The Governor's Commission for a
Sustainable South Florida

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A Report on Full Cost Accounting

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I. INTRODUCTION

The Governor's Commission for a Sustainable South Florida

Governor Lawton Chiles created the Governor's Commission for a Sustainable South Florida (Commission) in March 1994, and charged it to determine South Florida's sustainability and, if necessary, make recommendations which will ensure that the region becomes sustainable. The Commission determined that South Florida, on its present course, is not sustainable. Through an unprecedented bipartisan consensus approach, its members, consisting of federal, state, regional, county and local government, business, environmental and Native American representatives, developed recommendations for achieving a healthy balance among South Florida's environmental, economic, and societal components. These recommendations, contained in its *Initial Report*, tackled many issues including Everglades restoration, water supply, education, employment, economic development, livable communities, agriculture, and transportation. Currently, the Commission is monitoring the implementation of its initial recommendations and continues to refine and develop further strategies to ensure the health of the Everglades ecosystem. The Commission includes in its definition of the Everglades ecosystem the natural and built environments.

In its *Initial Report*, the Commission recognized the need for better evaluations and monetary estimations of environmental and social benefits and costs resulting from policy decisions. Specifically, it called for land use and water management decisions to be evaluated using full cost accounting principles, and ecosystem restoration plans to incorporate principles of full cost accounting. The application of these principles has the additional advantage of presenting to citizens a clearer evaluation of public projects, policies, and programs deemed to be in the public interest. It is the considered position of the Commission that full cost accounting is critical to the advancement of the concept of sustainable societies.

Definition of Full Cost Accounting

The Commission defines full cost accounting as a set of analytical techniques for better informed decision-making in order to encourage efficiency and innovation and to enhance economic, environmental, and social goals. These techniques include benefit/cost analysis, economic impact analysis, fiscal analysis, and cost effectiveness analysis. Currently, in public policy decisions, the terms "full cost accounting" and "benefit/cost analysis" are used interchangeably. Even though the committee accepts these terms, it recognizes that traditional benefit/cost analyses fails to encompass the entire scope of analysis for which the Commission expressed concern in its *Initial Report*. For example, many policy decisions have economic consequences for both individuals and specific communities that are not addressed in a traditional benefit/cost analysis. Such shortcomings may be overcome by the inclusion of a fiscal impact analysis or an economic impact analysis. In fact, there are a variety of economic tools available to help understand the impacts of a policy. Therefore, the best policy decision will result from utilizing most, if not all, of these various methods of economic analysis. When employing all of these tools for evaluating a policy decision, one must be sure to avoid adding together measures of impact estimated from different evaluation methodologies.

The term ***full cost accounting*** is relatively new in management and public policy discussions and is oftentimes misunderstood. In a broad sense, it calls for the inclusion of factors that have often not been directly quantified for management and policy decisions. Specifically, full cost accounting attempts to identify, quantify, and monetize all of the social and environmental benefits and costs resulting from projects, policies, and programs. If the benefits and costs cannot be assigned a monetary value, their existence should, at a minimum, become incorporated into the decision process. While qualitative estimation is not as accurate as monetization, it is more accurate than excluding a known impact from consideration. Benefits of using full cost accounting include: benefits and costs of projects, policies, and programs are better understood; politically sensitive issues tend to be put into perspective; and stakeholders' interests are placed on a level playing field.

Even initial steps to implement full cost accounting will provide a better understanding of the relationships between the benefits and costs of projects, policies, and programs, including resources that may be lost (e.g. wetlands) as a result of their implementation. This information provides the public with a better ability to judge the tradeoffs associated with proposals as a part of the decision-making process.

In the Economic Literature, the term full cost accounting is also used to reference two other evaluation frameworks: social accounting and corporate internal accounting. A description of each can be found in the Glossary. It is not the intent of the Commission to include these two evaluation frameworks in its definition of full cost accounting.

II. PRINCIPLES OF FULL COST ACCOUNTING

These principles serve as a guide for full cost accounting applications, and at the same time, call for the incorporation of public input that facilitates sound and informed decision-making.

1. Full cost accounting is a set of analytical techniques for better informed decision-making in order to encourage efficiency and innovation and to enhance economic, environmental, and social goals.

2. Full cost accounting approaches should be flexible, practical, and adaptable as new information and valuation techniques arise.

3. Full cost accounting approaches should be tailored to the issue under consideration, to the decision-making entity (private industry vs. governmental agency), and to the geographical scope of the decision (local vs. regional vs. global).

4. Full cost accounting should incorporate the benefits and costs that accrue to present and future generations.

5. Efforts should be made to estimate and assign a monetary value to all economic, environmental, and social benefits and costs, public and private. If this valuation is not feasible, they should be qualitatively incorporated into the decision-making process.

6. Full cost accounting should seek public input regarding economic, environmental, and social benefits and costs, public and private.

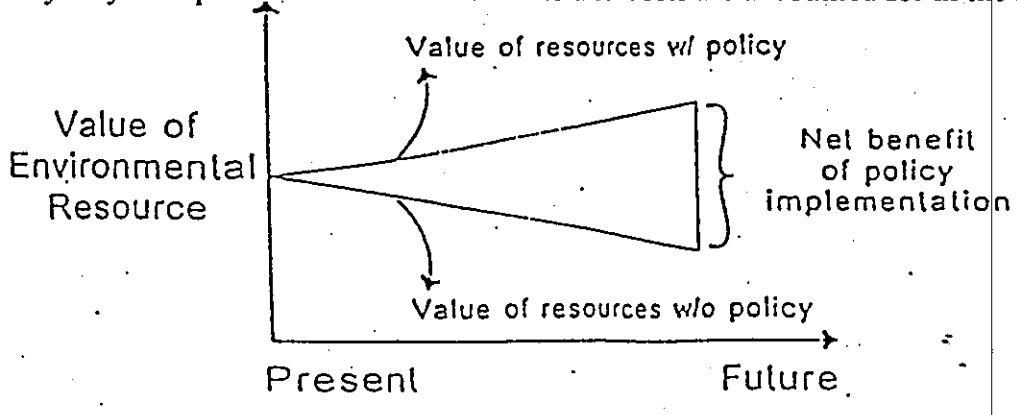
III. Economic Evaluation Tools of Full Cost Accounting

It is important to understand the different types of information produced by each of the analytical techniques that comprise full cost accounting. Of particular concern to the Commission are the following economic evaluation tools: benefit/cost analysis, economic impact analysis, fiscal analysis, and cost-effectiveness analysis.

Benefit/Cost Analysis

Benefit/cost analysis is the one most appropriate for evaluating public decisions. In terms of the benefit/cost framework, full cost accounting refers to the practice of making meaningful measurements of all benefits and detriments that may result from a project, policy, or program. These benefits and detriments include private as well as external effects that may occur outside traditional private markets for goods and services. Social benefits and costs are the sum of private and external benefits and costs. Applications of full cost accounting for evaluating social investment projects have a long history in the U.S. including early applications in water resource development planning and have more recently been applied to the analysis of public policy.[1]

Benefit/cost analysis can play an important role in sustainable development planning because it helps to incorporate and integrate economic, environmental, and social concerns in decision-making. For a specific environmental resource such as a lake, a complete accounting of both private and social benefits and costs resulting from a policy choice will reveal the expected change in the ***total economic value*** for that resource. This is illustrated in the graph below which shows that, in the absence of a policy to protect a particular lake ecosystem, the resource decreases (depreciates) in value over time. With the policy, however, the value increases (appreciates) over time. The difference between the with and without policy results is a measure of the change in total economic value, or ***net benefits***, from the policy. The change in total economic value will be a reliable guide to sustainability only if all private and external benefits and costs are accounted for in the analysis.



Measuring Changes in Total Economic Value Due to Policy

1 See Joint Economic Committee, Ninety-First Congress. *Guidelines for estimating the benefits of public Expenditures.* Washinton: U.S. Government Printing office, 1969.

Projects, policies, and programs, initiated and approved in the "public interest", can best be evaluated by the public when the array of benefits and costs that can be practically valued are presented as dollar values. The use of such a process creates a uniform and understandable measurement and thus improves the public's capacity to make an informed decision.

Though the theoretical basis of this type of analysis is quite solid, the application of benefit/cost analysis has been hindered by a number of real, though not insurmountable, problems. These include: the identification of the externalities; the estimation of the extent of the externalities, not otherwise internalized; the monetization or value of the externalities; the choice of the relevant geographic scope and time frame for analysis; and the choice of the discount rate. Economists have developed generally accepted methods to address these problems, however, additional difficulties arise from institutional reticence or barriers to expanding traditional benefit/cost analyses.

Economic Impact Analysis

Economic impact analysis measures a particular policy's effect on regional and/or local employment, income, and revenues. Alternatively, a ***fiscal impact analysis*** measures the policy's effect on tax revenues and disbursements, and the subsequent incidence and burden of these disbursements. Economic Impact and Benefit/Cost analysis can measure the effects on specific groups identified by race, income, age, gender, etc. Though economic impact and fiscal impact analyses illuminate important potential consequences from a given policy, they do not provide guidance as to whether the policy, from a social perspective, should be undertaken or rejected. Unlike benefit/cost analysis, economic impact analysis does not attempt to measure economic benefits and costs to society as a whole. Economic impact analysis (and fiscal impact analysis) can and should be used congruently with benefit/cost analysis to evaluate projects, policies, and programs.

Cost-Effectiveness Analysis

Cost-effectiveness analysis is a methodology that can be applied whenever it is unnecessary or impractical to consider the dollar value of the benefits provided by alternatives under consideration (e.g., each alternative has the same benefits expressed in monetary terms or each alternative has the same effects but dollar values have not been assigned). A project is cost-effective if it is determined to have a lower cost than competing alternatives in present value terms for a given amount of benefits.

A cost-effectiveness modeling approach avoids the issue of evaluating benefits by setting desired objectives beforehand and searching for the lowest-cost ways of achieving these. Such an approach can facilitate the comparison among alternative policy or management plans. Such an approach also allows decision-makers to build a "frontier" of cost-effective actions that highlights the higher marginal costs associated with different alternatives.[2]

Recently, incremental cost analysis has been used to evaluate the cost-effectiveness of different components or scope of a given project, policy, or program. Incremental cost analysis

2 This discussion on cost-effectiveness analysis originated from Lipton, et. al. Economic Valuation of Natural Resources - A Handbook for Coastal Resource Policymakers. NOAA Coastal Ocean Program Decision Analysis Series No. 5. NOAA Coastal Ocean office, Silver Spring, MD, 1995.

attempts to determine the additional cost associated with increasing levels of output, where output is usually measured in physical rather than monetary terms.

Key Concepts

Of the economic tools that comprise full cost accounting, benefit/cost analysis requires an understanding of several concepts and issues.

Definition of Benefits and Costs

Benefit/cost analysis aims to monetize the values of all goods and services (economic, environmental, and social) that may be produced or consumed (destroyed) in the design, implementation, and execution of projects, policies, and programs. To accomplish this goal, the analysis must incorporate measures of ***social costs and benefits*** which include both ***private costs and benefits*** and ***externalities***. ***Private cost and benefits*** accrue solely to the economic entity or individual making the production and/or consumption decision. An ***externality*** occurs when, in the process of production, consumption, or disposal, benefits are accrued to or costs are paid by a third party who does not pay for these benefits or receive compensation for these costs. An example of an external benefit or externality is that of the unpaid bee-keeper. The honey produced by the bee-keeper represents a private benefit, but the activity of bee-keeping generates an external benefit to other farmers through crop fertilization for which the bee-keeper receives no compensation.[3] Total social cost (benefits) is the sum of these private costs (benefits) and external costs (benefits).

Benefit/cost analysis estimates the change in the value of goods and services produced from a project, policy, and program, including environmental services. It is also important to keep in mind that in benefit/cost analysis, the terms "costs" and "benefits" are used in their economic sense. Full cost accounting measures ***economic costs and benefits***. ***Cost*** means ***opportunity cost***, and ***benefit*** means all increases in value including ***costs*** which are not incurred now or in the future. ***Opportunity cost*** is the value of an economic resource, good or service in its next best use. ***Opportunity cost*** arises from the existence of ***scarcity*** and reflects the fact that the production/consumption of a given good or service implies giving up the opportunity to consume/produce other goods and services. For example, if a freshwater lake has but two potential uses, as a source of drinking water and as a depository of industrial waste, the opportunity cost of polluting the lake are the benefits foregone from using the lake as a drinking water source. This opportunity cost (foregone benefits) could then be measured as the higher cost of drinking water for potable water for the surrounding population.

Economic costs can be either ***explicit*** or ***implicit***. ***Explicit costs*** are out-of-pocket costs and can include the administrative, engineering, construction, monitoring, and enforcement expenses necessary to implement a policy. Compliance costs incurred by those impacted by the policy are also included. ***Explicit costs*** are usually the easiest economic costs to measure because they involve goods and services that are priced through traditional markets.

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3 It is, in fact, the realization of this externality that has led to the development of a market in bee-keeping services. Farmers often pay bee-keepers for their services and this, in turn, internalizes the externality.

Implicit costs, on the other hand, are additional costs borne by society as a result of a policy that may not be directly measurable through out-of-pocket expenditures, but represent an opportunity foregone. Implicit costs may be ***market*** or ***non-market*** in nature. An example of a market implicit cost is the interest forgone by a private investor who uses his personal capital to finance an investment project. A non-market implicit cost may include effects of an investment, policy, project, or program on the environment and the welfare of individuals. For example, a policy may decrease the variety of wildlife in a park. Users of the park bear these costs through a reduction in their enjoyment of the park, but these costs are not registered through the market and are thus hard to monetize. Some possible methods to provide monetary values for these implicit costs are discussed below.

Discounting

Full cost accounting not only considers benefits and cost accruing in the present, but also those that will occur in the future. What is the relevant time frame to use? How far into the future do we measure costs and benefits? How do we convert monetary values of costs and benefits occurring in the future into ***present values***? What is the correct ***discount rate*** to use?

To find the present value (PV), future cost and benefits have to be discounted. The present value of future benefits accruing in period "t" can be computed as follows:

$$\text{PV of NB} = \sum_{t=1}^{T} NB_t / (1 + i)^t$$

where NB_t is the monetary value of benefits minus costs (***Net Benefit***) in period t, and "i" is the ***discount*** rate. "T" is the total number of years evaluated (time frame). The present value of future costs and benefits will be significantly affected by the selected discount rate. The higher the discount rate, the less weight future costs and benefits will have in the evaluation process.

Identifying Benefits and Costs

Full cost accounting seeks to monetize the value of all changes in well being resulting from a project, policy, or program. For traditional market goods, these changes may accrue through increases or reductions in the availability or price of goods and services. Benefits and costs may also accrue from improvements to ***public goods*** or the deterioration in their quality or availability. For example, public goods include bridges, roads, educational institutions, and environmental resources such as wildlife populations (or diversity) and a healthy habitat.

An important first step in full cost accounting is the identification of all costs and benefits. It is helpful to distinguish two sources of value: ***use value*** and ***non-use (passive use) value***. Use values can be classified as ***direct value*** when associated with direct consumption and/or production of the good or resource in question, or as ***indirect value*** when the good or resource serves as an input in a production or consumption. Whether or not a project, policy, or program generates indirect or direct values depends on the final types of goods and services produced from the project, policy, or program. Another type of ***use value*** is called ***option value***. ***Option value*** is the value of retaining a resource, good or service for potential uses (direct and indirect) in the future.

Non-use values, on the other hand, arise from simply knowing that a resource exists and that it will be held in stewardship for future generations. In the literature, non-use values are also referred to as existence, stewardship, or passive use values. This may be important to individuals because their value for the resource extends beyond direct or indirect consumption. In recent years, non-use values have become an increasingly important component of economic benefit measurement due to public concern about long term sustainability and advances in measurement techniques.[4]

Total economic value of a good or resource is the sum of all relevant ***use*** and ***non-use values.*** However, some of the possible uses of a good or resource are mutually exclusive and care must be taken not to double count. The table below attempts to identify and classify some possible values of wetlands.[5]

TOTAL ECONOMIC VALUE OF THE TEN THOUSAND ISLANDS

USE VALUE			**NON-USE VALUE**
Direct Value or *Indirect Value*		*Option Value*	*Existence Value* **(Stewardship, Passive Use, Bequest)**
Recreational Fishing	Commercial Fishing	Future Uses of Direct and Indirect Values	Critical Habitat
Water Supply	Water Quality		Endangered Species (Florida Panther, Manatee, etc.)
General Recreation	Biodiversity		
Hunting	Nature Observation		Cultural Heritage
Photography	Hiking/Camping		Wildlife Diversity
Wildlife Habitat	Nutrient Uptake		

Measuring Benefits and Costs

Various methods can be used to measure economic costs and benefits as part of a full cost accounting analysis. It is important to recognize, however, that even the most complete analysis may not be able to account for all non-market values. An effort to monetize non-market values, even if it were incomplete, would improve policy makers' and the public's ability to evaluate proposed

4 See Brandt, Ellen. "How Much Is a Grey Wolf Worth?" *National Wildlife* (June-July 1993): 4-13.

5 Adapted from Pearce, David. "Deforesting the Amazon: towards an economic solution." *The Economics of Project Appraisal and the Environment*, John Weiss ed. Cambridge, Great Britain: University Press, 1994.

projects, policies, and programs. While qualitative estimation is not as accurate as monetization, it is more accurate than excluding a known impact from any consideration.

The basic distinction in methods for measuring economic benefits and costs is between methods based on market price information versus a non-market setting where values must be constructed. Market prices are useful because they convey information about the cost of production and the value of goods to consumers. Measures of costs and benefits of private goods traded in markets can be obtained using actual market prices and expenditures. In the absence of market prices, or in the presence of market imperfections (monopolies, subsidies), constructed prices, also called ***shadow prices***, can provide similar information.

Measuring the value of non-market costs and benefits can be more challenging than measuring market costs and benefits. The valuation of non-market costs and benefits can be measured either directly or indirectly. ***Indirect measures*** of costs and benefits of non-market goods rely on market information about other related activities to infer the value of the good or service in question. For example, no market exists for clean air, but rising levels of pollution increase market activities such as doctor visits and medicine purchases by asthma victims. ***Direct measures*** of costs and benefits can be used for all goods in question, including market goods. Direct methods solicit value information directly from the consumer through the use of surveys or through experiments.

The table below lists some of the different methods that can be used to measure economic costs and benefits. The methods are not mutually exclusive, so more than one might be employed to measure costs or benefits. It is important, however, that the methods do not "double count" the costs or benefits. Brief descriptions of each method are provided in the Glossary.

METHODS TO MEASURE NON-MARKET ECONOMIC BENEFITS AND COSTS

Benefits/Costs	Indirect	Direct
Use Value	Foregone Expenditures Averting Expenditures Travel Cost Hedonic Models	Contingent Valuation Multi-attribute Analysis
Non-Use Value	Not Applicable	Contingent Valuation Multi-attribute Analysis

IV. THE USE OF ECONOMIC EVALUATIONS BY FEDERAL AND STATE AGENCIES

As they implement their legal duties, government agencies are called upon to determine available alternatives and evaluate their benefits and costs. For Florida to become sustainable, agencies must come to apply full cost accounting to such policy evaluations. At present, though most

agencies attempt to become informed, most, if not all, do not truly practice full cost accounting. In many instances, the ability to fund monetization of impacts is the limiting factor. Monetization is important because it provides an apples-to-apples comparison of benefits and costs among alternative projects, policies, and programs. Absent full monetization, agencies should, though they often do not, use the best available information to estimate impacts qualitatively. The following examples explain in more detail the experience of one federal agency and one state agency.

The Army Corps of Engineers (Corps)

The Corps is the federal agency responsible for implementing Everglades restoration projects. Its Central and South Florida Comprehensive Review Study (Restudy), when completed, will produce a blueprint for the "replumbing" of the water management system that will eventually restore more natural water flows to the Everglades ecosystem. Ecosystem restoration, however, remains a relatively new enterprise for this agency, especially a restoration project as large and complex as the Everglades effort. Traditionally, the Corps' experience with Congressionally authorized projects has focused on the provision of flood control, water supply, drainage, and navigation.

With respect to the use of economic tools for project evaluation, the Corps has historically been in the forefront among federal government agencies. Routinely, it performs benefit/cost analyses to estimate a project's net effects on the nation's welfare. If the benefit/cost analysis indicates a ratio of benefits to costs for the nation greater than one (positive net benefits), the undertaking of the project is justified. Prior to the adoption of the National Environmental Protection Act of 1969 (NEPA), however, the Corps placed little emphasis on the environmental and social benefits and costs resulting from their policy decisions. During that time, the standard practice for evaluating project feasibility rarely involved the inclusion of social and environmental benefits and costs.

The original Central and Southern Florida Project (C&SF) embodied the typical pre-NEPA project. With its operation, the Corps fulfilled its mandate to rescue South Floridians from the seasonal floodings and constructed one of the most successful water management systems to date. The emphasis placed on the project centered around flood control, water supply, and drainage, the Congressionally authorized purposes of the project. Environmental concerns were primarily limited to the speed at which the swamp could be drained and made available for agriculture and development. This approach bore testimony to the attitudes and values of the past as well as the standard professional practice at the time.

During the 1950's and the 1960's, the Corps started to identify and account for some external benefits and costs in its assessment of projects, where applicable. Typical benefits included the creation of jobs and recreational benefits. For example, the benefit/cost analysis for the initial Kissimmee River project in the 1950's accounted for the recreational benefits gained and lost from the straightening of the river. Since then, the Corps and the public have recognized the importance of considering the social, including environmental, benefits and costs resulting from policy actions and decisions.

Requirements of Principles and Guidelines

The advent of NEPA was the turning point for federal agency responsibility to environmental concerns. NEPA required that the Corps, and other federal entities, consider environmental and social impacts in its project and policy assessments. Over the years, the Corps has attempted to do so with varying degrees of success. In the 1970's, the Corps received guidance in its policy decision-making through the Principles and Standards, and again through the Principles and Guidelines (P&G), promulgated in 1983. The P&G identifies four "accounts", or analytical tools, that should be used for project evaluations. Specifically, the P&G attempts to facilitate evaluation and display of the effects of alternative plans for the Corp's decision-makers.

The four "accounts" outlined in the P&G are the following: the National Economic Development account (NED), the Environmental Quality account (EQ), the Regional Economic Development account (RED), and the Other Social Effects account (OSE). The NED account, the equivalent of a benefit/cost analysis, intends to illustrate a project's net effect on the national welfare. The NED account requires the monetization of all costs and benefits identified in this account. The EQ account exhibits the effects on ecological, cultural, and aesthetic attributes of significant natural and cultural resources that cannot be measured in monetary terms. Evaluation using the RED account is the equivalent of an economic impact analysis and shows the regional incidence of impacts to national welfare including the effects on income, transfer payments, and employment. Finally, the OSE account displays urban and community impacts and effects on life, health, and safety.

The Corp's Use of the Principles and Guidelines.

To determine the feasibility of a project prior to authorization, the Corps must evaluate, at a minimum, the NED account. Specifically, the NED account must demonstrate a benefit/cost ratio (in monetary terms) greater-than-one for project justification. An important exception to this rule is a project that primarily involves environmental restoration benefits. The exception arose from the Corps' concern that, in the evaluation of projects whose benefits were overwhelmingly environmental and categorized as "non-use values", it would encounter great difficulties in monetizing those benefits, and consequently, in meeting the greater-than-one benefit/cost ratio requirement necessary for authorization. In the case of projects that primarily involve environmental restoration, the Corps' policy and practice has been to conduct a benefit/cost analysis, excluding environmental "non-use" benefits and costs, and an EQ analysis, where benefits and cost are not necessarily monetized.

To aid in final project selection for the Restudy, the Corps has also been relying on cost-effectiveness and incremental-cost analyses. Typically with environmental restoration projects, the Corps originally considers a number of alternatives. After some initial screening and discarding of alternatives, the Corps selects a subset of alternatives and evaluates them using a cost-effectiveness analysis. This methodology identifies the alternative(s) which produces either the same output for less of a cost than the others, or an increased output at an equal or lower cost. Following the cost-effectiveness analysis, the Corps then employs an incremental-cost analysis to determine the additional cost per unit associated with increasing levels of output for the various alternatives. The use of the incremental-cost analysis helps determine (at the margin) if the benefits of the last added increment of ecosystem restoration justifies the additional cost.

While the use of the NED and EQ accounts is a mandatory requirement for project evaluation, the other accounts in the P&G may be explored to enhance the degree of economic information about a specific project. Both the Corps and the local sponsor of the project determine which of the other three accounts, along with NED, merit investigation and inclusion in the Project Study Plan (PSP). In an attempt to provide flexibility for the analysis, the PSP is designed as a "living" plan that may be modified at the request of either party, pending the other's consent.

Economic Evaluation of the C&SF Restudy

The original PSP for the C&SF project spanned a six-year time frame and included all four accounts. The Water Resources Development Act (WRDA), passed in the fall of 1996, specified that the Restudy be completed by July 1999, three years earlier than its original deadline. The Corps and the South Florida Water Management District (District) revised and, in July 1997, adopted a new PSP to reflect the accelerated schedule. While the C&SF Comprehensive Plan is due by July 1999, the Corps submitted a "draft" in October 1998. In order to accommodate the accelerated deadline of July 1999, the new PSP language and scope of work differs significantly from the original six-year plan. According to the Corps, the plan will limit its evaluations to a "gross-level" review of the different proposed components of the Restudy; however, it will still require the completion of a cost-effectiveness analysis and an incremental cost analysis. Another issue that is important to acknowledge here is that partly because of the compressed schedule, but also partly because of the immense breadth, scope, and uncertainties of the project, the July 1999 report is to be viewed as a broad "umbrella plan," much the same as the role played by the original 1949 report, which will set a flexible blueprint for years to come.

Important issues have arisen as a result of this new timetable. First, the Corps has stated that a robust data collection would likely require the six years originally allocated for the effort. Accordingly, it will not have compiled and disseminated all the information necessary to fully evaluate all the alternatives by 1999. Therefore, its selection of the alternative will be supported by a percentage of the information it normally commands for such a determination. Nevertheless, the Corps believes that it will have enough data to choose the most appropriate alternative.

Secondly, economic analyses during the alternative identification and evaluation stages were limited, and there was no economic analysis on individual components. However, cost effectiveness analysis was an integral part in the development and formulation of alternatives.

In the final evaluation of the alternative which appears in the draft Comprehensive Plan, most of the economic evaluations were non-monetary in nature. The only monetized economic effects were water supply and regional economic impacts (changes in agricultural water supply and the economic impact of agricultural land taken out of production with the implementation of Comprehensive Plan components). Other benefits that were identified, including commercial navigation, recreation, commercial fishing, and flood protection, were evaluated qualitatively. No economic evaluation, even on a qualitative basis, has been provided for the ecological (non-use value) component of the alternative.

The Comprehensive Plan will be delivered to Congress in July 1999. While the Congressional authorization is expected to include the entire Plan, individual projects will be subsequently authorized over time. These continued authorizations will likely be incorporated in future Water Resources Development Acts. The future authorizations will be supported by implementation documents which provide decision-makers additional information including economic analyses.

The South Florida Water Management District

The Florida Legislature created the five water management districts in 1972 with the Florida Water Resources Act. The South Florida District oversees water management within its geographic boundary which includes all or parts of sixteen South Florida counties. Its operational boundaries parallel the hydrology of the Everglades ecosystem, beginning in the Kissimmee Chain of Lakes and ending in the Florida Keys. The daily maintenance and operation of the C&SF Project are administered by the District. The District and the Corps are the co-sponsors of the Restudy. As a state agency, the District is subject to State Law regarding economic analyses.

Economic Analysis in State Rulemaking

From 1992 to 1995, an Economic Impact Statement was required prior to the adoption of any State rule. According to state Law, an agency must prepare an Economic Impact Statement if "(1) the agency determined that the proposed action would result in a substantial increase in costs or prices paid by the consumers, individual industries, or state or local government agencies, or would result in significant adverse effects on competition, employment, investment, productivity, innovation or [international trade], and alternative approaches to the regulatory objective exist...; or a written request for preparation of an economic impact statement is filed with the appropriate agency..."

The requirements for preparation of an Economic Impact Statement were as follows:

1. A summary of the proposed rule relative to existing regulations.
2. An estimate of the impact of the proposed rule on state and local governments.
3. An estimate of the cost or the economic benefit to all persons directly affected by the proposed rule.
4. An estimate of the impact of the proposed rule on competition and the open market for employment.
5. An analysis of the impact on small businesses as defined in the Florida Small and Minority Business Assistance Act of 1985.
6. A comparison of the probable costs and benefits of the proposed rule relative to the probable costs and benefits of not adopting the rule.
7. A determination of whether less costly methods or less intrusive methods exist for achieving the purpose of the proposed rule where responsible alternative methods exist which are not precluded by law.

Based on the requirements listed above, a properly prepared Economic Impact Statement would be consistent with the goals of full cost accounting. Under the sixth listed requirement above, the benefits and costs can address those who are not directly affected by the proposed rule.

In 1996, the requirements for preparation of an Economic Impact Statement were replaced with the requirement to prepare a Statement of Estimated Regulatory Costs (SERC). State agencies are "encouraged" to prepare a SERC and must do so under the following condition:

Within 21 days of notice of intent to adopt a rule, a substantially affected person may submit to the agency a good faith written proposal for a lower cost regulatory alternative to a proposed rule which substantially accomplishes the objectives of the law being implemented. Upon submission of the lower cost regulatory alternative, the agency shall prepare a SERC or shall revise its previously prepared SERC. The agency must either adopt the alternative or give a statement of the reasons for rejecting the alternative in favor of the proposed rule. The failure of the agency to prepare or revise the SERC once a lower cost regulatory alternative has been proposed is a material failure to follow applicable rule making procedures.

The requirements for preparing a SERC are as follows:

- A good faith estimate of the number of individuals and entities likely to be required to comply with the rule and a general description of the types of individuals likely to be affected by the rule.
- A good faith estimate of the cost to the agency to implement and enforce the rule and any anticipated effect on state and local revenue.
- A good faith estimate of the direct costs likely to be incurred by individuals and entities, including local governments, required to comply with the rule requirements. Direct costs include filing fees, the cost of obtaining a license, the cost of equipment required to be installed or used or procedures to be employed in complying with the rule, additional operating costs incurred, and the cost of monitoring and reporting.
- The impact on small businesses as defined by s.288.703 and on small counties and cities as defined by s. 120.52.
- Any additional information that the agency determines may be useful.

The requirements of the SERC listed above give us only a cost analysis. The evaluation of benefits is not required. Cost-effectiveness is only considered if an alternative "lower cost" proposal is received by the agency and the cost-effectiveness analysis would be limited to the original proposed rule and the proposed alternative.

District Use of Economic Analyses

None of the Water Management Districts incorporated guidelines for conducting economic assessments in their water management plans until the early 1990s. In conjunction with the Florida Department of Environmental Regulation, the Districts did develop a "convention" for economic assessments in 1991. The purpose of the economic convention was "to outline a set of sound and consistent economic principles to be followed when analyzing solutions to critical water resource problems." The convention covers the use of cost-effectiveness analysis, cost/benefit analysis, economic impact analysis, and fiscal impact analysis. The guidelines recognize the difficulty in monetizing all costs and benefits, and that final decisions need to include other evaluations in addition to the economic assessments. For the most part, the District has not regularly used the convention in completing water management planning evaluations.

Prior to the adoption of the new economic convention, the Districts developed analysis procedures to "fit specific needs such as the analysis of wastewater reuse feasibility and water conservation." In addition, the Districts looked to the procedures outlined in two federal documents, Economic Principles and Guidelines for Water and Related Land Resources Implementation Studies (U.S. Water Resources Council), and Guidelines for Performing Regulatory Impact Analysis (the U.S. Environmental Protection Agency).

In its recent Lower East Coast planning effort, the District analyzed projects by determining physically based performance measures. Instead of identifying and quantifying all the possible benefits that may be derived from the implementation of a project, the District evaluated the benefits using "performance measure graphics that show differences in modeled physical and operational characteristics such as hydroperiods, water levels, and flows and frequencies." If, for example, a more natural hydroperiod for a region is reestablished, an improved natural system functioning is expected to result.

As a partner in the Restudy, the District has expanded its typical economic evaluations to include cost-effectiveness analyses and incremental cost analyses. Many of the modeling data the Corps uses to generate the various components of its Restudy alternatives originate from the District. Accordingly, the District will continue to aid the Corps for the next two years to determine a selected alternative through the use of the two economic analyses.

There does not appear to be any movement toward the District's adoption of monetizing and identifying all environmental and social costs and benefits for policy decisions. Its Governing Board has the responsibility to effectuate such a determination.

Conclusion

Full cost accounting is a set of economic evaluation tools that can help policy makers and managers gather more complete information for better informed decisions and a clearer understanding of proposed public interest projects, policies, and programs. Even today, many agencies and businesses rely on information and evaluation techniques which do not adequately categorize or provide for the entire "picture." Full cost accounting is a powerful set of evaluation tools that can overcome these information shortfalls and illuminate many of the overlooked environmental and social benefits and costs associated with policy decisions. However, estimating some of these values remains the greatest obstacle to its widespread use. The intent of full cost accounting is <u>not</u> to dictate policy.

Many agencies and businesses do attempt to garner enough information to aid in their respective decision-making processes. However, most, if not all, do not truly practice full cost accounting. With regard to the agencies involved with the C&SF Project Restudy and Everglades restoration, neither the District nor the Corps employ full cost accounting. NEPA Principles and Guidelines call for the total array of tools necessary for a full cost accounting approach, however, the Corps' implementation of the guidelines does not reflect full cost accounting. Full cost specifically tries to identify and quantify many of the environmental and social costs and benefits which the Corps does not address routinely (non-use

values). It is important that the monetization of some of these critical values be part of any benefit/cost analysis. Again, full cost accounting does not necessitate the monetization of all benefits and costs, but rather their incorporation, quantitatively or qualitatively, into the decision-making process. If the Corps were to expand its scope of concern to reflect non-use values of resources, then, arguably, it would take tremendous strides toward the realization of a full cost accounting approach. The Corps' implementation of the Principles and Guidelines reflects the closest embodiment of full cost accounting of the two agencies.

One of the foremost reasons for the exclusion of non-use values in its economic assessments is the reliability and defensibility of the data. The perceived weakness of Contingent Valuation (CV) studies, among other things, can stem from the actual translation of money promised and money put forth for a particular issue. Moreover, the judicial system has increasingly been favorable to well designed and implemented studies. The adoption of non-use values by the Corps would provide it with a better understanding of the issues involved in a particular decision, and would likely pave the way for additional agencies, state and federal, to enhance their evaluation frameworks.

The District, on the other hand, also has many of the tools required for a full cost accounting exercise in its economic convention. However, it does not regularly employ many of the economic assessments outlined in the convention. In some instances, the District did, after the fact, contract consultants to employ some of the economic assessments typical of a full cost accounting approach for particular policy decisions, such as the Dairy Industry Buyout above Lake Okeechobee.

The implementation of a full cost accounting approach by these agencies would enhance the quality and amount of information available to them for policy decisions and would likely result in an improvement in the quality of decisions and policies. Everglades restoration would also benefit from the application of full cost accounting as many of the overlooked environmental and social values, costs, and benefits find their way into the decision-making processes.

V. A FULL COST ACCOUNTING CASE STUDY – THE 8.5 SQUARE MILE AREA

The Natural Resources Committee of the Governor's Commission asked the Full Cost Accounting Committee (FCAC) to search for a current issue/topic to apply the full cost accounting principles and to report back to the Commission regarding the limitations and the success of their implementation. After reviewing several potential topics, the committee chose the 8.5 Square Mile Area as its pilot project. The FCAC felt that the topic not only contained economic, environmental, and social elements vital to sustainability, but also exemplified a "land and water management decision" for which the Governor's Commission recommended a full cost accounting approach. In fact, the issues of the 8.5 Square Mile Area mirror the many complex issues that surround Everglades restoration. Additionally, the policy decision between the clearly defined alternatives being proposed for the 8.5 SMA would greatly benefit from the application of a more complete benefit/cost analysis.

Beginning in September 1997, the committee met with the District Review Team responsible for overseeing the development of alternatives for the 8.5 Square Mile Area and their contracted consulting group, PEER Consultants, Inc. In the initial meetings, the consultants and the Review Team (composed of representatives from the District, Miami-Dade County, Everglades National Park, and the Army Corps of Engineers) briefed the committee on the various alternatives under consideration for the locally preferred option (LPO).[6] During these discussions, the consultants also described the range of costs and benefits that they were investigating to compare the different alternatives. Following these briefings, the committee members identified areas that, under a full cost accounting approach, were missing from the economic analysis, and conveyed these information shortfalls to the Review Team. For example, flood control benefits and costs associated with the different alternatives had not been fully considered, as well as the benefits and costs of future land use investments (provision of County services, etc...) potentially resulting from the various alternatives.

Following these initial discussions, the FCAC and the Review Team decided to create a list of information that a full cost accounting approach would ideally provide to policy makers for a comparison of alternatives. To aid in this process, the committee identified five broad informational categories: recreation, flood control, wetlands, future land use impacts, and water storage/supply. Once completed, the two groups would determine which information had already been accounted for in the current scope of work by the District's consultants. The committee would then identify the missing information and determine the most "necessary and crucial" pieces which should be gathered. One of the participants in the District Review Team would then be responsible for the collection of the additional information. Those pieces which could not be fully addressed by this new effort would still be provided to policy makers for their qualitative incorporation into the decision process.

The application of full cost accounting, while initially supported by the District Review Team, was not endorsed by the Governing Board of the District. While the Commission acknowledges the need for an expedient conclusion to the resolution of the 8.5 Square Mile Area, it firmly believes the full cost accounting application could provide decision-makers with additional information that could significantly contribute to the policy decision. It is not the intent of the Commission to dictate a specific alternative with the increased information, but rather improve the informational base from which policy makers can draw their own conclusions.

In its final evaluation of a locally preferred option, the Governing Board did embrace the qualitative, and in some instances quantitative, incorporation of many of the informational categories outlined by the Full Cost Accounting Committee. This process provided the District and the public with a better understanding of the environmental and social benefits and costs associated with each of the alternatives. These initial steps are consistent with the intent of full cost accounting and should be continued.

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[6] If the District does not support the Corps' alternative to address the 8.5 Square Mile Area issue, it must develop, with its partners within the Review Team, another alternative that minimally provides the same benefits as the Corps' alternative. The alternative selected by the District would be classified as the "locally preferred option."

VI. RECOMMENDATIONS

In essence, full cost accounting is a set of tools to improve decision-making that incorporates all social, economic, and environmental impacts when evaluating options. It helps decision-making by avoiding erroneous conclusions that occur when we fail to consider all important factors or consider factors only in isolation. Applying full cost accounting principles may not be easy, but not using them can lead, as current Everglades restoration efforts demonstrate, to very costly errors. While it cannot happen in full overnight, it is of critical importance that Florida begin to incorporate full cost accounting principles into decisions regarding public projects, policies, and programs.

Just as important is the necessity to improve economic evaluation methodologies to adequately estimate and monetize social and environmental benefits and costs, as well as to educate decision-makers and the public about the usefulness of a full cost accounting as a policy evaluation tool. Moreover, decision-makers must be made aware of the various information shortfalls that a full cost accounting approach attempts to clarify.

Recommendations

1. The Commission recommends that full cost accounting applications be guided by the following principles:

a. Full cost accounting is a set of analytical techniques for better informed decision-making in order to encourage efficiency and innovation and to enhance economic, environmental, and social goals.

b. Full cost accounting approaches should be flexible, practical, and adaptable as new information and valuation techniques arise.

c. Full cost accounting approaches should be tailored to the issue under consideration, to the decision-making entity (private industry vs. governmental agency), and to the geographical scope of the decision (local vs. regional vs. global).

d. Full cost accounting should incorporate the benefits and costs that accrue to present and future generations.

e. Efforts should be made to estimate and assign a monetary value to all economic, environmental, and social benefits and costs, public and private. If this valuation is not feasible, they should be qualitatively incorporated into the decision-making process.

f. Full cost accounting should seek public input regarding economic, environmental, and social benefits and costs, public and/or private.

2. The Governor should issue an executive order that directs State agencies and encourages local and non-State agencies to apply full cost accounting principles in the evaluation of their significant projects, policies, and programs where demonstrable benefits and costs may apply.

3. The State of Florida should institute a competitive grants process that focuses on social science and integrated ecological and environmental studies. In particular, the grants process should focus on studies relating to full cost accounting, to the C&SF Project Restudy, and to efforts that provide policy analysis for a sustainable South Florida.

4. The State of Florida, through its University system, should encourage and facilitate efforts to produce and distribute literature that explains the concept of full cost accounting in layman's terms and includes case studies which illustrate its usefulness in policy making.

5. Through the Florida University system, a clearing house should be established that collects and makes available information and studies involving economic valuation studies.

6. Programs should be developed to improve estimation methods for those types of information which public decision makers need in order to apply full cost accounting principles. Adequate funding by the State of Florida should be provided for these purposes.

7. The Corps should specifically include non-use values, at least at a qualitative level, in its economic analyses of project alternatives.

8. Following Congressional approval of the Comprehensive Plan, the Corps should conduct further economic evaluation, including benefits, in its analysis of the best means of implementing individual project components of the plan.

9. Amend Florida Statute 120.54 (3) (a) to include a requirement that a notice of proposed rule include a summary of the expected benefits from the rule. Benefits can be monetary, where possible, or qualitative.

10. Amend Florida Statute 120.541 (2) to require as part of the Statement of Estimated Regulatory Costs a good faith estimate of the expected costs to individuals and other entities if the rule is not adopted.

VII. Acronyms and Abbreviations

C&SF Project – The Central and Southern Florida Project

Commission – The Governor's Commission for a Sustainable South Florida

Corps – The Army Corps of Engineers

CV – Contingent Valuation

District - The South Florida Water Management District

EQ – Environmental Quality Account

FCAC – The Full Cost Accounting Committee

LPO – Locally Preferred Option

NED – National Economic Development Account

NEPA – National Environmental Protection Act

OSE – Other Social Effects Account

P&G – Principles and Guidelines

PSP – Project Study Plan

RED – Regional Economic Development Account

Restudy – The Central and Southern Project Comprehensive Review Study

SERC – Statement of Estimated Regulatory Costs

WRDA – Water Resources Development Act of 1996

VIII. Glossary

Averting Expenditures - The costs of avoiding harmful effects that may result from the presence or absence of a policy.

Benefit/Cost Analysis - The analysis of the social costs and benefits, present and future, that will result from an investment, project, and/or the implementation of a policy decision.

Bequest Value - The willingness to pay for the satisfaction derived from endowing future generations with a given resource (stewardship value).

Capital Projects - Projects that increase our capital stock, private and social. This includes roads, water supply facilities, and other infrastructure works. A capital project involves expenditures of funds today in anticipation of benefits in the future.

Contingent Valuation – An analysis that utilizes survey techniques to assess economic values for increments or decrements in the level of a non-market good.

Demand - The amounts of goods consumers are willing to consume in relation to market prices. The demand curve reflects marginal benefits in consumption.

Discounting - The process of converting future costs and benefits into their equivalent present value.

Discount Rate - The rate used to calculate the present value of costs and benefits through time. The discount rate reflects time preference and the opportunity costs of not using an asset today but saving it for the future.

Economic Efficiency - The use and allocation of economic resources to maximize net benefits with the given inputs and technology.

Economic Impact Analysis - Measures how a project, policy, or program changes regional income and other economic activities such as revenues, expenditures, and employment. Because it doesn't consider alternative actions, EIA does not account for social benefit or opportunity cost.

Environmental Accounting - The inclusion in economic accounts of the value of the environmental stock and/or of the environmental benefits and/or costs of all production, consumption, extraction, and disposal decisions. Environmental accounting is a subset of social accounting.

Environmental Impact - The evaluation of the environmental effects produced by economic activity, investment projects, or public policy . Environmental impacts include the physical estimation of the environmental effects and the economic evaluation of these effects.

Existence Value - The willingness to pay for the knowledge that a resource is protected even though no use is contemplated.

Explicit costs - Actual out-of-pocket expenditures.

Externality - In the process of production or consumption, the benefits and/or costs accrue to third parties without their receiving compensation for costs or making payment for those benefits.

Fiscal Impact Analysis - A measure of how an action changes the collection and disbursement of public revenues.

Foregone Expenditures – The cost-savings or averted expenditures to individuals resulting from a project, policy, or program.

Hedonic Model - A valuation technique that uses data on wages, land, housing, or property values to infer the positive or negative effects that may result from a policy or the implicit value of a specific resource.

Human Capital – The quantity and quality of the human labor force or the stock of technical knowledge and skill embodied in a nation's work force. The degree of investment a nation makes in health, education, and nutrition.

Implicit costs - The opportunity cost of using resources that are not out of pocket. An example of this is the wages one could have earned if he/she worked elsewhere.

Incremental Opportunity Cost Analysis - The analysis of private and social costs (including foregone opportunities) resulting from an incremental change in a project or policy.

Internal Corporate Accounting - The identification of all the private and social costs associated with an investment's or product's life cycle, including raw material acquisition and product disposal (Ditz et al.). This type of accounting (sometimes called ***life cycle analysis***) can lead to a better understanding of the environmental consequences of various production practices within a business.

Life Cycle Analysis - A measure of direct and indirect social costs and/or benefits caused by the production, use, and disposal of a specific product.

Multi-attribute Analysis – An analysis that uses survey techniques to elicit individual's preferences and values across multiple market and non-market goods and services, which may include economic and other social values.

Natural Capital – The stock of environmentally provided assets such as the soil, the atmosphere, the forests, wildlife, and water.

Negative Externality - When in the process of production, consumption, or disposal, costs are accrued to a third party who does not receive compensation for these costs.

Net Benefit -Total benefits minus total costs.

Non-Market Valuation - Empirical methods or techniques for measuring the value of non-market goods and services.

Non-Use Value (Passive Use Value) - The value expressed by an individual for a particular resource even though there is no active use by the individual or potential for future active use. This might include existence, bequest, and stewardship value.

Opportunity Cost - The value of an economic good or service in its next best use. Opportunity costs arise from the existence of scarcity and reflect the fact that the consumption/production of a given good or service implies giving up the opportunity to consume/produce other goods and services.

Option Value - The value of retaining a quantity and/or quality of a resource, good, or service for potential uses in the future.

Physical Capital - Plant, equipment, and infrastructure represent physical capital.

Positive Externality - When in the process of production, consumption, or disposal, benefits are accrued to a third party who does not pay for these benefits.

Present Value – Today's value for an asset that yields a stream of benefits and costs over time. To calculate the present value, the uneven stream of costs and benefits accruing in the future are discounted to reduce them to a common present day value.

Private Benefit - The benefits from a consumption, production, or disposal decision that accrue solely to the economic entity or individual making the decision.

Private Cost - The costs from a consumption, production, or disposal decision that accrue solely to the economic entity or individual making the decision.

Public Good - A good or service whose benefits may be provided to all people at no more cost than that required to provide it to one person. The benefits of the good are indivisible and people cannot be excluded from using it. Examples include a bridge and a wetland. This contrasts with a private good whose benefits can be enjoyed exclusively by only one individual.

Scarcity - When at zero price, quantity demanded for a good or service is greater than the quantity supplied. Resources are limited and wants are unlimited.

Shadow Prices - Estimated prices that reflect real costs of production and the value of goods to consumers in the absence of market prices or in the event that market prices are distorted by market failure or government intervention.

Social Accounting - The inclusion in national and regional product accounts (such as the Gross National Product or the Gross State Product accounts) measures of natural, human, and social capital

and their depreciation during the time period in question. Their inclusion in the products accounts provides a better indicator of social welfare and serves as a guide for achieving sustainability.

Social Benefit - The total benefit of a consumption, production, or disposal decision that is enjoyed by society. Social benefits include both private benefits and external benefits (positive externalities).

Social Capital - The shared value that holds a society together as well as a social institution that enables society to function.

Social Cost - The total cost of a consumption, production, or disposal decision that is imposed on society. Social costs include both private costs and external costs (negative externalities).

Stewardship Value – The value expressed by an individual for a resource derived from a sense of human stewardship over the natural system.

Stock - A stock variable is one that measures a quantity at a point in time. An example of this is water in a lake, capital (plant and equipment), natural capital, and/or an asset.

Supply - The amount of goods a producer is willing to produce in relation to market prices. The supply curve reflects the producer's marginal cost of production.

Total Economic Benefit - The sum of all possible values (values foregone) of a given good or service. This value includes use value (active use value), option value, and passive use value (non-use value, intrinsic value, passive use value).

Total Economic Cost - The sum of all possible economic costs of a given good or service.

Travel Cost – An analysis that considers the time and expenses associated with visits to recreation sites and the effect a policy may have on visitation and the value of the visit. It can in turn be used to measure the effect on recreation benefits from changes in resource quality.

Use Value - The value derived from the actual use or consumption of a resource, good, or service. An example of this is the timber value of a forest and/or recreational value from the use of the forest.

Willingness-to-Pay - The maximum amount of money a consumer is willing to pay for a given quantity and/or quality of goods and services given income contraints. Willingness to pay reflects the benefits derived from these goods and services. In perfect functioning markets, willingness to pay is equal to market price.