CODEX PLANETARIUS

Experiences in Voluntary Standard Development
as Related to *Codex Planetarius*

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About *Codex Planetarius*

Codex Planetarius is a proposed system of minimum environmental performance standards for producing globally traded food. It is modeled on the *Codex Alimentarius*, a set of minimum mandatory health and safety standards for globally traded food. The goal of *Codex Planetarius* is to measure and manage the key environmental impacts of food production, acknowledging that while some resources may be renewable, they may be consumed at a faster rate than the planet can renew them.

The global production of food has had the largest impact of any human activity on the planet. Continuing increases in population and per capita income, accompanied by dietary shifts, are putting even more pressure on the planet and its ability to regenerate renewable resources. We need to reduce food production's key impacts.

The impacts of food production are not spread evenly among producers. Data across commodities suggest that the bottom 10-20% of producers account for 60-80% of the impacts associated globally with producing any commodity, even though they produce only 5-10% of the product. We need to focus on the bottom.

Once approved, *Codex Planetarius* will provide governments and trade authorities with a baseline for environmental performance in the global trade of food and soft commodities. It won't replace what governments already do. Rather, it will help build consensus about key impacts, how to measure them, and what minimum acceptable performance should be for global trade. We need a common escalator of continuous improvement.

These papers are part of a multiyear proof of concept to answer questions and explore issues, launch an informed discussion, and help create a pathway to assess the overall viability of *Codex Planetarius*. We believe *Codex Planetarius* would improve food production and reduce its environmental impact on the planet.

This proof-of-concept research and analysis is funded by the Gordon and Betty Moore Foundation and led by World Wildlife Fund in collaboration with a number of global organizations and experts. For more information, visit www.codexplanetarius.org

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Abstract

Voluntary standards are problematic in efforts to lessen the negative environmental impacts of food and fiber production by agriculture, aquaculture, and forestry. Best practice programs that are suggested for use by farmers seldom will be implemented completely. Practices that are easy to install and implement at little expense will be favored, and there is no penalty for claiming to adopt such programs while not implementing all of the practices.

Certification programs have been developed in which adoption of practices are verified by a third-party, accredited auditor who conducts periodic inspections of farms for compliance. Certain operational methods may be required or prohibited, and some programs have a few metric standards, but the standards often are lenient, and most emphasis is placed on practices. Moreover, there is no requirement that producers seek certification of their products.

Codex Planetarius will develop one or two metric-based standards for each food commodity that will focus on the perceived major environmental impacts of each commodity. These standards will be metric-based and audited. The intent is to develop a program within the World Trade Organization in which compliance with *Codex Planetarius* standards would be necessary for export of food commodities.

Introduction

Governments and society are faced with the necessity of reducing the amount of damage being done to the planet by the food and fiber production sector, i.e., crops, animal husbandry, forestry, aquaculture, and fisheries. Current methods to achieve better environmental stewardship in the food and fiber sector rely mainly on voluntary codes of practice, mandated governmental regulations, and voluntary certification programs with both practices and standards.

Voluntary practices are exactly as their name implies: the producer, by his own volition, adopts a prescribed code of practice for the purpose of reducing negative environmental effects of production, but no onus is incurred. Regulations decreed by governments usually have mandated practices, metric-based standards, or both, and producers are under obligation to the government to comply with the regulations. Compliance with government regulations, even if they are potentially effective, often is either not audited or audited but inadequately enforced. Of course, in some developed countries, governmental regulations are well enforced and have reduced air, water, and solid waste pollution by industries, municipalities, and in the transportation sector considerably, but much less success has been achieved in the food and fiber sector.

Voluntary certifications for food and fiber crops were developed to go beyond governmental regulations. They tend to contain more practices and stricter metric standards than found in government regulations. However, certifications should not truly be considered "voluntary" because buyers will adopt the certifications and then mandate them on suppliers. In effect the certifications are no longer voluntary, rather the choice of the supplier to sell the product to the buyer is what becomes the voluntary component. Voluntary certification often uses accredited, third-party auditing firms for confirmation of compliance because it is considered best practice. Auditors will schedule a timeline for correcting deficiencies found by the audits imposed. Continued failure of compliance will lead to loss of certified status; but the production activity continues. Certifications will maintain some period of time before the audited company can reapply.

Certification programs for improving environmental performance, depending upon the particular crop, have been available for 20-70 years, and much experience in the procedures and results of voluntary certification has been gained. It is clear that these programs are neither fully serving their intended purposes nor completely meeting the expectations for them. These certification programs make it clear as day about the threats they think are most important, but yet they don't report out the impacts of the threats at certified facilities. Rather, there are vague linkages and less than helpful comparisons to other issues where there is hope of making some proxy evaluation of impact. Nevertheless, these programs have not been without benefit; they have lessened some environmental impacts, and local benefits sometimes are remarkable. These programs have revealed that some impacts are more difficult to resolve than others. Overall, it is clear that they are not going to significantly improve environmental stewardship by the food and fiber sector, and improvement in that sector is a major factor in restoring stability to global ecosystems and cycles. Food and fiber production are at the core of this problem, and a new approach is needed.

Environmental Regulations and Voluntary Certification

One major flaw, possibly the greatest, in the voluntary and governmental efforts results from the apparent unawareness at all levels with the connection between resource use and negative environmental impacts. The larger the amounts of resources used to produce a unit quantity of a particular food or fiber product, the greater will be both the embodied and direct negative environmental impacts per unit of production. A simple illustration with electricity and carbon dioxide emission will illustrate this truth (see **Box 1**).

Box 1. Illustration of the reduction in an environmental impact through resource use conservation

The amount of electrical energy used for aeration in pond aquaculture production is about 6-10 GJ/t harvest biomass, but the aerators often are operated with no respect to the actual need for aeration at any particular time during the production period. By monitoring dissolved oxygen concentration and operating the aerators according to dissolved oxygen concentration, the amount of electricity usually can be reduced by 10-30%. Using 8 GJ/t and 20% reduction in energy, direct energy use could be reduced to 6.4 GJ/t (1,778 kW·hr/t as compared to 2,222 kW·hr/t). Average carbon dioxide emissions from grid electricity in the United States is 0.371 kg CO2 e/kW·hr. The CO2 e emissions will be reduced from 824 kg CO2 e/t to 660 kg CO2 e/t, a 164 kg CO2 e/t reduction.

This is not the only benefit. Grid electricity in the United States has an average efficiency from primary energy use in generation and electrical losses during delivery via the grid to the place of end use of about 40%. In this example, the reduction in primary energy would be 4 GJ/t of fish production (1.8 GJ/t less end use electricity ÷ 0.4 efficiency from primary energy) as a result of lessening embodied energy use.

The average cost of grid electricity in the US is around $0.1042/kW·hr. Energy use and carbon dioxide emissions in this example would be lessened, and there also would be a savings on the cost of electricity of $42.26/t.

Emphasis has not been put on conserving resources; the focus has been to reduce negative environmental impacts, and the designers of the voluntary certification programs are apparently oblivious to the connections between the two aspects thereof. Another underlying fault in the programs is that there is no agreement on the major negative impacts, or for that matter, on the comparative importance of conservation of the different major resources. There are benchmarking programs on top of certification programs that further try to discern differences that cannot be drawn from the certifications themselves. But there is no wide agreement on ranking the benefits of the various certifications. There are also tradeoffs in resource use and negative environmental impacts. The prevention in one impact invariably results in an increase in one or more other impacts, and this same principle applies to the use of major resources. The simple truth is that environmental and resource management efforts are bottled up to arbitrary decisions about what is best. The choices made in designing standards may improve one aspect of environmental and resource management but diminish another facet. How do we know what is the best environmental and resource use move without having made relative rankings of the importance of the different resources and negative environmental impacts? We should try to answer this question both within local situations and in a global perspective. This effort seems to be incumbent on those considering the standards for *Codex Planetarius.*

Certification bodies tend to have different focuses. One program may put great emphasis on lessening wild fish use for feed ingredients, another may have the main goal of lessening farm-level effects on the environment, and still another may focus more on social issues, animal welfare, and food safety aspects. The upshot is that too many programs have arisen, each has a particular agenda, and there is confusion about how the programs compare in effectiveness. The certification programs tend to focus on certification of the production process rather than the product. This means the product being purchased is likely not associated with practices considered socially and environmentally responsible or with procedures that would sacrifice animal welfare or food safety. The main emphasis has been to provide a certification label in an effort to meet the perceived desires of the environmentally-aware portion of consumers. Retailers also can use their offers of certified products as an act of environmental stewardship.

Environmental protection programs can be likened unto soap brand ads: each brand claims that it cleans best, but consumers have no way of evaluating the validity of the ads. As a result, one usually chooses the soap with the most appealing ad or the soap that smells the best. Environmental protection does not need to function at the level of competing soap brands. At least in the case of soap brands, they all likely are similar in cleansing power, because they all contain basically the same cleansing chemicals: sodium stearate and some surfactants. With respect to voluntary certification programs to improve environmental responsibility, the efficiency of each program is unknown, even to the experts.

Another problem with voluntary certification and mandatory governmental standards is that they are used almost exclusively for food products for international trade. The majority of food production is not traded internationally but consumed in the country of origin. This limits the effectiveness of voluntary programs to specific products and the areas where these products are produced. In addition, only the more progressive producers have an interest in voluntary programs, and they are the portion that already is using better practices than the multitude of the producers of a particular crop. Government environmental regulations typically are imposed on larger producers who also tend to be the more responsible ones. The small-scale producers often are not given much attention in governmental regulations, and this is especially the case in developing countries and even in the United States. The US Environmental Protection Agency rule for aquaculture effluents does not apply to farmers producing less than 20,000 lbs/yr of coldwater species or 100,000 lbs/yr of warmwater species.

The voluntary standards basically have been arranged around too many issues among which there has been no concerted attempt to prioritize in importance. Compliance is basically a record-keeping exercise. Moreover, when farms cannot achieve compliance with a particular standard,

options often are allowed for continuance of certified status.

Certification bodies are businesses with their income being the fees paid by participants in the programs. Therefore, if certification standards are so rigorous that producers find them inconvenient or noticeably expensive to implement, they are not under any obligation to continue in the program. Some retailers have agreed to sell only certified products, but should these retailers not be able to find sufficient certified products, they will no doubt sell uncertified products.

I want to repeat for emphasis, that there have been benefits to food and fiber certification standards. Awareness over the global impacts of food production has increased, because of the appearance of certified products in the market and the advertising and labels associated with them. But, more importantly, we have learned that voluntary certification programs are not going to bring the global food and fiber system into harmony with the environment. It is clear that voluntary programs have too many control points and standards and often overlook the most important issues. We also have a better idea of the most important issues, because of lessons learned through voluntary standards. Despite these lessons, it seems most certification programs fail to appreciate the feed conversion ratio (FCR). An example of the benefit of good feed conversion in feed-based animal production is provided (see **Box 2**).

Box 2. The feed conversion ratio as a key standard in feed-based animal production.

The feed conversion ratio (FCR) is the ratio of the amount of feed offered animals divided by the live weight production of animals. If it takes 2 kg feed to produce 1 kg of live animal biomass, then FCR is 2. The amount of feed that is not converted to animal biomass become waste, mainly carbon dioxide emitted to the air through animal respiration, nitrogen in urine, organic matter in feces and uneaten feed that decomposes requiring oxygen and releasing carbon dioxide to the air and nitrogen and phosphorus to the water. Nitrogen and phosphorus that ultimately enter water bodies can potentially cause eutrophication.

Consider a chicken farm where the farmer applies better feed management and reduces the FCR from 2.0 to 1.8. Before 2,000 kg feed provided 1 tonne of live chickens, but now, only 1,800 kg feed is necessary for 1 tonne of chickens. A reduction in feed use of 200 kg/t chickens was realized, meaning an economic savings equal to the cost of 200 kg feed and a waste load reduction equal to the carbon dioxide, nitrogen, and phosphorus equivalences of 200 kg of feed.

Experiences in Designing Standards

The *Codex Planetarius* effort should certainly draw on the experiences of voluntary and government-mandated programs in its effort to improve environmental responsibility in food and fiber production. This type of experience is not typically written up concisely and often is personal to the point of opinionation. Nevertheless, some comments about both voluntary and governmentally-imposed environmental protection standards might be useful in thinking through ways of approaching the *Codex Planetarius* standard development effort.

Stakeholders Involvement

The standards should ultimately be a product of a group representing all aspects of the production and market chain of the food or fiber commodity under consideration. The object should be to "cut to the chase," identify the problems, the possible solutions, the bottlenecks in applications of solutions, the tradeoffs, and ways of evaluating likely benefits of a proposed standard and finally identifying a few better standards. The problem is that "cutting to the chase" has been impossible in most of my experiences because of individuals insisting on having the only solution, one or more individuals trying to impose their leadership on the effort, other individuals trying to highjack the effort for their personal benefits, and those perfectionists who want to include and tidy up each and every detail no matter how minute.

I am criticizing myself also; I realize that I can be as big an obstruction in getting to the core of a matter in group discussions as anyone. The point is that stakeholders should realize how human nature tends to play out and to make every effort to stay on track. The main agenda should be the development of a few concise standards that cover the main points, i.e., the main point is to lessen the major impacts by way of a few carefully selected key standards.

Opinions of the nature of various stakeholders are listed below:

Farmers (producers) – They tend to be too practical and want to improvise solutions. They do not like to spend beyond what they feel necessary, but they often waste much money for convenience, purchasing inferior tools of the trade at lower cost, and believing in miracle solutions. They tend to place experience above reliable facts or reason. Nevertheless, they are the ones who must be convinced to make a new idea viable. They also know what is done on farms and how to do it. Successful farmers have learned to overcome, at least most of the time, the tendencies mentioned. Thus, carefully selected farmers should be a key part of a multistakeholder group.

Researchers – As a rule, they are more interested in the details than in the solutions. However, researchers who have experience in helping farmers with real problems are knowledgeable about how production is done and can see where production intersects with the environment in negative ways.

Extension specialists and consultants – This group tends to learn from farmers and pass what they learn on to others. However, some keep current with scientific knowledge and technical advances and can readily make the connections between practices, impacts and possible solutions

Environmentalists – They tend to know the problems and act as the force driving improvements in environmental sustainability. Unfortunately, there is an overall deficiency in their understanding of how products are produced, and many are weak with respect to applied science. However, they are essential for success in standard development.

Suppliers and buyers – The suppliers are the sources of products that are needed in production, and their knowledge of inputs can be helpful – especially related to fertilizers, feeds, equipment, pesticides, therapeutants, etc. The buyers of farm products

know the types of products needed and have some idea of the present and future expectations of consumers.

Consumers – A random consumer would not likely be useful. However, a person who understands consumer attitudes about products would contribute to the overall process.

Government regulators – It is essential to have representation of the government in the development of standards. They bring experience in making standards, auditing, compliance, and enforcement. But it usually is difficult to find regulators who can see beyond the specific areas of regulation with which they are concerned in their daily work as a government employee.

The most important thing is to get a group of stakeholders who are truly experts at what they do. But it also is necessary to choose those who will express their opinion, yet listen to different opinions, and more importantly, be willing to change their opinion in face of new information. The idea should not be to reach a compromise; the environment has been compromised almost beyond recovery already. The purpose should be to work out what appears to be the best solution, or in this case standards, with only the most critical standards included.

Because of the nature of the different stakeholders, the initial draft standards likely should be drafted by one or a few experts, e.g., possibly a researcher, consultant, and farmer. Then, maybe an extension specialist, an environmentalist, and a government regulator could be brought in to help revise the initial standards. After this, the other stakeholders could be included in the deliberations for the final draft. Of course, there needs to be a mechanism to permit a public presentation of the final draft and allow comments before the entire multistakeholder group finalizes their effort.

The development of standards by a multistakeholder group typically is supposed to be an effort that produces reasonable, coherent standards. But, a shorter or longer list of standards is not enough. The effort must result in a document that explains the purpose of each standard and provides guidelines on what is necessary in terms of practices to achieve compliance with each standard, outline a sampling (or observation) procedure that allows a metric-based measurement or assessment of the specific indicator(s) required for each standard, and cautions about particular difficulties that may result for a specific crop, location, scale of the production operation, production methodology, climate, etc. It seems obvious that different commodities will require different standards to a greater or lesser extent depending upon the commodity. Also, the same commodity may require different standards according to the circumstances of production. But the emphasis should be to avoid more than a few standards in each situation.

Science-Based Standards

The overall product of the group of stakeholders is usually claimed to be science-based. The descriptor, science-based, has become a "buzz" word and no longer sends a clear message. A scientist may reserve "science-based" for a concept or method that has been studied by experimental means and shown to have a very high statistical probability (usually 90-95%) of reducing or preventing a particular negative impact. At the practitioner level, "science-based" may mean that an expert or a group of experts have looked at a proposed concept or method and agreed totally or to a large extent that it is based on scientific principles and should have the desired effect. To the general public, "science-based" has no particular meaning other than with respect to their degree of faith in science and advertising. The use of "science-based" in referring to a standard is to them analogous to the label on a product that states "made of the highest quality ingredients."

A good approach to this dilemma might be to present with the standards document the names of each of the stakeholders involved in producing the standard, their role in the effort, and their professional affiliations. Of course, the purpose of *Codex Planetarius* is to make science-based standards, but one reading the document could then decide if they believe the goal has been achieved. In a sense, this is part of the transparency aspect already mentioned.

Better Standards

The stakeholder group who makes a particular standard will, at least at finalization of the standard making process, naturally feel that they have made better standards for the intended purpose. Some groups may be so convinced about the betterness of their standards that they will make the requirements for altering the standards extremely difficult and time-consuming. This is a serious mistake that will come back to haunt the future value of the standards. Of course, *Codex* should develop a standard revision procedure, but it should not require a long period of many months or even a year or more to accomplish.

Table 1: Possible Standards for Turbidity in an Effluent

Ranking	Standard
No standard	Farmer does what is necessary and discharges water.
Very poor (but good idea)	Do not discharge excessively turbid water into the receiving water body.
Poor (improved, but little guidance)	If discharge is excessively turbid, locate the source of turbidity and eliminate it.
Medium (further improvement with guidance, but no final treatment and a high limit for turbidity)	If turbidity of discharge exceeds 50 nephelometer turbidity units (NTU), provide grass cover or other erosion control cover, e.g., liners or gravel, on erodible surfaces. Pass inflowing water through a retention basin before use in production system.
Good (still has weak turbidity NTU limit)	Same as medium standard plus, install a settling basin for final treatment.
Better	Same as for good standard plus, the turbidity limit is reduced to 25 NTU. (This may require enlarging the settling basin or reducing the effluent flow rate).

The question that should be considered is: what is a better standard in comparison to a less than better standard? This question is difficult to answer for several reasons, but primarily because there usually will not be an easy way, other than by opinion, to clearly reveal that one set of standards is better than another. However, a better standard should be able to prove it is better based on its compliance metric(s).

The list of possible standards for turbidity in an effluent **(Table 1, Page 4)** will be given in ascending order from no standard to a better standard:

The better practice gives guidance for reducing the turbidity of the incoming water before it enters the area of usage and while it is being used. It also incorporates a final treatment stage in situations where the water remains excessively turbid regardless of the precautions required before introducing into the place of usage and during use. The turbidity NTU limit also is less for the better standard. The cost and effort of compliance with the standard will increase as the standard is improved, with the better standard being most costly and requiring the greater effort.

The cost factor is not always a debit. It was illustrated above (Box 2) that achievement of a lower FCR in feed-based animal production can reduce nutrient and organic matter loads and direct carbon dioxide emissions associated with feed use. Moreover, the improvement in FCR usually will not incur anything but better feed management, yet it will lower the amount (and cost) of feed per unit of production. Nevertheless, more attention to feed management usually is considered an inconvenience and an imposition on producers. But, a word of caution, this example may not work out to less cost where lowering the FCR requires a change in how the feed is applied. The labor cost or equipment cost might increase.

Codex Planetarius

Codex Planetarius intends to cover a wide range of commodities. These commodities are not all produced by similar methods, and the same commodity may be produced by somewhat different methods across all farms. In order to reduce the number of standards, it must be considered that each commodity uses land, water, energy, and other resources and in the process of production produces solid, aqueous, and gaseous wastes, each of which has different negative environmental impacts.

The question becomes, will the emphasis be on reducing the use of resources, reducing the amounts of certain emissions, or both? There also is the somewhat overreaching reality that commodities all require the use of potentially harmful pesticides and therapeutants. The use of such chemicals could result in a major cost of analyses. Obviously, in order to arrive at a few standards, preferably one to no more than three or four standards for each commodity, or specific circumstance for the production of which metric standards are to be applied, should be based on a thoughtful and scientific consideration of the error to which omission of standards may lead. This would be valuable in selecting the best combination of a few standards.

It is clear that one or a very few standards could greatly reduce the negative environmental impacts that tend to be of global significance. Therefore, I believe that the *Codex Planetarius* concept is a logical way of making major headway towards lessening the deterioration of global ecosystems and natural cycles. The more minor effects could be left to government regulation, voluntary standards programs, and the education of the public towards a better environmental ethic.

Codex Planetarius will be voluntary at the national level. Governments cannot be forced to adopt it, but for sake of trading products internationally, it would behoove a government to adopt it. Adoption would result in *Codex Planetarius* standards becoming legally binding and the World Trade Organization (WTO) would enforce the program with respect to nations who agree to adopt it. Basically, the nations adopting *Codex Planetarius* would be required to meet its standards at the production level for the internationally-traded portion of the national production of specific commodities.

The standards are envisioned to be few, but to cover the major impacts. As already discussed, these standards, while minimal with respect to current voluntary standard programs, will be developed carefully so that implementation methodology will be clear, and each standard will have a specific metric-based guideline (limit) for compliance. A single, uniform standard is highly unlikely for any commodities to be covered by *Codex Planetarius*. The expectation is that the standards will be developed by commodity, and for each commodity the standards may vary by country, region of country, method of production, etc. However, a large number of different standard requirements pertaining to the circumstances of production of each commodity will not result.

The standards will only be imposed on internationally-traded portions of commodities. This fact will complicate the enforcement of *Codex Planetarius* in most countries, and it is likely that at least some countries will find it easier to require compliance with the *Codex* standards even for production for domestic use rather than to attempt to separate farms producing for international markets from other farms.

Codex Planetarius will not replace voluntary standards or governmental mandated standards. These should continue, because the voluntary standards may result in products sought by the more environmentally-aware consumers of internationally-traded products. Governmental standards also are necessary for local environmental situations that will not be covered by the rather minimal *Codex Planetarius* standards. Moreover, the standards of *Codex Planetarius* would facilitate development of the voluntary and governmental standards by providing a baseline for key indicators and associating standards. ■