out standards. This is when knowledge becomes important. Standards have to be salient, and they have to be credible. Salience means that each element of the standard must relate back to the goal. It makes no sense to require practices that have no impact on the underlying goal. The standards must be credible in that they can be believably observed, measured (if appropriate), and reported upon. Standards should also be flexible, so that they can incorporate new knowledge or changed goals. Sustainability is continuous, and a standard that is unchanging could quickly become out of date. For example, the LEED standard has gone through multiple versions to reflect improvements in available technology, and specialization to address the issues specific to different types of buildings (hospitals, schools, houses, commercial spaces, etc.). Flexibility and adaptability ensures long-term salience.

Standards, like goals can be highly contentious. There are no direct costs associated with goals—there are costs associated with the actual performance standards that get attached to a goal. So, unsurprisingly, the best standards need to include not just scientific and technical knowledge, but also economic, financial, and management understanding. Standard setting is a multidisciplinary process.

Certification

Once standards are in place, the next step is to outline the process for certification. There are several directions that this can take. There are examples, like 33/50 and Responsible Care, where firms or industrial trade groups self-certify. While this can produce questions about credibility, there is evidence that these programs have been effective. Another option is third-party certification and auditing. This is the method used by FSC,

LEED, Fair Trade,[45] USDA Organic and many others. Regardless of who does the certifying, the certification process needs to be developed in a way that discourages cheating. Methods of measurement, sampling, inspection, verification, and monitoring that not only reward good behavior, but also detect the bad need to be in place. This is another place where a combination of disciplines—including environmental science, industry specific technological knowledge, and statistics need to be employed. Certification is not just a one-time interaction between auditor and auditee. There is a continuous relationship.

Certification is also the stage in the process where sanctions and penalties can take place. One obvious penalty is to deny or revoke certification and any attendant benefits (like rights to use a related label). There might also be probationary policies, if firms fall short, to give them a chance to regain compliance. One of the challenges to certification is that unlike with mandatory government regulation, there are relatively few punishments available, beyond revocation and the reputational impacts. But since reputation and market pressure are both important reasons why a firm chooses to engage in voluntary regulation, done properly, they can be effective at discouraging cheating and ensuring compliance over the long term.

Labeling

After certification, the last step is labeling, which has been discussed the least, but is usually the most visible part of the entire process. Labels need to be legitimate—consumers who base market decisions on the presence of a label need to be able to access information about the underlying certification and standards. They have to believe that the label is real, and that it isn't just empty marketing. There are several kinds of labeling strategies that can be used, depending on the target audience.

The most familiar labels for most people are ones that are on consumer goods. These are many examples: certified organic, free trade, marine stewardship council, Energy Star, EPA Design for the Environment, etc. They are usually straightforward—a product either has the label or it does not, or in some cases (like LEED), there may be several levels of certification. There is evidence that consumers do not pay attention to large amounts of information. Studies have shown that detailed nutritional labeling does very little to change consumer behavior.[46] There is, however,

[45] *http://www.fairtrade.net/.*

[46] G. Cowburn and L. Stockley, "Consumer understanding and use of nutrition labelling: a systematic review," *Public health nutrition* 8(1):21-28.

preliminary evidence that very simple nutritional information (on a five-star scale) can impact buying patterns.[47]

Not all labeling is aimed at consumers. Labeling is a useful tool within the supply chain. Firms may only consider ISO 14000 certified suppliers, large food buyers have begun to insist on certified fish. These purchasers are more likely to be capable of digesting more detailed information—they may in fact find it desirable. Within the supply chain, simple certification can be useful, but there is also a place for score cards, like the Material Data Safety (MDS) sheets required for chemicals, which help users of chemicals understand the different hazards associated with the chemicals that they purchase. And since every firm has its own internal set of requirements, goals, and standards, there could be value for them in certification programs whose output is more detailed than a single stamp of approval.

The most appropriate form for the label needs to take into account the target audience, the product being labeled, and the most effective ways to display the information (largely a question of marketing). In all instances, the label needs to relate back to readily available information on the underlying goals and institutions. Labels, after all, are a kind of branding. As the number of labels grows, there is competition between them, and issues of credibility, legitimacy and saliency become more important, as does transparency and availability of information.

This entire process is iterative. Standards, certification methods, and labels all change over time, in response to the demands of stakeholders. Sometimes they exist for a limited time, like 33/50, until a specific goal is achieved. In other cases, they persist. The empirical case studies show that progress can be slow. Fifteen years in, FSC and related certifications are still working to increase the level of uptake, and their impact on markets and on forest conservation.[48]

Questions and Areas for Future Research

Certification is still a relatively new policy tool, and its impacts have not always been easy to quantify. There is a need to develop more case studies in areas of concern to sustainable development, and to improve our understanding of how and when they are effective. Some interesting questions not addressed in this paper, but worthy of consideration include:

[47] Andrew Martin, "Store Chain's Test Concludes That Nutrition Sells," *The New York Times* C; Business/Financial Desk (2007):3.

[48] Auld, Gulbrandsen, and McDermott, "Certification Schemes and the Impacts on Forests and Forestry," 187.

- Is there a role for an international environmental standards and certification body, especially to deal with their scientific and technical aspects?
- What are the incentives for third-party certifiers? Should this be a private market or a public function?
- What is the impact of other regulations (antitrust, WTO, intellectual property, and other health, safety and environmental regulation) on the effectiveness of certification?
- How does certification and labeling differ when it is truly voluntary, as opposed to when it is government mandated?
- Do certification schemes help prevent the environmental "race to the bottom" by multinational firms?
- Is certification effective in areas with lax environmental regulation, and could it be particularly important in these regions?
- How does certification impact innovation? Are there issues of technological lock-in and path dependency?
- Are there certain types of supporting policies that increase the effectiveness of certification systems?

There are many more, and this is an area that would benefit from both serious multidisciplinary scholarship, as well as the wisdom in the business world from the firms and managers that have been dealing with these programs for years.

CONCLUSIONS

Voluntary regulations have emerged in recent years as a popular way to address environmental problems. In particular, standards, certification and labeling are popular, market-based mechanisms that aim to use the provision of otherwise difficult to obtain information in order to create a market for more environmentally favorable products. The popularity of this method is well supported by the economic and policy theory literatures. Empirical experience has shown that while some programs have been successful, there are many challenges in creating effective certification systems. Like any policy tool, they need to be considered along with other policy options.

In cases where certification systems are used, they need to be designed with care. First, they must address a clear goal, to which the standard, the certification process, and the labels can be clearly linked. Secondly, process, not just the end product, matters. Inclusion of stakeholders, and the institutional arrangements used in the decision making process can have long-lasting impacts on the eventual acceptance and uptake of a standard. Standards need to be based on a solid knowledge base—they must be salient

to the goal, and the underlying knowledge should be credible. Similarly, the certification process must also be credible—it must be able to measure compliance and catch cheating. It must also be seen as legitimate, and free from capture or corruption. And finally, labels must also be credible, relate to the underlying goal, and be effectively targeted and branded. The entire process, at the end, should be able to relate otherwise unknown information to the consumers, in order to influence their purchasing decisions and create a market for the labeled products.

More research is needed on the best ways to design and implement these systems, and also about their effectiveness vis à vis other policy tools. They are not silver bullets, but neither should they be dismissed out of hand. There is a real need for ways to effectively convey otherwise invisible information about the environmental impact of products throughout the supply chain, so that markets, and individual consumers can make informed choices. This is one method which has already been shown to be effective in certain cases, and it deserves more examination from a variety of disciplinary perspectives.

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Surveying the Landscape: Certification Schemes for Sustainable Products and Services

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The field of certification standards and ecolabels has grown substantially since the early 1990s and now encompasses numerous complex issues, from labor and production processes to lifecycle and end-use considerations. However, like the diverse products and services which exist in today's marketplace, these new standards and labels present consumers and buyers with a surfeit of options which can lead to confusion. Additionally, existing certification schemes are not uniform, nor are they immune to competing and sometimes false claims which, at best, contribute to "green noise" and consumer fatigue, and at worst, undermine the efforts which do contribute to environmental and social improvements. Just as there is no precise technical definition of sustainability, there is no precise set of metrics or immutable standards on which certification schemes might be based. Instead, as this field matures and advances, there is increasing evidence of what works and why, and where there is room for improvement. This paper attempts to analyze the vast field of certification as an approach to sustainability, and in particular it considers the dimensions of sustainability being certified; how certification standards are developed and implemented; impacts to producer communities, businesses, consumers, and the environment, and; future areas for potential growth.

DIMENSIONS AND SECTORS BEING CERTIFIED

Ecolabels trace their history to Germany's "Blue Angel" label, introduced in 1978. As the term *eco*label implies, it was developed to communicate that a product or service has "environmentally friendly" characteristics.

While the definition of what constitutes environmentally friendly evolves as the science and our understanding evolve, the basic notion behind this effort influenced several subsequent labels which seek to convey information, make environmental performance transparent, and empower consumers.

Several factors explain this growing interest in certification as a tool, including the ineffectiveness of many governmental and intergovernmental processes, the rapid pace of economic globalization, and a general interest in pursuing innovative "smart regulation" to address adverse environmental and social impacts (Auld et al., 2008). Businesses have generally accepted this approach because they tend to be risk averse, although there is limited evidence that activist pressure actually affects market shares. Corporate strategies are changing and increasingly engaging nonbusiness stakeholders, and there is a perceived lack of credibility for industry self-regulation (Vogel, 2008).

Certification of sustainably produced products first emerged, and has witnessed arguably the largest growth, in primary industries such as agriculture, fishing, and forestry. Auld et al. (2008) attribute this to the fact that certification is likely to be effective in sectors dominated by large, vertically integrated firms which are vulnerable to public pressure, and more able to afford additional costs of certification. It may also be a response to highly visible production practices in these sectors—unsustainable practices can lead to resource depletion as well as spillover effects which negatively impact the surrounding ecosystem. Additionally, these natural resources are primary inputs to manufactured items, from food products to furniture, and so secondary industries and those higher up in the value chain often rely on certificates or labels from their upstream suppliers if they intend to promote their own products as 'organic' or 'sustainably sourced.'

As the market for green products has grown, and as regulators continue to seek innovative approaches to pollution prevention, voluntary certification standards have appeared in numerous secondary and service industries. The International Organization for Standardization's ISO 14000 series for environmental management is easily the best known, and for many industries it has become a de facto requirement for conducting business internationally. It has in some respects become its own brand and brings with it recognition benefits which help justify its costs (Vogel, 2008). However, it is not a brand geared towards household consumers. Industries such as apparel are currently working on developing environmental and social certification schemes which might appeal directly to consumers, but to date they have not enjoyed the brand recognition of those in primary industries.

There has been parallel growth in fair trade certification, which focuses on mitigating the negative impacts which a globalized economy imposes on small-share farmers and other producers in the developing world. More recently, some of these efforts, such as RugMark, have also focused on elim-

inating child labor. While fair trade is generally thought of as encompassing environmental sustainability as one of its tenets, its focus is inarguably on social and trade impacts. Similarly, some of the better known environmental standards, such as the Forest Stewardship Council (FSC), attempt to take a holistic approach to resource management, including the economic and social implications of practices. However, as will be explored later, fair trade and environmental standards have taken divergent approaches and each has had mixed results in building market share.

While there is no doubt that public pressure from activist campaigns, coupled with the threat of regulation, both influenced private regulatory standards in environmental protection and worker rights (Haufler, 2001), this also suggests that their development has been reactive and ad hoc rather than systematic. David Vogel (2008) and others have been critical of the notion that the 'public' participates in the development of many of these standards, and contend that western activists and NGOs have been the primary drivers and consumers. The FSC was created after NGOs failed to persuade governments to enact an effective international forestry treaty. Nonetheless, there does seem to be a correlation between existing regulatory requirements and establishment of third-party certification standards. In general, businesses have tended to support certification in areas where government regulations are most prescriptive, and the certification rules represent an incremental improvement over required practices (Auld et al., 2008).

IMPLEMENTING CERTIFICATION SCHEMES

Multistakeholder Approaches

Implementing a certification program has generally required that stakeholders from different sectors cooperate. In this respect, there seems to be much that can be learned from the broader spectrum of multistakeholder or public-private partnerships. Specifically, three issues have been raised through recent analysis of these sorts of partnerships (Vollmer, 2009):

- During the initiating phase, more time could be spent identifying and engaging the necessary stakeholders (including national governments)—by rushing through this step and into implementation, programs have often overlooked crucial segments within their value chain, leading to competitive efforts, slow progress, and ultimately weakening the sustainability of the program itself;
- Reputational benefits appear to be a key but often overlooked driver for participation in these partnerships. When placed in the context of certifying products, it is likely worth exploring how much additional value,

in terms of reputational benefits, businesses attribute to their participation in or support of certification schemes;

- It is critical that more resources be devoted to studying and reporting on the impacts of these efforts; self-reporting has focused on processes and outputs, but without demonstration of more tangible progress towards sustainability, these programs will remain vulnerable.

Stakeholder engagement has indeed been a fundamental challenge for many certification programs. Often times, it appears that local communities are being excluded from substantial participation in setting standards or making certification decisions (Vandergeest, 2007). And while certification efforts have been characterized as "nonstate market-driven" approaches (e.g., Cashore, 2004), this term is not meant to imply no government involvement. The reality is that governments frequently play at least a peripheral role in the implementation and uptake of these standards. Certification institutions often comprise shifting networks of actors, and are driven not only by markets but also by complex intersecting motives (Vandergeest, 2007). In fact, the success of many multistakeholder partnerships relies on government participation, most notably in the developing world (where participation lags), and most importantly in scaling up outcomes (NRC, 2009).

One criticism of certification, despite the interaction of different stakeholder representatives, is that the schemes lack independence and fairness because they are developed in isolation, and can reflect a narrow set of perspectives (Lebel and Lorek, 2008). There are also questions of transparency. Industries are able to play an active role in creating voluntary standards and the methods to certify them, but these standards may also be implicitly endorsed by regulating agencies. This has of course been a major criticism of the multistakeholder approach, where industries are accused of becoming unduly influential in setting the global environmental governance agenda (e.g., Pattberg et al., 2007)

Costs of Certification

The high cost of certification compliance is often cited as a key impediment to its growth in the market. Though there are potentials for price premiums, and in certain instances consumers are willing to pay higher prices (e.g., organic food, fair trade items), there is little evidence that these premiums are sustainable over the long term (UNEP, 2005). Moreover, it appears likely that producers are not the main beneficiary of the investments they need to make in order to become compliant (Ibid). Several schemes impose the costs of certification directly onto the producing entity, and impose complex documentation and monitoring requirements which put

small or less-organized producers at a disadvantage (Vandergeest, 2007). The growth in the organic food market has been aided in part by governments subsidizing part of the cost to farmers who adopt organic farming methods.

For industries, it is important to consider what impact these added costs may have on their research and development (R&D) efforts. If compliance costs are high, in terms of changing production practices to meet a standard, industries must determine how best to invest resources. Managing an R&D portfolio is arguably more art than science, and so it becomes even more complex when voluntary standards are introduced and R&D resources must be divided among regulatory requirements, voluntary standards (there may be several competing standards), and more general innovation. This begs the question of whether or not there is a learning curve for certifying products. In other words, can compliance costs come down on a predictable path, or might costs go up as scale increases beyond a certain level? If so, this could have important implications for both the producers of certified goods and consumers who desire these goods but are unwilling to pay the price premium.

It is also worth noting that costs need not be directly offset by a price premium. Guaranteed long-term contracts and increased market access are two potential benefits of undergoing a certification process. There is anecdotal evidence that large firms are beginning to require that their suppliers undergo certification (e.g., Home Depot purchasing FSC-certified timber). In addition, many certification programs seek to improve efficiencies (reduce energy, inputs, waste streams) and mitigate risks (accidents, social unrest, regulatory action). What is needed is a comprehensive calculation of the costs and benefits of undergoing certification.

Scientific Standards and Flexibility

There is an important and dynamic tension between the desire for rigorous science-based standards, and the reality that for many producers and suppliers, such standards are either deemed too costly or too difficult to achieve without technical assistance. Technical standards have been described as "immutable mobiles," those which could be developed in a think tank and then applied universally with very little flexibility (Vandergeest, 2007). From a business perspective, however, sound standards and guidelines are often preferable to the current situation, which is a crowded and confusing marketplace. Early adopters of rigorous standards fear being undercut by less rigorous competitors, and collectively the industry ends up diverting resources to marketing competing claims. Moreover, businesses may be hesitant to invest time and resources into changing production or sourcing practices if they do not have a clear signal

that the standards they are pursuing are in fact moving towards becoming an industry standard. This partially explains the relative success that certain standards have enjoyed through negotiating long-term contracts with large retailers. In the absence of government mandates, these large-scale buyers are offering guaranteed markets over specified amounts of time. Overall, there does appear to be a need for efforts to harmonize and define key terms for certification to succeed (Medina, 2005).

A major limitation of environmental standards is that they are framed in technical terms and developed with limited input from producing communities. Setting aside the argument that these communities may have different definitions of what 'sustainability' means, it is important to recognize that diverse ecological and social conditions exist within any given sector. This has arguably been the primary driver behind competing schemes—rather than large industries, it is producing communities and even developing country governments which have taken steps to establish standards that better reflect local circumstances. While industry codes are often perceived to be less credible than third-party certification, there are recent efforts in the aquaculture and coffee sectors which seem to have been more successful than third-party approaches in engaging producers. The Aquaculture Certification Council (ACC) was set up by an industry organization—ACC certifies process rather than product, and its provisions for community involvement are among the strongest within aquaculture (Vandergeest, 2007). The Common Code for the Coffee Community (4C) is another industry-driven effort, and one of its 'breakthroughs' has been to seek creative ways to get (and keep) producers at the bargaining table (Kuenkel et al., 2009).

Fostering Improvement

Ideally, certification systems are oriented towards continual improvement. As market share increases, but more importantly as science advances, it will be crucial that this bar continues to rise, as it has in other areas, e.g., nutrition labeling. The ISO 14001 process for environmental management is an interesting case in that it does not require particular on-the-ground changes, which is different from many certification schemes which essentially set targets which firms rise to meet. Instead, ISO 14001 is tailored to individual firms and requires that they make a continual improvement from their own specified baseline. In effect, what it does is introduce a culture of better environmental management and stewardship, though critics will point out that this system allows firms to present insignificant changes as a major accomplishment by being labeled ISO 14001 compliant.

The Common Code for the Coffee Community (4C) is another example—its premise is that, in order to elevate the environmental and social performance of the coffee industry, all the actors in the supply

chain must be brought along. To evaluate these actors, 4C uses a "stoplight" method and additive scoring system, with the idea that over time, and with technical assistance from 4C's capacity building efforts, these individual actors and firms will improve their performance (Kuenkel et al., 2009). The U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) rating system for buildings also provides an interesting example. It uses an additive scoring system and offers multiple levels of compliance (platinum, gold, silver), as well as rewards innovations (additional points). It has also recently announced plans to raise certain standards for 2009 as the next evolution in the LEED system.

Competition among certification schemes has led to mixed results. Efforts to achieve legitimacy place pressure on both the FSC and its industry competitors to alter rules, upward and downward (Cashore et al., 2004). In the U.S. organic market, there has been a tension between 'senior stakeholders' who have been in the market for several years and advocate higher standards and more stringent regulation, and the recent entrants who have favored a more free market approach (Johnson, 2008). While there is anecdotal evidence that competitors to the FSC, for example, have also contributed improvements in forest management, this does not indicate that this competition will continue to drive improvement. Moreover, it does not appear to be an efficient way to improve performance, given the scarce resources that must be diverted to marketing against competitors.

UNDERSTANDING IMPACTS

Market Share

Despite their growth, certified products continue to make up a small portion (<10 percent) of any market. This contributes to the argument that they are satisfying a niche market for "premium" green products (Esty and Winston, 2006). And while large-scale buyers and retailers have had and will continue to have an important influence on moving these products beyond niche markets, it is less clear that producers are poised to meet that growing demand. The existing markets in many cases may represent the low-hanging fruit—producers already oriented towards meeting the standards, supplying consumers willing to pay a price premium. Expanding this demand will require more attention to consumer behavior and leverage points (e.g., institutional buyers versus households). Meeting this demand will then require more attention to enabling noncompliant producers.

Governments and corporations play an important role in facilitating the market for certified products. In the case of certified wood, they help create markets through their own preferential purchasing, and the South African government has even begun 'outsourcing' its forest surveillance operations

to the FSC (Vogel, 2008). Some reviews have suggested that procurement and long-term supply contracts may prove more important than price premiums [which rely on consumers willing to pay the premium] (e.g., UNEP, 2005). Efforts to court other large-scale buyers, particularly retailers, are well documented and have arguably become the preferred approach to growing the market for certain schemes. Thus targeting procurement policies of governments and firms, not just households, will be crucial to the long-term sustainability of these kinds of programs—however, procurement policies and behaviors are not well understood (Lebel and Lorek, 2008).

Consumer Response

Consumer behavior is key to the impact that a society has on the environment (Jackson et al, 2004). However, consumer behavior is still not well-understood, particularly as the marketplace grows and products with new attributes, e.g., 'environmentally-friendly' are introduced. Lebel and Lorek (2008) point out that issues of convenience, flexibility, and function matter a lot, and this may help explain why campaigns to promote 'responsible buying' have been limited in their success. They also note that routines are of great practical importance, because much daily behavior is habitual rather than a cognitive reasoning process. Ecolabels largely appeal to consumers who already have an interest in environmental issues (Rex and Baumann, 2007). This has alternately been referred to as 'commodified activism' (Fisher, 2007).

A study of the impacts of dolphin-safe tuna labeling indicated that consumers did in fact respond to the ecolabel and help grow the market for certified dolphin-safe tuna; however, this study also noted a lack of research into the behavioral effectiveness of these sorts of programs (Teisl et al, 2002). A review of Americans' understanding of genetically modified (GM) food suggested that the public is generally unaware, unfamiliar with the science of GM food, and unsure in their opinions on the subject (Hallman et al, 2004). In-depth studies of consumer practices when making purchase decisions are rare, and experiences with ecolabels as communication instruments suggest that many can be better designed, especially by paying more attention to the context in which they are used (Rex and Baumann, 2007).

Conventional marketing techniques may have an impact as well—certification labels could be promotional tools rather than just conveying information. Promotion of green products has relied too strongly on ecolabels in isolation, and could make better use of the full range of marketing tools (Ibid). Fair Trade products have been marketed differently, and in particular campaigns have targeted household consumers (though they have more recently also targeted large-scale buyers). These consumers, in

turn, are often willing to pay a price premium. Both certifying organizations and advocacy groups have supported awareness programs and public outreach campaigns to this effect. However, several reviews of certification and ecolabels have concluded that household consumers are a narrow leverage point for influencing sustainable consumption (e.g., UNEP, 2005; Lebel and Lorek, 2008).

Trade Impacts and Unintended Consequences

The promise of a price premium is an important motivational tool, particularly for producers who expect to bear upfront costs associated with upgrading methods, paying for certification, and handling added administrative and documentation requirements—a failure to demonstrate access to proven consumer markets for these goods, or a failure to distribute any price premium equitably, will hinder the growth of certification (OECD, 2003). There has been a fair amount of criticism of existing standards as reinforcing global inequities of who defines and enforces standards (OECD, 2003; UNEP, 2005; Vandergeest, 2007). These standards are also criticized as reflecting the capacity of developed countries to meet them and leaving developing countries at a disadvantage. Interestingly, although government-enacted standards are regulated in international trade by the WTO, voluntary social and environmental labels do not currently fall under its jurisdiction.

Not only are developing countries less involved in shaping these standards, they are often *required* to meet them as a condition of doing business. This illustrates the need for analysis of the actual impact of certification on the environmental practices of firms in developing countries. The lack of data to understand these impacts is well known (e.g., UNEP, 2005), but recent research has suggested that the scope of coverage for certification programs is low in developed countries (Keane, 2008). For fair trade initiatives, there has also been a danger of producers being crowded out by other interests, or other producers, who form a club of privileged producers enjoying the price premium—this points to the need for meaningful representation of smaller-scale producers (Lebel and Lorek, 2008).

Environmental benefits of certification are even less certain and have not yet been demonstrated in any meaningful way in terms of outcomes. While there has been some consideration of a 'rebound effect'[1] undermining efforts to make consumption more sustainable, this argument does not hold up outside of the energy sector. Energy efficiency improvements have enabled households and industry alike to consume increasing amounts of energy and electricity services, e.g., refrigerators have become substantially

[1] The rebound effect refers to situations where improved environmental performance leads to increased consumption, thereby offsetting some of the gains.

more efficient over the decades, but have also become considerably larger. There is a possibility that the green building movement[2] could influence consumers towards new construction and away from retrofitting existing buildings. However, in most sectors, it does not appear likely that reducing adverse environmental and social impacts will correlate to increased consumption.

EMERGING AREAS AND FUTURE RESEARCH

Climate/Energy

Given the vast potential of carbon and renewable energy markets, it seems that certification may play a considerable role in facilitating this market. In recent years, renewable energy certificates (RECs) have been developed as a way for businesses and states within the United States to meet stated goals for utilizing green or renewable power—this of course relies on a credible third-party certifier and several have emerged to track and guard against double-counting. Carbon offsets, which can be anything from energy efficiency projects to afforestation projects, are another financial instrument which relies on certification. Given that these carbon offsets are likely to be an important component of greenhouse gas mitigation efforts (and that many of the opportunities will likely be in tropical forests in developing countries), one hopes that the experiences with certification to date can feed forward and lead to improved programs to certify these offsets—the existing Clean Development Mechanism does not appear to be an appropriate model (NRC, 2009a). The Greenhouse Gas Protocol (GHGP) is a program established in 2001, developed by the World Resources Institute and the World Business Council for Sustainable Development. Although it has become a sort of industry standard for calculating GHG emissions, the ISO announced in late 2008 that they intended to develop a common standard for measure carbon footprints, which would presumably be a competitor to the GHGP.

Ecosystem Services

While certain ecosystem services are being valued in the marketplace (e.g., forest products), there are a host of other services which are not currently valued, biodiversity being a prime example. Certification is one of many tools being considered to eventually begin placing tangible value

[2] LEED and other green building standards do have standards for existing buildings, and in the case of LEED it is catching up in terms of registered floor area, but this is still insignificant given the amount of existing stock.

on ecosystems, with the hope of generating revenue which could be used to protect and perhaps restore them. Experience from other sectors in certifying *management* and *services* instead of focusing on production practices may be useful in creating new standards to support ecosystem stewardship.

Areas for Further Research

Recent reviews of certification have identified issues requiring more research. Auld et al. (2008) describe certification efforts as 'win-lose situations' in that they require longer to realize economic benefits, but the authors also point out that such win-lose situations deserve more attention because if they emerge as purposeful features of the marketplace, they hold the greatest potential for moving consumption towards sustainability. The authors also note that organizations can change in response to external pressures—evolution may occur through competition or regulation, and this evolutionary framework is important to understand how win-lose situations might transform into win-win situations over time. David Vogel's review (2008) of civil regulations takes an even broader perspective, and he suggests that there are too few studies that examine the global impact of civil regulations (including certification) and their effectiveness. He calls for more research into the relationship between civil regulation and state regulation, as well as research into the 'black box' of business thinking, to better understand how firms balance costs of acting responsibly with the business risks of not doing so.

CONCLUSIONS

While there are undoubtedly many additional lessons to be uncovered by mining the knowledge of practitioners, collective experience and analyses to date suggest several issues which have bearing on the effectiveness of certification:

- Firms, not households, appear to be the important lever in building markets for certified products; consumer education is important, since they ultimately purchase the products, but retailers and other large-scale purchasers (e.g., governments) represent substantial portions of the market *and* can play a role in marketing certified products;
- There is an important tension between adopting rigid evidence-based standards and flexible, custom-tailored standards; some degree of flexibility seems desirable, both to encourage innovation at the top and to make room at the bottom, though low-level compliance ought to be matched with a capacity-building component to bring about improvement;

- The market share for certified products continues to be small, and to date, consumer demand has been limited—increasing awareness and preference for sustainable products has not yet translated to demonstrable changes in demand;
- On balance, the competition among standards within a sector has raised the overall level of performance, albeit slowly and arguably at considerable cost to businesses. A more efficient and effective approach might be a single scheme within a sector, but with gradients to reflect different levels of compliance;
- Impacts and unintended consequences of certification schemes deserve more careful attention and study. Even if a program is delivering on its stated goals, from a sustainability perspective it is important to consider the system in which it is operating. Benefits and positive impacts/outcomes also deserve more rigorous analysis—self-reporting, even from a multistakeholder partnership, is no substitute for objective evidence of a program's impacts;
- Certification schemes are not meant to be independent from governments. Governments often play a critical facilitative role, as a broker, partner, endorser, or large-scale purchaser.

There are also a number of critical issues deserving further inquiry, including:

- To what extent might there be a learning curve for certification within a sector? Can learning be applied across sectors, so that implementation costs are reduced?
- How has the growth of certification affected research and development (R&D) within firms? Are they devoting resources to exceeding standards, or simply meeting them? How has uncertainty about the direction of standards and labels affected decisions on where to make investments (e.g., marketing, improved processes, within the supply chain)?
- What are the longer-term environmental outcomes of certification programs, and how might they be measured and demonstrated? Is this an issue of scale, or is it a problem of tracing program outputs through to long-term outcomes?

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Appendixes

Appendix A

Workshop Agenda

Workshop on Certification of Sustainable Products and Services
January 19-21, 2009

Location:
Arnold and Mabel Beckman Center, National Academy of Sciences
100 Academy Dr.
Irvine, California
All times are PST

Workshop Objectives:

- Identify strengths and weaknesses of certification as an approach to encouraging sustainable consumption
- Identify problem-driven research topics which might be taken up by academia and the analytical community
- Determine whether or not there is an opportunity for a traditional, National Research Council (NRC) consensus study to articulate guiding principles for scientifically reliable certification systems
- Highlight what is needed from the various institutional actors to foster improvement in certification systems (i.e., governments and regulatory bodies, businesses, NGOs, research organizations, public-private partnerships, and the academic community)

Monday, January 19, 2009

9:00 am General welcome and introductions
[Harold Schmitz and Leslie Carothers]

9:30 am **Presentation on Certification's growth, opportunities, and limitations**
Ben Cashore, Yale University

10:00 am Questions and discussion

10:30 am Break

11:00 am Plenary discussion: **Certification's Place in the Toolbelt**
[Leslie Carothers]
The use of product certification and labeling is growing as an alternative or supplement to state regulation or other voluntary approaches to achieve sustainability. Are there certain sectors, or situations, in which certification might be the most desirable approach? How does certification help or hinder complementary approaches to reducing adverse social and environmental impacts? Lead discussants:
- Peter Vandergeest, York University
- Bob Stephens, Cal/EPA (retired)

12:30 pm Lunch

1:30 pm Plenary discussion: **Surveying the Landscape of Certification Schemes**
[Pam Matson]
The success of some certification schemes is contributing to a proliferation of claims, both in new sectors and as competitors to existing frameworks. How are these standards typically developed and implemented? What share of the market do certified products represent? Are there sectors which have been slow to adopt standards? Lead discussants:
- Tensie Whelan, Rainforest Alliance
- Ruth Norris, Resources Legacy Fund
- Patrick Mallet, ISEAL Alliance

3:00 pm Break

3:30 pm Plenary discussion: **What Makes a Standard Credible?**
[Harold Schmitz]
Consumers and industries are increasingly concerned with "green noise" in the marketplace. While these claims are meant to convey additional information related to environmental or social impacts, they can also be misleading, contradictory, or downright false. Lead discussants:
- Urvashi Rangan, Consumers Union
- Anne Caldas, ANSI [telephone]
- Alison Kinn Bennett, EPA

5:00 pm ADJOURN FOR DAY

Tuesday, January 20, 2009

10:00 am Plenary discussion: **Drivers, Tipping Points, and Ratchets**
[Kai Lee]
What has been the experience of suppliers and retailers in addressing the demand for certified sustainable products? What mechanisms exist for a standard to improve, and what drives this improvement? What seems to enable a standard to move beyond a niche market? Lead discussants:
- Dave Long, SC Johnson (retired)
- Suzanne Lindsay, PetSmart
- Kevin Rabinovitch, MARS

12:00 pm Lunch

1:15 pm Plenary discussion: **Obstacles, Impacts, and Unintended Consequences**
[Pam Matson]
What have been some of the primary challenges associated with certification (either the process, or marketing the product/service)? What is known about the impacts (to the market, to producing communities, to the environment)? Lead discussants:
- Jason Clay, WWF
- Jodie Keane, Overseas Development Institute
- Papa Gora Ndiaye, Enda Diapol

3:00 pm Break

3:30 pm Plenary discussion: **Supply Chains and Lifecycle Analyses**
[Dick Jackson]
Certification often refers to production processes, but alternative efforts are emerging which seek to foster improvement throughout the lifecycle of products. Such approaches can be desirable for retailers, and they might also aid in incorporating other social and health concerns, but what has been the experience with addressing supply chain and lifecycle issues? Lead discussants:
- Tim Smith, University of Minnesota
- Paul Firth, Green Standard
- Jonathan Kaplan, NRDC
- Chet Chaffee, Scientific Certification Systems

5:00 pm ADJOURN FOR DAY

Wednesday, January 21, 2009

9:00 am Roundtable discussions: **Enhancing the Effectiveness of Certification as a Tool**
[Leslie Carothers and Harold Schmitz]
Where might science and technology help enhance desirable outcomes? What social science research is needed, or could lead to further improvement? What sustainability issues on the horizon might lend themselves to certification schemes?

10:30 am BREAK

11:00 am Roundtable discussions: **What Would a Credible Sustainable Certification Scheme Look Like?**
Participants will discuss how existing standards and schemes might be improved, and how enhanced or new standards could aid a transition to sustainability. Participants will reflect on the earlier discussions at the workshop, and will consider not only standards themselves, but the implementation of these standards, and their impacts on markets, producer communities, consumers, and the environment.

Appendix B

Workshop Participants

Molly Anderson
Principal
Food Systems Integrity

Steve Ashkin
Executive Director
Green Cleaning Network

Alison Kinn Bennett
Co-Chair, EPA Green Building Workgroup
Office of Pollution Prevention and Toxics Environmentally Preferable Purchasing Program
U.S. Environmental Protection Agency

Jodi Bostrom
Associate Program Officer
Ocean Studies Board
The National Academies

Anne Caldas
Director, Procedures and Standards Administration, Accreditation Services
American National Standards Institute

Leslie Carothers
President
Environmental Law Institute

Benjamin Cashore
Professor and Director, Program on Forest Policy and Governance
School of Forestry and Environmental Studies
Yale University

Chet Chaffee
Vice President
Scientific Certification Systems

Paul Chalmer
Environmental Specialist
National Center for Manufacturing Sciences

Tegan Churcher Hoffman
Principal
T.C. Hoffman and Associates

Jason Clay
Senior Vice President, Market Transformation
World Wildlife Fund

Rob Doudrick
Director, Resource Use Sciences
U.S. Forest Service

Paul Firth
Vice President, Technology
The Green Standard

M.R.C. Greenwood
Professor, Department of Nutrition
University of California, Davis

Amy Horton
Consultant
Blue Sky Sustainability

Dick Jackson
Professor and Chair, Environmental Health Sciences at the School of Public Health
University of California, Los Angeles

Jonathan Kaplan
Senior Policy Specialist
Natural Resources Defense Council

John Katz
Pollution Prevention Coordinator Region 9
U.S. Environmental Protection Agency

Jodie Keane
Research Officer, International Economic Development Group
Overseas Development Institute

Kai Lee
Program Officer
Conservation and Science
David & Lucille Packard Foundation

Suzanne Lindsay
Director of Environmental Sustainability
PetSmart

David Long
Manager, Sustainability and Innovation (Former)
S.C. Johnson

Patrick Mallett
Technical Director
ISEAL Alliance, Canada Office

Marty Matlock
Area Director, Center for Agricultural and Rural Sustainability; Associate Professor of Ecological Engineering
University of Arkansas

Pamela Matson
Naramore Dean, School of Earth Sciences
Goldman Professor, Environmental Studies
Stanford University

Kira Matus
PhD Candidate & Doctoral Fellow, Sustainability Science Program
Harvard University

Kathleen McAllister
Research Associate
The National Academies

Pierre Mérel
Assistant Professor,
Agricultural and Resource Economics
University of California, Davis

Ruth Norris
Consultant
Resources Legacy Fund

Papa Gora Ndiaye
Programme Officer for Fisheries
Enda Diapol

Jeff Omelchuck
Director
Green Electronics Council

Kevin Rabinovitch
Global Sustainability Director
Mars, Incorporated

Urvashi Rangan
Environmental Health Scientist
Consumers Union

Joshua Saunders
Global Service Line Manager
UL Environment

Harold Schmitz
Chief Science Officer
Mars, Incorporated

Tim Smith
Director & Associate Professor,
Center for Sustainable Enterprise Development
University of Minnesota

Robert Stephens
Multi-State Working Group on Environmental Performance

Peter Vandergeest
Associate Professor, Sociology
York University

Derek Vollmer
Associate Program Officer
The National Academies

Tensie Whelan
President
Rainforest Alliance

Appendix C

Roundtable Roster

The Roundtable on Science and Technology for Sustainability was established by the National Academies in 2002 to provide a forum for sharing views, information, and analyses related to harnessing science and technology for sustainability. Members of the Roundtable include senior decision makers from government, industry, academia, and nonprofit organizations who deal with issues of sustainable development, and who are in a position to mobilize new strategies for sustainability.

The goal of the Roundtable is to mobilize, encourage, and use scientific knowledge and technology to help achieve sustainability goals and to support the implementation of sustainability practices. Three overarching principles are used to guide the Roundtable's work in support of this goal. First, the Roundtable focuses on strategic needs and opportunities for science and technology to contribute to the transition toward sustainability. Second, the Roundtable focuses on issues for which progress requires cooperation among multiple sectors, including academia, government (at all levels), business, nongovernmental organizations, and international institutions. Third, the Roundtable focuses on activities where scientific knowledge and technology can help to advance practices that contribute directly to sustainability goals, in addition to identifying priorities for research and development (R&D) inspired by sustainability challenges.

ROUNDTABLE ON SCIENCE AND TECHNOLOGY FOR SUSTAINABILITY

Thomas Graedel (Co-Chair), Clifton R. Musser Professor of Industrial Ecology, Yale University
Emmy Simmons (Co-Chair), Former Assistant Administrator for Economic Growth, Agriculture, and Trade, USAID
Matt Arnold, Partner, PricewaterhouseCoopers
Ann M. Bartuska, Acting Deputy Under Secretary for Natural Resources and Environment, U.S. Department of Agriculture*
Arden Bement, Director, National Science Foundation*
Michael Bertolucci, President, Interface Research Corporation
Nancy Cantor, President and Chancellor, Syracuse University
John Carberry, Former Director of Environmental Technology, DuPont
Leslie Carothers, President, Environmental Law Institute
William Clark, Harvey Brooks Professor of International Science, Public Policy, and Human Development, Harvard University
Glen T. Daigger, Senior Vice President and Chief Technology Officer, CH2M HILL
Patricia Dehmer, Acting Director, Office of Science, U.S. Department of Energy*
Sam Dryden, Managing Director, Wolfensohn & Company
Nina Fedoroff, Science and Technology Advisor to the U.S. Secretary of State, U.S. State Department*
Marco Ferroni, Executive Director, Syngenta Foundation for Sustainable Agriculture
Mohamed H. A. Hassan, Executive Director, The Academy of Sciences for the Developing World (TWAS)
Neil C. Hawkins, Vice President of Sustainability, The Dow Chemical Company
Geoffrey Heal, Garrett Professor of Public Policy and Business Responsibility, Graduate School of Business, Columbia University
Catherine (Katie) Hunt, Corporate Sustainability Director, Rohm and Haas Company
Lek Kadeli, Acting Assistant Administrator, Office of Research and Development, US Environmental Protection Agency*
Jack Kaye, Associate Director, Research of the Earth Science Division, National Aeronautics and Space Administration*
Gerald Keusch, Assistant Provost of the Medical Campus and Associate Dean, School of Public Health, Boston University
Suzette Kimball, Acting Director, U.S. Geological Survey*
Kai Lee, Conservation & Science Program, Packard Foundation

Thomas E. Lovejoy, Biodiversity Chair, The H. John Heinz III Center for Science, Economics, and the Environment
Pamela Matson, Dean of the School of Earth Sciences and Goldman Professor of Environmental Studies, Department of Geological and Environmental Sciences, Stanford University
J. Todd Mitchell, Chairman, Board of Directors, Houston Advanced Research Center
M. Granger Morgan, Professor and Head, Department of Engineering and Public Policy, Carnegie Mellon University
Prabhu Pingali, Head, Agricultural Policy and Statistics, Agriculture Development Division, Bill and Melinda Gates Foundation
Per Pinstrup-Andersen, H.E. Babcock Professor of Food, Nutrition and Public Policy, Nutritional Sciences, Professor, Applied Economics and Management, Cornell University
Christopher Portier, Associate Director, National Institute for Environmental Health Sciences (NIEHS)
Harold Schmitz, Chief Science Officer, Mars Inc.
Robert Stephens, International Chair, Multi-State Working Group on Environmental Performance
Denise Stephenson Hawk, Chair, The Stephenson Group, LLC
Dennis Treacy, Vice President, Environmental and Corporate Affairs, Smithfield Foods
Vaughan Turekian, Chief International Officer, The American Association for the Advancement of Science*

STAFF

Marty Perreault, Director, Roundtable on Science and Technology for Sustainability
Pat Koshel, Senior Program Officer
Derek Vollmer, Associate Program Officer
Kathleen McAllister, Senior Program Assistant
Emi Kameyama, Senior Program Assistant

#membership as of January 2009
*denotes ex-officio member