The Greening of National Accounts: The Role of Ideas in a Theory of Institutional Change

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I. INTRODUCTION

The United Nations' System of National Accounts (SNA) is one of the most important economic institutions of our time. Although only 50 years old, it is central to the way economists and policymakers think about economic progress and development and it predicates the empirical basis for much of our decisionmaking.

In recent years advocacy groups, such as environmentalists and feminists, have drawn public attention by arguing that the SNA is fundamentally misleading [Repetto 1989, Waring 1990] -- environmental destruction is interpreted as progress and the economic contributions of women are declared to be valueless. Far from nonsense of the lunatic fringe, doubts concerning these kinds of fundamental biases in the national accounts were planted even before the accounts were firmly established and have been quietly debated over the years by the most eminent of economic academicians [Hicks 1940, Hayek 1941, Kuznets 1946, Samuelson 1961, Solow 1986, Eisner 1988]. Once institutionalized however, the SNA became deeply embedded into information systems. Even small changes hold the threat of injuring the "integrity of the federal statistics" [Carson 1993]. Despite increasing disillusionment from interest groups of various persuasions, and the widespread acceptance among economists that the accounts are not exactly what we would like them to be, changes to the SNA have been incremental rather than fundamental.

This should come as no surprise to scholars of the "New Institutional Economics" (NIE). Douglass North, who has perhaps contributed more than any other economist to a unified theory of institutional change, emphasizes that "the single most important point about institutional change,

which must be grasped if we are to begin to get a handle on the subject, is that institutional change is overwhelmingly incremental" [1990, 89].

In December of 1993 however, the United Nations issued a handbook to guide the construction of "satellite" environmental accounts [1993]. The handbook presents a "system for integrated environmental and economic accounting" (SEEA) and recommends maintaining environmental accounts which are to be kept separate from the core accounts although they are entirely compatible with them. Revisions to the core system (adopted in February of 1993) have anticipated the needs of the SEEA [1992].

While not a fundamental change (the SEEA is an optional attachment to the core), this official recommendation by the United Nations to adopt the SEEA represents the culmination of a process of institutional change that began almost as soon as the accounts were institutionalized. Since the late 1960s, increasing demands from interest groups and governments, for better information about the interaction between increased economic activity and changes in natural resources and environmental assets, intensified that process of change.

This paper uses the "greening" of national accounting to further explore the theory of institutional change from the NIE perspective. It examines what have been the underlying forces of change -- the demands for information, the creative input of scholars, the importance of acquired knowledge, the actions of interest groups, and the key elements of timing. Also examined are the forces of inertia -- the embeddedness of the accounts in information systems, the high cost of achieving the necessary consensus required for change, and the relatively low payoff to individual political entrepreneurs or interest groups who might work toward achieving change.

In so doing, it focuses on a neglected element in the theory of institutional change -- the role of ideas and the feedback mechanisms between ideas, learning, acceptance, consensus, and effective demand for change. While economists such as Denzau and North [1994], North [1990], and Ruttan and Hayami [1984] have recognized the importance of ideas for institutional change, most case studies

have focused rather on changes in factor prices or technology as inducements to institutional change [Demsetz 1967, North and Thomas 1970, Hayami and Kikuchi 1981].

The following section presents the elements of a theory of institutional change necessary for the analysis of changes in the SNA. Section 3 describes the institutionalization of the SNA as we know it and section 4 explores the development of academic thought regarding the treatment of natural and environmental resources in the SNA. National demands for better environmental information were made manifest in the 1970s and resulted in a variety of country efforts at environmental accounting reviewed in section 5. Section 6 examines the more recent political process that led to the development and release of the SEEA and summarizes conclusions regarding the role of ideas in the incremental process of institutional change.

II. ELEMENTS OF A THEORY OF INSTITUTIONAL CHANGE

The SNA as an Institution

Institutions, according to North [1990, 3], are the rules of the game -- "humanly devised constraints that shape human interaction." They provide structure and reduce uncertainty.[1]

The SNA of the United Nations is certainly an institution in that sense. And because the SNA structures the primary economic data bases used around the world for economic analysis, the SNA can be called an economic institution.

But the SNA is not a market institution because it does not govern market transactions. The SNA structures economic incentives only to the extent that it provides indicators such as GDP that individual leaders or groups might find in their interest to maximize. The SNA is primarily an institution that serves the interests of collective decision-making. It provides structure to empirical economic information and substantially reduces uncertainty about economic environments around the world. The SNA provides the rules that specify how humans will account for their economic activity,

and that accounting ultimately affects a wide variety of policy decisions that provide incentives for human behavior.

Forces of Change

Most economic research on institutional change has focused on market institutions -- particularly property rights or economic regulations. Both property rights and regulations can provide substantial direct benefits, in the form of profits or rents, to individual economic actors or small groups. The quest for these benefits has been used as a demand-side explanation for the emergence of such institutions.[2] While some institutions may provide significant benefits to individuals or small groups, all institutions are public goods and hence are inefficiently provided. An institution like the United Nations' SNA provides benefits only to a very large and dispersed clientele -- in this case an international clientele. "Revealing the demand" for institutional change at this level requires an arduous and typically inefficient political process.[3] Researchers in the public choice tradition have illuminated the inefficiencies of acquiring consensus and effecting change in national political processes.[4] Olson [1965] argues effectively that as institutions evolve over time, smaller and more cohesive interest groups stand to benefit at the expense of larger groups composed of relatively disinterested members.

Organizations, following the game analogy of North [1990], are the players which interact with the institutions -- both responding to them and shaping them. Various United Nations organizations, academic and professional organizations, and other nongovernmental organizations have been instrumental in eventually effecting change in the SNA.

While sometimes it is useful to separate forces of institutional change into those of demand and those of supply,[5] oftentimes as pointed out by Bardhan [1989], the distinction may be somewhat artificial. Particularly in the case of the SNA, those organizations and individuals which participated in the process of change are at once suppliers and demanders of change. Does the research of social scientists and accountants calling for changes in the SNA represent only an increase in the stock of

knowledge and hence a "shift in supply" of institutional change as in Feeny [1988] or does it also represent a demand for institutional change? The same question could be asked of the popular perception of the SNA -- does a relative dissatisfaction with the status quo shift the demand for change or reduce the cost of change and hence shift the supply? Does the cost of achieving consensus reduce the supply of institutional change or is this cost an impediment to the revelation of the "actual" demand[6] for institutional change?

Since the focus of this paper is precisely the role of such ideas, perceptions, and consensus in the process of institutional change, we abandon the notion of supply and demand of institutional change in its two-dimensional price and quantity space and think rather in terms of an multidimensional process of change.[7] Forces of change move the process forward in any number of possible directions while forces of inertia work in the opposite direction.

Path Dependence and Forces of Inertia

The notion of path dependence is central to an understanding of change in the SNA. Certainly the way accountants organize economic data today depends almost entirely upon how it was done yesterday. The contributions of David [1985] and Arthur [1988] analyzing technological change provide substantial insight in this case. As will be shown, the structure of the SNA depends to a large extent on the concerns when the accounts were first institutionalized -- the Great Depression and World War II. The particular historical context and personalities left their mark. Since then the methodology has become "locked in" to information systems around the world because of major economies of scale due to the high fixed cost of setting up the information and complementarities within and between information systems.

Network effects and the "hardware/software" paradigm explored by Katz and Shapiro [1994] have also produced inertia in the SNA. The SNA is used internationally, and comparability demands certain priority. Major unilateral deviation would involve significant costs. The economic data produced can also be thought of as hardware in a hardware/software relationship with economic models.

By producing economic data in the same way as everyone else, modes of economic analysis can be shared.

Notions of "bounded rationality" and "predictable behavior"[8] provide additional insight to an understanding of the forces of inertia that must be countered for changes in the SNA to occur. As pointed out by Kuznets [1946, 135] so many years ago, the difficulties of achieving a proper interpretation of the national accounts could well lead the responsible economist to despair. While teaching macroeconomic principles to students, economists may well squirm over the interpretation of GDP before proceeding with relief to the theoretical models based on these rather dubious numbers.[9] In the face of such uncertainty it *is* comforting to follow the rules unquestioningly [Heiner 1983]. Indeed, when few economists can fully comprehend the complexity of the SNA -- why should it be changed to something else?

It is remarkable, therefore, to find even incremental changes when the forces of inertia are so strong. The process of change is thus worthy of analysis.

The analytical threads here presented are woven through the following tale of the history and the "greening" of the SNA beginning with the institutionalization of the SNA.[10]

III. THE INSTITUTIONALIZATION OF THE SYSTEM OF NATIONAL ACCOUNTS

The United Nations' System of National Accounts (SNA) came into being with the 1947 report on the *Measurement of National Income and the Construction of Social Accounts*. Modernization has come largely in the form of additions to the system rather than essential modifications of the original system. The principal purpose of the last major UN revision made in 1968 [1968], was to link the original income and product accounts to input-output accounts, flow of funds accounts and balance sheets.[11] Like the SEEA, these additions were optional at the time that they were instituted.[12] The 1968 UN document served as the basis for member country accounts until the current revision [1992].

Before the 1940s, only a handful of countries estimated national income. Sir William Petty is recorded as the first to compute national income[13] for England in 1665 as an intellectual exercise. Kendrick [1972] reports that "intellectual curiosity" and "nationalism" motivated individual investigators in a few industrialized countries before the twentieth century to prepare income estimates based on fragmentary data.[14] The Soviet Union and Canada were the first governments to institute official continuing government estimates in 1925 and by 1939 seven other countries had joined them in doing so. Demand at the state level for better information intensified during the Great Depression of the 1930s and also during World War II. Historical studies of national accounting emphasize the importance of these particular events and also the personalities involved in shaping the accounts as we now know them.[15] In the United States, a senate resolution calling for estimates of national income was adopted in 1932 at the depth of the depression [Kendrick 1972, 16]. Simon Kuznets [1933] at the National Bureau of Economic Research cooperated with the Department of Commerce in the preparation of the estimates. During World War II demands for information on how the economies could support the war effort and where bottlenecks might occur made comprehensive economic accounting essential [CBO 1994, Kendrick 1972]. Richard Stone and James Meade worked in Great Britain with encouragement and advice from John Maynard Keynes preparing income and expenditure estimates. Stone later played a major role in the formulation of both the UN standardized accounts and those of the Organization for European Economic Cooperation (OEEC) set forth in 1953 [Kendrick 1972].

As the most influential macroeconomist of the day, the ideas of Keynes [1936] helped to structure the national accounts and have forever influenced the empirical basis for macroeconomic analysis. Short run considerations were under high priority at this time and the cost of capital consumption was secondary -- both for Keynesian business cycle analysis and also for the war effort. The emphasis on gross rather than net capital formation and income was thus established to

accommodate analysis of short-run interactions between income, expenditure, and employment while ignoring capital consumption [Bos 1992].

It should also be recognized that the urgent needs for an information system demanded a practical approach. Sir Richard Stone was a man suited for the job [Gorter and van der Laan 1992]. Stone defined social accounting as "an orderly presentation of what is taking place in an economic system"[16] and he developed his framework around the empirical foundations that had been established [Gorter and van der Laan 1992]. In general, experts in national accounting emphasize that the accounts are what they are and the theory should be used to explain what is [Reich 1991].

After the war and the introduction of a standardized system by the United Nations, the number of countries making estimates of national income grew rapidly -- from 39 countries in 1945 to 93 in 1955 [Kendrick 1972]. By the early 1970s, income accounts were virtually universal. Although the precise methodologies used vary somewhat between countries -- most countries adhere rather closely to the U.N. SNA.

Clearly, when the SNA was institutionalized, history mattered and people and their ideas mattered and in fact largely determined the subsequent path of institutional change. Urgent needs demanded a practical approach -- an "optimal" design was never part of the plan. Economies of scale, complementarities and network effects spread the system around the world and it quickly became locked-in to information systems. The incremental changes which have occurred since have been additions and minor modifications rather than fundamental changes.

Still, changes have occurred -- largely in response to increasing needs for information and the input of scholarly research.

An international forum for scholarly papers in the national income field -- the International Association for Research in Income and Wealth (IARIW) -- was founded at about the same time that the UN published the standardized accounts. The conference proceedings of the association became the basis for *The Review of Income and Wealth* -- the journal where national accountants have since

communicated with each other and have developed the ideas that sought to improve on methods of income accounting.[17]

IV. ACADEMIC FERMENT - A FORCE OF CHANGE

Concerns of Kuznets

Scholars recognized fundamental biases in the national accounts even while they were being institutionalized. Simon Kuznets, considered by many to be the father of national income accounting and certainly a primary influence on its development during the 1940s and 1950s, argued for extensions or revisions of the income accounts to include nonmarket output (especially household production), a more careful distinction between intermediate and final output, and more comprehensive measures of tangible and intangible investment.[18] These are the same themes that serious scholars have debated ever since and that special interest groups -- including feminists and environmentalists -- have more recently publicized.

Despite the influence of Kuznets, the biases in the accounts remained. Even in the 1940s and early 1950s, the forces of inertia were already too strong. Uncertainty about the proposed changes and the high cost of achieving international consensus encouraged cautious behavior. Although particularly in these early years the public benefits of making changes could have been large, these benefits would accrue to all and especially to future generations. Thus the payoff to political entrepreneurs at the time was insufficient to cover the cost of change.

Since the time of Kuznets, most serious scholars intimately acquainted with the national accounts have suggested extensions as opposed to any kind of major revisions of the core accounts. Indeed Eisner [1988, 1616] states,

> I would argue first -- and all those working with extended accounts would, I believe, agree -- that the conventional accounts should be retained, to be viewed alone or as a central component of revised and expanded measures. They offer and should continue to offer historical series of enormous value for economic analysis.

In addition to the network effects and the complementarities between information systems and modes of analysis, the value of a consistent time series gives an enormous advantage to the accounting system already in place.

Nevertheless, over the years many serious scholars have considered the SNA to be an inadequate base for policy decisions, so numerous extensions have been proposed. Eisner [1988] provides an excellent review of the kinds of extensions that have been proposed within the context of the U.S. National Income and Product Accounts (NIPA).[19]

While the debates on modifying and extending the national accounts span a much broader horizon than environmental concerns, we here restrict ourselves to an exploration of those themes that were most essential to the process of institutional change which ultimately resulted in the development of "greener" accounting methods.[20]

Income or Welfare

Economists teach their students that "Gross domestic product is not a measure of a nation's well-being," [Baumol and Blinder 1997, 101]. And scholars of national accounting repeatedly emphasize that the accounts should not be expected to be more than a measure of economic activity [Eisner 1988]. Nevertheless, almost universally economists appeal to Sir John Hicks when defining income. The Hicksian notion is an ideal with "well offness" as its principal characteristic [Hicks 1946]. The definition is often reduced to "that spending which keeps capital intact."[21] This is closely related to what some economists -- particularly environmentalists -- now call "sustainability" [Bartelmus 1994, Pearce et al. 1989, Solow 1986]; but is not well related to what is actually measured in the SNA [Reich 1991].

While the accounts were being established, the eminent economists of the day were all involved in discussions of their interpretation and there was clearly a concern that they should reflect welfare and capital maintenance.[22] Kuznets [1948] was the first to point out "a dangerous confusion between current product and current welfare" in the writings of Professor Hicks. Yet Kuznets too held welfare as

an ideal, as is evidenced in his discussion of the decision to exclude illegal economic activity on the grounds that it does not represent consumer "goods" [1946, 122-123].

Growth is Bad

Before long some economists took the next step to argue that increases in income as computed in the SNA actually meant decreases in welfare. Kenneth Boulding, [1949/50, 82] noted that "to an alarming extent our 'production' consists of the squandering of our geological capital." And although environmental concerns now include a broader sphere than "geological capital," his words are still echoed today [Repetto 1992]. K.W. Kapp with *The Social Costs of Private Enterprise*, published in 1950, was another early (if little recognized) pioneer in the interactions between economy and environment with objections to increases in national product reflecting environmental destruction.

John Kenneth Galbraith's attack on increasing production and consumption in *The Affluent Society*, 1958, comes from a much broader angle than purely environmental concerns, but it played an important role in popularizing the notion that economic growth and increases in national product could be seen as a "bad" rather than a "good."

Galbraith was also an early contributor to the studies and discussions that took place at Resources for the Future (RFF) -- a nonprofit organization established in Washington, D.C. in 1952, with funding from the Ford Foundation dedicated to "research and education in the development, conservation, and use of natural resources" [Jarett 1958]. The research done at RFF in these early years was central to the development of ideas on the role of natural resources in economic activity. As an independent nonprofit organization, RFF became an important interface between academic and popular interests.

Environment Enters the Mainstream

Alongside the academic concerns, popular concerns for the environment also grew. In the late 1960s and early 1970s there was a virtual explosion of environmental debate all over the world (see

next section). Among economists, natural resources gained new legitimacy as an integral part of economic systems.

Economics and the Environment: A Materials Balance Approach, by Kneese, Ayres, and d'Arge [1970], published by RFF played an important role in this legitimization. The study integrated environmental resources and pollutants as inputs and outputs into a general equilibrium economic model. Wassily Leontief also incorporated emissions and pollutants into his input-output models which had by then become standard.

A milestone in approaches to national income accounting was made in 1972 by William Nordhaus and James Tobin in "Is Growth Obsolete?" This work contained the first serious attempt to provide a comprehensive welfare-oriented measure of national output and attracted wide attention.[23] Although the analysis went beyond environmental concerns alone, they focused on the importance of keeping capital intact, discussed the problem of nonsubstitutability between natural and man-made capital, introduced the terminology of sustainable net income, and made deductions for "regrettables and intermediates," "disamenities," and "additional capital consumption." These ideas form the basis for the kinds of adjustments now recommended in the United Nations' SEEA.

Development of Green Accounting Methodologies

By the mid-1970s a substantial number of researchers were focusing more narrowly on adjusting the national accounts for environmental changes [Drechsler 1976]. National level demands to account for the environment (see next section) began to encourage the research and the development of valuation methodologies.

László Drechsler [1976] points out early divisions among researchers that still exist today and are reflected in the SEEA. Some researchers focus on what Drechsler called the "input asymmetry" problem -- the fact that man-made capital has been depreciated in the accounts to arrive at net domestic product while depreciation of natural capital has been ignored. Valuation is relatively

straightforward in the case of natural capital depletion since the depletion of oil, minerals, and even renewable resources like timber -- can essentially be valued at market prices.[24]

Other researchers are also interested in correcting national accounts for the "output anomaly" [Drechsler 1976]. But there is considerable disagreement on how this should be done. Leipert and Simonis [1989] among others, have, for example, suggested that environmental protection expenditures should not be included in final output; while many agree with Maler [1991] -- that such "defensive" expenditures could in the limit include all consumption.[25] Henry Peskin [1976] and Roefie Hueting [1980] have worked on more comprehensive approaches to accounting for environmental benefits as well as costs.

Techniques for valuing these kinds of non-marketed environmental services developed slowly until recently when demands for information increased substantially. V. Kerry Smith [1993] traces an increase in demand for better valuation techniques in the U.S. to an executive order in 1981 that required benefit-cost analyses of major regulations.[26] Much skepticism still remains regarding many of these valuation methodologies, however [Meyer 1993b].

The SEEA [UN 1993] recognizes the differences between schools of thought and is designed to accommodate a variety of approaches. The handbook calls itself a "work in progress," encourages further explorations in approaches, and hopes to provide a framework for improved comparability and communication between researchers in this field. Thus once again, like they did in 1947, the United Nations has left the academics to continue their debate while taking practical steps to satisfy increasing demands for information.

V. NATIONAL DEMANDS FOR ENVIRONMENTAL INFORMATION

Alongside and interacting with the academic ferment on environmental accounting grew a popular environmental movement and increasing demands for environmental information at national levels. The popular movement and the academic work each reinforced the other: national demands for

information and popular concerns for the environment funded research to respond to these needs. At the same time, the development of a solid research base and the beginnings of methodological approaches for environmental accounting provided legitimacy and inspired increased confidence that better accounting was indeed possible. Thus the research response strengthened demands at the national level for improved environmental accounting.

Popular Environmental Concerns

Concern for the environment grew rapidly in the late 1960s and reached a peak in the early 1970s -- in the United States and around the world [Dalton 1993, Lester 1989, Vig and Kraft 1994]. The first Earth Day was held in the United States on April 22, 1970 shortly after Congress passed the National Environmental Policy Act (NEPA) and President Nixon proclaimed the 1970s the "environmental decade." In Europe, 1970 also marked the "European Conservation Year." In June of 1972 the United Nations held a conference on the human environment in Stockholm, Sweden which was attended by 113 member nations and hundreds of nongovernmental organizations (NGOs). The UN Environmental Program (UNEP) was created to stimulate, coordinate, and facilitate environmental activities.

Such highly visible books such as Paul Erlich's *Population Bomb* [1968], E.F. Schumaker's *Small is Beautiful* [1973], and *The Limits to Growth* [1972] produced by the Club of Rome reflected and reinforced the spirit of growing segments of both the academic and popular communities: further growth of the economy and the population could threaten human welfare and the survival of the planet.[27]

National Environmental Accounts

The public demand for more attention to the environment -- and the need to therefore produce better environmental information -- manifested itself in a variety of accounting methods among the governments of industrialized countries.[28] In light of the popular support, politicians now found it in

their interest to make changes and individuals in accounting bureaucracies could expect eventual career enhancement from taking the initiative to push environmental accounting along.

The efforts of a few of the most frequently cited country approaches are here sketched out. Norway and the United States have pursued rather limited objectives but have significant experience in implementation. France and the Netherlands have invested relatively more time since the early 1970s developing comprehensive accounting frameworks but have a shorter record of successful implementation. Norway has the longest running series of environmental data and the most extensive experience using that data for policy purposes. The approach is restricted to physical resource accounting for politically and economically important resources [Alfsen et al. 1987]. The Ministry of the Environment was established in Norway in 1972 and was assigned the task of collecting and processing information on the state of natural resources. The accounting methodology used describes the transformation of key resources, energy, and selected contaminants for each economic activity in terms of stocks, flows, and input-output relationships as resources and energy enter into the production process and are transformed into products and wastes. Forestry data series begin in 1970 and fisheries begin in 1974; other minerals, petroleum, hydropower and key emissions have since been added. Although the environmental accounts were never intended to adjust GDP, environmental and natural resource accounts are compatible with the SNA framework of product accounts and input-output relationships and they have been integrated into government macroeconomic planning.

Also in 1972 in the United States, the Bureau of the Economic Analysis (BEA) began assembling pollution-abatement expenditure data for manufacturing establishments which have since been used for environmental and economic policy analysis. Until only very recently, identifying environmental expenditures has constituted the principal official environmental accounting activity in the United States. The U.S. Environmental Protection Agency conducted a pilot study of integrated environmental and economic accounting in the Chesapeake Bay with the help of Henry Peskin [Grambsch, Michaels and Peskin 1993].

In France an initial proposal for environmental accounting from the Ministry of Finances came in 1966 [de Jouvenel 1966]. But not content with a limited approach, the decision to establish "Natural Patrimony Accounts" came over ten years later in 1978 [Theys 1989]. "Patrimony accounting" is quite ambitious conceptually and is designed to analyze the environment from the economic, social, and ecological dimensions. The system moves from resource data at the first level to aggregate welfare indicators at level seven [Theys 1989]. The established accounts, however, are rather similar to those used in Norway [Peskin and Lutz 1993].

Since the end of 1969 the Department of Environmental Statistics of the Netherlands Central Bureau of Statistics has explored the development of a comprehensive framework for environmental data under the direction of Roefie Hueting [1980].[29] At the same time socio-economic accounts have been developed independently [Gorter and van de Laan 1992]. Actual implementation of either is still incipient.

In 1973 a Japanese government committee initiated a two-year study to develop improved accounts to measure national welfare, including adjustments for the effects of environmental pollution, based largely on the model of Tobin and Nordhaus [1972]. These accounts were not maintained although they were unofficially updated in 1985 by Professor Kimio Uno of the University of Tsukaba [Peskin and Lutz 1993].

Alongside these early efforts and particularly in anticipation of the recent changes in the U.N. SNA, many other industrialized countries have also taken steps to explore environmental accounting approaches that might be linked to the core economic accounts. [Abaza 1992, Peskin and Lutz 1993].

Differences Among Nations

The particular socio-political environment in each country and the personalities involved made for rather different processes of institutional change within countries despite relatively equal access to acquired wisdom on environmental accounting and apparently similar public demands for increased environmental information in industrialized countries. In their survey of environmental accounting

approaches in industrialized countries, Peskin and Lutz [1993, 152] conclude that, "Undoubtedly the choice of evaluation method is affected by a number of capricious factors such as historical accident or simply the interests of the individuals responsible for developing the technique." They also believe that differing policy goals and the perceived costs of attaining those goals have been important.

The Norwegian system, for example, as pointed out by Peskin and Lutz [1993, p. 152], reflected "the Norwegian desire to manage their resources of petroleum, timber, hydropower, and fish." Given the strong economic reliance on these natural resources, their well targeted demands for information could make it through the political process more easily. While the energy crisis in the early 1970s was an important factor in the environmental movements, in Norway (as contrasted to other Scandinavian countries) attention became focused on their use of rich North Sea oil reserves and hydroelectric power -- not available to Denmark and Sweden [Lester and Loftsson 1993]. Strong environmentalist opinion favored protecting rivers from further development. Energy accounts linked to economic accounts provided a firm basis for decision-making on hydroelectric projects [Lone and Nyborg 1993]. Thus political entrepreneurs in Norway in the early 1970s found a positive payoff for steps to institute environmental accounting targeted at politically key resources.

The Dutch approach is more broadly concerned with environmental-economic interactions in a highly developed economy. While the Dutch do not have the same kind of energy reserves as does Norway, they have strong environmental interests dating to the early rise of environmental movements in Europe in the late 1800s and early 1900s. The destruction of World War II intensified conservation movements throughout Europe, and Dutch interests were particularly strong in the early 1970s [Dalton 1993, Axelrod 1993].

Because environmental movements generally in Eurpoe waned in the late 1970s, early initiatives in environmental accounting that took hold had an advantage. Personalities, like Roefie Hueting in the Netherlands, in the right places, with keen interests in environmental accounting and

specific ideas on how the process should evolve, have also had major impacts on the direction of change at the country level.

France, like the Netherlands, has a long history of strong environmental movements, rooted in a particularly strong romanticist trend in the mid-1800s and intensified by World War II [Dalton 1993]. The French legacy as a former superpower and the romanticism embedded in their culture is reflected in their desire to develop elaborate "patrimony accounts" on their own initiative while others like Australia, prefer to wait for the United Nations to issue some guidance [Young 1993].[30]

In the United States environmental awareness has grown more slowly than in Europe [Milbrath, 1993]. The United States of course escaped the destruction of World War II, and Milbrath [1993, p. 36] believes that the U.S. leaders and citizens have a more superficial understanding of the gravity of environmental problems. This may be reflected in the very limited approach to environmental accounting practiced there.

Certainly the organizations that play an active role in shaping accounting and information institutions also vary between countries. Differences in the structure of these organizations and kinds of linkages that they have to other organizations will imply differences in the way the institutions evolve. For example, in the United States, the BEA, the Bureau of the Census, and more recently the EPA have all played roles in environmental information and accounting. In other countries -- in Latin America for example -- watershed corporations may be heavily involved in the collection of environmental data. The communication between these organizations shapes the evolution of the information systems.

VI. GREEN ACCOUNTING COMES OF AGE

Feedback between State Governments and the UN

Except for the fact that the United Nations is expected to take a leadership role -- consensus at this international level is even more costly to achieve than in individual countries. What has been

achieved with the release of the SEEA is something less than consensus.[31] The SEEA reflects many different concepts and methodologies and is still a "work in progress" despite the goal of "setting in motion the worldwide implementation of integrated accounting" [UN 1993, iv-v]. Building on the experience of individuals, states, research organizations, and other groups around the world, the UN has developed some methodological guidelines for the institutionalization of integrated environmental and economic accounting. But much of the work of institutionalization is passed back to the states.

International consensus has only really been achieved on the need to develop an appropriate institutional framework, that would incorporate environmental information, as a complement to the SNA, For example, *Agenda 21*, the document agreed on by more than 150 countries at the June 1992 UN Earth Summit encourages all member nations to obtain the handbook describing the SEEA and to, "develop, test, refine and standardize the concepts and methods proposed." It states that the "resulting system of integrated environmental and economic accounting should be seen as a complement to, rather than a substitute for, traditional national accounting practices for the foreseeable future" [Sitarz 1993, p. 255].

Yet the action taken by the UN encourages further action at the national level. In the United States, President Clinton in his April 1993 Earth Day speech called for the BEA to produce, " 'Green GDP' measures [that] would incorporate changes in the natural environment into the calculations of national income and wealth."[32] In 1994 the BEA began publishing estimates of changes in mineral stocks measured in dollar terms and further changes are anticipated.[33] Carol Carson, Director of the BEA feels that, "momentum is building for major change in the economic accounts, change that will upgrade and modernize them over the next decade." She sees domestic concerns about natural resources and the environment more generally as a major factor in this momentum, in addition to the changes anticipated by the recent UN revision of the SNA.[34]

UN Steps for Greener Accounts

The United Nations' Stockholm Conference over 20 years ago in 1972, during a peak period of public concern for the environment, set in motion a series of steps that after much frustration, ultimately resulted in the development of the SEEA in the recent process of revisions. Bartelmus [1989] reports frustrated attempts in 1973 by the Conference of European Statisticians of the Economic Commission for Europe which began to develop a system of environmental statistics to complement the SNA. The UN Statistical Office (UNSO) also began work, in 1974, on a more flexible system of environmental statistics without direct linkage to the SNA.[35]

Linkages to the SNA were attempted but abandoned, drawing on the recent academic breakthroughs. First developed was a material/energy balances approach similar to that of Kneese, et al. [1970] but in 1976 it was considered "too ambitious for short-term implementation."[36] And in 1977 the UNSO also examined the work of Nordhaus and Tobin [1972] (among others) in extending the accounts for welfare indicators but declared that they would be "inappropriate for official and especially international use."[37] Guidelines to include natural resource assets in the balance sheets (as opposed to the flow accounts) were, however, issued in 1977 [UN 1977b].

Popular demands for better environmental information in industrialized countries were already quite strong in the mid-1970s but in the light of significant uncertainty regarding accounting methodologies and the high cost of achieving consensus, the UNSO stayed a cautious course. Decisionmakers perceived inadequate benefits to cover the costs and risks of institutional changes at that point.

By the early 1980s it became clear that many oil producers were simply living off their natural capital [El Serafy 1981] and other developing countries also faced decline when the natural resources supporting their economy ran out [Ward 1982]. Thus natural resource accounting was increasing seen as particularly relevant for developing countries. In 1982 the UN Environmental Program (UNEP) held a special session to commemorate the tenth anniversary of the Stockholm Conference (when the UNEP was created) and "requested the executive director to develop methodological guidelines for

developing countries on environmental accounting and its use in development policy and planning" [Ahmad, El Serafy and Lutz 1989, xi].[38]

The UNEP convened the first consultative meeting on environmental and resource accounting in February of 1983 in Geneva under the chairmanship of Yusuf Ahmad. Participants at this meeting included representatives reporting on official environmental and resource accounting efforts in Canada, Norway, the Netherlands [Roefie Hueting 1980], France, Japan, and the OECD. Representatives from Resources for the Future (RFF), including Henry Peskin [1976] also attended, as well as Robert Goodland from the World Bank and Partha Dasgupta from the London School of Economics. The intent of the meeting was to determine whether the present state of the art of environmental accounting was adequate to support its use as a public policy tool [Ahmad et al. 1989, xi].

This first meeting was followed by a series of four workshops, in 1984 to 1986, with increasing participation from developed and developing countries, international organizations (especially the World Bank), researchers, and nongovernmental organizations [Ahmad et al. 1989].

The SNA Expert Group (composed of national accountants) met in March of 1988 in Vienna and reiterated UN intentions not to change the central framework of the SNA (UN, [1986]). Then in November of 1988, national accounts experts and environmental economists met at a Joint UNEP-World Bank Expert Meeting in Paris to discuss the draft framework for environmental satellite accounts [Bartelmus et al. 1991]. They endorsed the idea of satellite accounts with no major changes to the core. Work then began re-drafting the handbook, conducting pilot studies, and surveying approaches.[39]

In February of 1993 the Statistical Commission unanimously adopted the revised System of National Accounts and recommended the SEEA for the maintenance of satellite environmental accounts.

NGOs Popularize Natural Resource Accounting

Environmental interests groups in the United States, led by the World Resources Institute (WRI) managed to catch the wave of change as it rose and helped to create relatively widespread popular interest in environmental accounting -- in both industrialized and developing countries -- just prior to the Earth Summit in Río de Janeiro in June of 1992. Robert Repetto and other researchers at WRI working in collaboration with groups in Indonesia and Costa Rica conducted two major natural resource accounting studies at the national level to adjust national income for the depreciation of natural resource assets -- especially oil, timber, and soils [Repetto et al. 1989, TSC and WRI 1991].

Although the approach used was somewhat simplistic (it accounted only for resource depletion -- the "input asymmetry" discussed earlier) and the analysis was developed without attention to the burdensome details of the SNA, these studies made the case to other environmental groups and policymakers around the globe that environmental accounting could be done on the national level. Researchers in the area of environmental accounting everywhere were soon citing WRI's case studies.[40] Repetto participated in several of the UNEP-World Bank workshops in the mid-1980s and led NGOs in arguing for fundamental changes in the national accounts.

While fundamental changes were an impossible goal, the popular attention drawn to the issue intensified efforts at the UNEP-World Bank workshops. Whether or not the actions of WRI and other NGOs actually helped to force the decision to adopt satellite accounts is not clear since the SEEA was already being developed.[41] But WRI's work did encouraged many pilot efforts around the world -- particularly in developing countries. Researchers close to current efforts in environmental accounting believe that the most intense demand for change now exists primarily in developing countries.[42] NGOs could have an important role to play from this point forward in furthering current momentum.

Conclusions on the Role of Ideas in Institutional Change

The recent decision of the UNSTAT to encourage member nations to supplement the core national accounts with satellite environmental accounts was actually rooted in ideas and incremental changes that worked toward that end for almost 50 years. Random events and particular personalities

have played important roles. So have the persistent warnings of academics that the accounts are interpreted to represent welfare when they do not. The slow steps of the UN to respond to demands for improved environmental accounting over the last 50 years formed an integral part of the road to this decision. The Stockholm and Río UN conferences in 1972 and 1992 were, likewise, key elements in galvanizing public attention on environmental issues that resulted in promises to act.

In this particular process of institutional change, ideas have played a major role. Initial demands for information were partially inspired by scholars and popularized by interest groups. Governments and political bodies at national and international levels responded with collective decisions that fed back as an increased demand for researchers to further develop their ideas. As increased confidence developed in the accounting methodologies, both national governments and the UN could take stronger actions.

General acceptance of need and ability to provide the information grew, became legitimized with collective decisions and then continued growing on the strength of greater consensus. Ultimately the perceived benefits to political entrepreneurs exceeded the perceived costs of institutional change and change occurred -- always predicated, of course, by its historical path.

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NOTES

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1. To a large extent this analysis follows the theory of institutional change presented in some detail in North [1990] and summarized in North [1993].

2. See Eggertsson [1990] and Libecap [1986] for reviews of research on the emergence of property rights. Demsetz [1967], for example, describes how increased prices of furs in early America encouraged the emergence of private property rights. Ekelund and Tollison [1982] focus on how the regulations of mercantilism emerged to pad the pocketbooks of those who devised the regulations. Buchanan [1980] links the emergence of property rights to the emergence of regulations, and thus the property rights literature to the rent-seeking literature.

3. Alain de Janvry [1973] examines how "latent" demand for public institutions is translated into "actual" demand.

4. See Buchanan and Tullock [1962] and Olson [1965] for seminal works in this area and Mueller [1989] for a comprehensive review.

5. See Ruttan and Hayami [1984], Feeny [1988], and Meyer [1992, 1993a].

6. See de Janvry [1973] and note 3 above.

7. Indeed the complexity of institutional change demands an multidimensional workspace -- quantity of institutional change in a single direction has little meaning given the qualitative features of any kind of change.

8. Simon [1955] is a classic discussion of behavioral choice. The notion of "bounded rationality" introduced by Simon is a key ingredient of Oliver Williamson's theories of market institutions [Williamson 1985]. Heiner [1983] predicts that greater uncertainty will lead to stricter adherence to rule-governed behavior.

9. This is perhaps a matter of perspective. Bartelmus comments that after assessing the relevance of economic modelling he returns with relief to expanded data systems (personal communication, July 1994; also Bartelmus [1994]).

10. McCloskey [1983] has defended the role of storytelling to complement the rigor of other modes of analysis. Feeny [1988, 171] explains that the role of ideas has often been left out of the analysis of institutional change precisely because quantitative methods and formal analytical tools have proven incapable of dealing with it. Ruttan and Hayami [1984, 218] appeal to colleagues in other social sciences to provide "more helpful analytical tools" so that we might in the future include the role of ideas in the analysis of institutional change. Denzau and North [1994] suggest a framework of "punctuated equilibrium" to explore the process of cognitive change as societies evolve.

11. Major pioneers for these additions include Wassily Leontief [1941] on input-output matrices; Morris Copeland [1952] on flow of funds accounts, and Raymond Goldsmith [1962] on balance sheets.

12. The United States, for example, did not include balance sheets until 1980 [CBO 1994].

13. "annual Income and Expense of the People" from Studenski [1961] as cited in Kendrick [1972, 15].

14. Studenski [1961], Kendrick [1972], and Campbell and Peskin [1979] recount the history of early income accounting efforts. This paper largely follows Kendrick [1972].

15. See especially Studenski [1961] and Kendrick [1972] as well as Eisner [1988], CBO [1994], Gorter and van der Laan [1992], and Bos [1992].

16. From Stone and Croft-Murray [1959, 9] as cited in Kendrick [1972, 3].

17. Peter Bartelmus emphasizes the need for effective dialogue between users and producers of data and suggests that the nonprofit community as perhaps a more appropriate mode (personal communication, July 1994). The next section illuminates the important role that Resources for the Future played as an interface between academic and popular interests.

18. Eisner [1988] reviews the changes that Kuznets suggested. See Kuznets [1946] for a review of the difficulties in interpretation of the national accounts.

19. Included in this review are the extensions by Nordhaus and Tobin [1972], Zolotas (1981), Jorgenson and Fraumeni [1987], Kendrick [1976], the Ruggleses [1970] as well as his own work beginning in 1970.

20. Usher [1980] and Hueting [1980] are good literature references for the development of environmental accounting.

21. Reich [1991, 238]. See Reich [1991] for an insightful discussion of the contrast between the current recognition of what the accounts are and the outmoded tradition of appealing to Hicks.

22. See the contributions from the early 1940s of Pigou, Hayek and Hicks on the maintenance of capital intact in Parker and Harcourt [1969]. Hicks [1940] tries to equate "social income" with "economic welfare". Kuznets [1948] responds and receives a reply [Hicks 1948].

23. Eisner [1988, 1627] notes that it quickly entered into Samuelson's 1973 9th edition principles text as well as the accompanying book of readings.

Other work initiated in NBER conferences at this time was also influential in establishing that the accounts as they existed did not measure welfare. See particularly Juster [1973] and contributions in Moss [1973].

24. Pioneers in accounting methods for natural capital depletion include Weitzman [1976], Hartwick [1977], El Serafy [1981], Landefeld and Hines [1985], Maler [1991], Boskin et al. [1985], and Solow [1986]. Meyer [1993b] reviews valuation methods for resource depletion.

25. The arguments regarding "defensive" expenditures were brought up originally by Kuznets regarding national defense during World War II. Kuznets believed that there were good reasons not to include these expenses in final output. Environmentalists have developed arguments along the same lines for expenses to defend against pollution or clean up the environment.

26. These techniques include such approaches as the travel-cost approach and contingent valuation surveys. See Smith [1993] and Lutz [1993] for a reviews of accounting methodologies for non-marketed environmental services.

27. Nordhaus and Tobin [1972, 1] for example, begin their study, "Is Growth Obsolete?" with direct reference to Erlich's popular book.

28. See Peskin and Lutz [1993] for a review of the methodologies used for environmental accounting in industrialized countries.

29. More recently the work of Steven Keuning [1992] has been influential.

30. Australia's reluctance to go ahead with environmental accounting is also linked to a strong negative reaction on the part of Clarke and Dragun [1989] to work presented by Robert Repetto from the World Resources Institute (WRI) (Peskin and Lutz [1993], Young [1993]). See next section for more on Repetto's work on natural resource accounting with WRI.

31. Buchanan and Tullock [1965] assert that the cost of decision making increases with the size of the decision-making unit.

32. From White House, "Earth Day Address" (press release, April 21, 1993) as cited in CBO [1994].

33. *Newsweek*, May 16, 1994.

34. Carson [1993, 22]. Carson sees concerns about the globalization of the economy as another factor forcing changes in accounting methods.

35. See CES [1973] and UN [1984] for primary sources.

36. Bartelmus [1989, 80]. See also UN [1976].

37. See UN [1977a, 66] as cited in Bartelmus [1989, 80].

38. John Hartwick notes that the 1982 UN initiatives were a result of the realization that many developing countries were living off natural capital (personal communication, July 1994).

39. Lutz [1993] is an edited volume which contains the results of pilot studies in Papua New Guinea and Mexico, a review of country approaches, and a number of other research papers.

40. Peskin and Lutz [1993] compare environmental accounting methods in industrialized countries with the "Repetto method."

41. Henry Peskin believes that the SEEA would have been recommended in any case but that WRI's work did influence the methodological approaches being considered (personal communication, 1994).

42. Peter Bartelmus (personal communication, July 1994) has made this point and Henry Peskin believes that current efforts in the Philippines to establish environmental accounts are an outstanding example of the institutionalization of a new accounting approach at the national level (personal communication, July 1994). See Meyer [1993b] for a review of other initiatives in environmental accounting in developing countries.