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## A Trusteeship Theory of Accounting for Natural Capital Assets

One of the problems encountered in implementing accrual accounting in the government sector is that of accounting for natural capital assets provided freely to government and which are used as public goods. Professional accounting standards require that these assets be valued and included in the government's statement of assets and liabilities. The problem is not encountered in business accrual accounting because business neither acquires assets freely nor provides services to the public on a non-commercial basis.

Various issues surrounding accrual accounting for natural capital assets used as public goods are examined in this article. The nature and characteristics of such assets, and the distinctions between private goods and public goods markets, are first explained to set the context for examination of the issues. Then the issues as to whether natural capital assets should be treated as assets for accounting purposes and included in the government's statement of financial position are analysed according to FASB standards; it is concluded that they are not assets. Rather, it is proposed that these assets used for the provision of non-commercial services to the public should be treated in a separate category as public goods assets which are held in trust by the government on behalf of the nation, for the benefit of current and future generations and for the preservation of the natural ecology of the nation. Commercial valuations are not relevant for these assets and they need not be valued in financial terms for their good management.

**Key words:** Assets; Capital; Natural resources; Theory; Trusteeship.

Many western governments are considering adopting full accrual accounting as part of the new managerialist philosophies being embraced by them. Accrual accounting is seen as a necessary tool in the drive for greater efficiency and effectiveness in the delivery of public goods and services to the community and as a means of curtailing government expenditures in an era of budget tightness. As a management-information system, the traditional cash basis system of government accounting has many limitations. These can be largely overcome by the adoption of business-style full accrual accounting systems. Such systems allow the full cost of government programs and administration, and the financial position of the government, to be determined. In turn, this information should lead first to improved decision

making and efficiency and effectiveness in administration and program delivery, and second to a better understanding of the financial position of the government. Furthermore, it provides the basis for full accrual budgeting and thereby improved decision making in the selection of programs to provide public goods and services, improved tailoring of taxation policies to fund the cost of programs, and a better understanding of the financial burdens often being accumulated and passed on to future generations as a result of current budgeting policies.

In Australia, recent professional accounting standards specify the use of full accrual accounting systems by government, and they have been accepted by governments (ASCPA/ICAA, 1992, 1993, 1996a, 1996b). For example, the Commonwealth Government has prepared full accrual accounting reports since 1995, several state governments have also prepared them, and the A.C.T. government introduced full accrual budgeting as well in 1997. Local governments are also committed to using accrual accounting.

The adoption of accrual accounting and budgeting by government raises some major problems not encountered in the commercial world. The public sector environment differs from the private sector in many ways, and business accounting methods cannot be transferred to it uncritically because of fundamental differences between the two environments. Rather, some accrual accounting methods need to be adapted to the public sector environment to faithfully represent the realities of the public sector environment. One particular difference concerns accounting for freely provided natural capital assets under government control which are used for non-commercial social and environmental purposes. The extent of this government endowment can be massive. Should natural capital assets be included in the government's statement of assets and liabilities and be included in assessments of its financial position? This problem does not occur in a commercial environment.

This article examines some of the issues concerning accounting for publicly owned natural capital assets which are used for non-commercial social and environmental purposes. Following an explanation of the concepts of natural capital assets and of public goods markets, the issue is examined as to whether they should be defined as assets for inclusion in the statement of government assets and liabilities. This requires a review of the meaning and purpose of such a financial statement. It is proposed that publicly owned natural capital assets used for non-commercial purposes should not be included in the government's statement of assets and liabilities. Rather, they should be treated as trusteeship assets which are managed by the government on behalf of its citizens for the benefit of present and future generations and for protection of the environment: This conclusion is based on the nature and purpose of the use of these assets in providing a wide range of social and environmental benefits to the public at large. They are 'public goods' which involve 'externalities' and which are non-revenue generating, and cannot readily be sold. As such, they cannot easily be valued in financial terms. Attempts to place financial valuations derived from private markets on them are unsound because such valuations ignore the 'externalities'. The assets can be managed successfully without arbitrary financial valuations being placed on them.

CONCEPT OF NATURAL CAPITAL ASSETS

The concept of natural capital assets is used in this paper to embrace all natural assets in the community (i.e., those not created by man and which have no cost of production) which are not privately owned or acquired or used by the government to perform its normal administrative functions. The major examples comprise Crown land, unclaimed mineral resources, natural water resources, forests on public land and beaches. Many of these assets are treated as infrastructure and heritage assets. The concept does not include man-made additions, or 'improvements', to these assets. The term 'natural capital' derives from the classical economics classification of factors of production into 'land, labour and capital', where 'land' was defined to include all natural capital. It is the term used by environmental scientists. The addition of the word 'assets' to the name makes it more recognizable to accountants.

In Australia, Crown land refers to all that land that remains unalienated from the Crown and for which there is no title. It comprises over one million square kilometres, about one-seventh of the continent, and is used for a wide variety of purposes, including recreation and conservation, water catchment, river and lake beds, parklands, roads and public institutions, and for pastoral purposes. For example, in Western Australia, where Crown land occupies 93 per cent of the state, 38 per cent of Crown land is occupied by pastoral leases, 16 per cent is in declared environmental and recreational reserves, and 35 per cent is vacant (PSACOE, 1995, p. 5).<sup>1</sup> Similar issues on territorial ownership concern the inclusion of the twelve miles of territorial sea and the 200 mile exclusive economic sea zone surrounding the continent. Inclusion of this zone more than doubles the area under Australian jurisdiction. Related issues concern whether the fish in these oceans (as with forests on the land—it is the third largest fishing zone in the world) and the potential mineral resources (particularly oil and gas under the sea bed) should also be included in the government's financial statements. As well, the Australian Antarctic Territory comprises over 6 million square kilometres, about one-half of Antarctica and only modestly smaller than the Australian continent (Grolier, 1997, Vol. 1, pp. 130–1). Again, there are the prospects of minerals in Antarctica which could be considered. Thus the extent of natural capital assets that could potentially be included in government full accrual accounting statements is massive, and could dominate all other items. Accounting for them raises a host of problems not confronted in business accounting.

THE DISTINCTION BETWEEN PRIVATE GOODS MARKETS AND  
PUBLIC GOODS MARKETS

The distinction between private goods markets and public goods markets is important for the analysis of natural capital assets used for the provision of public goods

<sup>1</sup> Data provided by the Australian Bureau of Statistics, Canberra. To give readers some appreciation of the area involved, the area of Australia (7.7 million square kilometres) is almost as great as that of the U.S.A. excluding Alaska, about 50 per cent greater than that of Europe excluding European Russia, and thirty-two times greater than the U.K. (Australian Bureau of Statistics, 1995, p. 3). It should be noted that much of the Crown land is subject to Native Title claims.

and services and it has direct implications for the type of accounting information system which should be used. The distinction has been developed by economists and is used to justify why some goods and services must be provided by government rather than by business enterprises (Musgrave, 1998; Stiglitz, 1998).

Private goods markets operate for the provision of private goods and services. In these markets, consumers bid for what they want to buy and firms try to produce what consumers want at minimum cost. Assets are acquired by firms to assist in the productive process and their value is based on their expected service potential, as measured by their contributions to future cash inflows. The objective is that private markets will operate efficiently and effectively to bring about 'Pareto optimality', which helps to maximize economic welfare. However, achievement of this objective depends on a host of assumptions, including sufficient competition to bring forth competitive results, a high degree of knowledge of all market factors by producers and consumers, mobility of resources, etc., and most importantly for purposes of this article, the absence of externalities. Full accrual accounting can provide necessary information for the efficient allocation and use of resources by firms and adaptability of firms to changing factor and product market conditions and thereby help bring about Pareto optimality. Externalities occur where all the costs and benefits are not confined to the transaction parties. They occur where consumption benefits are shared and cannot be limited to particular consumers (e.g., the benefits arising generally from the systems of law and order and from use of roads and national parks), or where economic activity results in additional social costs or benefits which are not paid for by the producer or consumer who causes them (e.g., pollution costs and community service obligations). Where externalities occur, private markets cannot operate efficiently in the context of optimizing social welfare and market failure occurs. Externalities provide the fundamental economic justification for the existence of governments and their provision of a wide range of goods and services to society, called public goods, which cannot be provided to them through private markets (Musgrave, 1988, chs 1, 4; Stiglitz, 1988, chs 1, 3, 5). Government activities in the public goods markets complement commercial activities in private goods markets with the aim of improving social welfare.

In the first case of externalities when consumption benefits can be shared, there is a fundamental difference between private goods and public goods markets. Private markets are based on the 'exclusion principle', that is, A's purchase of a good denies others use of it. A obtains exclusive title or property rights to the good. However, for public goods it is inefficient to exclude any one consumer from partaking in the benefits since that consumption does not reduce consumption by anyone else. Benefits from public goods are not vested in the property rights of individuals, and consumption is non-rival. The same benefits are available to all and without mutual interference. The marginal cost of admitting an additional consumer is zero or negligible, and so should be the price for an efficient utilization of the facility. However, there may be a large fixed cost in providing or maintaining the facility, and this cost must be borne initially by the government. Commercial firms cannot operate under these conditions as there is no way of funding the facility and charging customers to operate it at a profit.

In the second type of externality, the divergence between private costs and benefits and social costs and benefits can justify the provision of public goods or some other form of interference in the pricing mechanism. Here, private markets will not bring about a socially optimal production of goods because they are based on the interaction of private costs and benefits only. Where social costs exceed private costs, taxation or regulations may be used to raise private costs to the social cost. This occurs, for example, where pollution of the environment results from commercial activities. Where external benefits are derived from private goods, subsidies may be paid to either producers or consumers to optimize results, or alternatively the government may supply the goods as a matter of social welfare policy. This may occur where community service obligations are deemed to exist or where public health is affected. For example, immunization programs not only benefit the recipients but also reduce the spread of the virus to others.

### SHOULD NATURAL CAPITAL ASSETS BE TREATED AS ASSETS FOR ACCOUNTING PURPOSES?

There can be no doubt that these natural capital assets used as public goods are valuable resources for the nation and its citizens. They provide a wide range of social benefits—recreational, cultural, educational and environmental—to the nation as well as economic benefits. This is particularly the case for all assets declared as national and state parks. Some of the most outstanding sites, such as the Great Barrier Reef Marine Park, have World Heritage listing. These natural capital assets are important parts of our natural environment which must be protected to ensure continuity of life on earth. Environmentalists classify them into critical natural capital and other sustainable, substitutable or renewable capital (Gray *et al.*, 1993, p. 290). Critical natural capital comprises those elements of the biosphere that are essential for life on earth and which for sustainability must remain inviolate (e.g., the ozone layer, soil fertility, a critical mass of trees, quality fresh water, river and drainage systems, and oceans). Other sustainable, substitutable or renewable natural capital comprises those elements of the biosphere that are renewable (e.g., woodlands) or for which reasonable substitutes can be found (e.g., fossil fuels). These two groups of natural capital assets must be protected and conserved to ensure continuity of life on earth. As well, natural capital assets can provide valuable economic resources to the nation—farm land, timber, fish, mineral resources, and infrastructure for transport routes and public facilities. But notwithstanding these valuable attributes of natural capital assets, the issues are whether they satisfy the accounting concept of an asset and, if so, whether they ought to be included in the government's general purpose statement of assets and liabilities.

The most widely used concept of an accounting asset is that proposed by the Financial Accounting Standards Board, whose SFAC 6 defines assets as 'probable future economic benefits obtained or controlled by a particular entity as a result of past transactions or events'. As well, it lists three essential characteristics of an

asset, namely: (a) it embodies a probable future economic benefit that involves a capacity . . . to contribute directly or indirectly to future net cash inflows; (b) a particular entity can obtain the benefit and control other users' access to it; and (c) the transaction or event giving rise to the entity's right to or control of the benefit has already occurred (FASB, 1995, paras 25–6).<sup>2</sup>

On the basis of this definition, it would appear that most if not all natural capital assets could be treated as accounting assets. They have the potential to provide future economic benefits (land, mineral resources, forests, water, fish, etc. can all be commercially exploited), visitor charges can be levied for recreational use, and they could be sold to private owners. They are under the direct control of government, and it issues licences where appropriate for their use or exploitation. They result from past events—the occupation of the continent by mankind. Existing Australian studies on accounting for these types of government assets recommend that they be recognized as assets (Rowles, 1992, ch. 4; Micallef *et al.*, 1994, ch. 7).

Nevertheless, when the essential characteristics of natural capital assets used for public purposes are examined, it appears that these items may not satisfy the first two requirements. In so far as the use of these assets is confined to the public goods sector of the economy, they will either not generate any future cash inflows or alternatively the cash inflows will be of only incidental consequence. This occurs as a direct result of their role in providing services of a non-commercial social nature. The determining factor is how the natural capital assets are to be used rather than the physical nature of the assets. For example, mineral deposits and forests have commercial potential, but if they are located in sensitive, pristine national parks, the government, acting on behalf of strong popular opinion, may prohibit mining of the deposits or lumbering of the timber. Likewise, the government and the public may place a very high priority on conservation of wilderness areas for the protection of flora and fauna or for their use as water catchment areas, and such areas will have negligible cash flow potential. Many other areas, such as vast arid areas of Australia, have no commercial potential other than for the prospect of mineral deposits.

The second essential characteristic of an asset is that the owner can obtain the benefit and control others' access to it. The government can certainly control others' access to these assets: it may either deny access, for example, to mineral deposits; or encourage access, for example, to national parks. However, the government as owner does not necessarily obtain the benefit. In the case of natural capital assets held for the provision of benefits to the public, the benefits accrue to the public; the responsibility of the government is to protect these assets so that they can continue to provide public benefits. Pallot (1990, p. 82) makes a useful classification of asset ownership rights into: (a) the right to manage and make decisions about the property; (b) the right to benefits arising from the property; and (c) the right to dispose of (sell or destroy) the property.

The government clearly retains (a); as for (b), the public and not the government are the beneficiaries of the services provided by these facilities. With regard

<sup>2</sup> The Australian definition of an asset in SAC4 (ASCPA/ICAA, para. 4) is similar.

to (c), it is frequently not possible for the government to sell the asset because of the need for environmental conservation or public opinion. Normally government agencies which manage the assets are prohibited from selling them and such a decision can only be made at the most senior level of government. A further aspect of control in private markets is that the owner has the right to exclude persons from use of the asset except in return for payment. In public goods markets, the reverse applies as consumption is non-rival and users do not obtain exclusive use of the facilities—they obtain no property rights to the facility.

Hence, in those situations where natural capital assets are used to provide social goods to the public, they do not necessarily generate future cash flows, and hence need not satisfy the first essential FASB criterion for their recognition as accounting assets. Nor do they normally satisfy the second essential characteristic of receipt of benefits by the owner and the unfettered power to dispose of the asset. Hence it must be concluded that natural capital assets used for public purposes do not satisfy the two criteria essential for their recognition, and that they should not be treated as assets for accounting purposes. The problem with the definition is that it is too broad and general, and it has been described as ‘an empty box’ and ‘almost everything or anything can fit into it’ (Schuetze, 1993, p. 67). On the other hand, where the government has chosen to exploit natural capital assets on a commercial basis and sell their products to consumers, then they clearly satisfy the requirements for asset recognition. It should be emphasized that the distinguishing characteristic for this conclusion is based on the use of the resources in the provision of public goods, and not on the physical characteristics of the resources. Moreover, the decision as to which natural capital assets are to be reserved for a social role and which ones may be used for commercial purposes is largely a political decision, and it may be changed over time.

#### NATURE AND PURPOSE OF A BALANCE SHEET OR STATEMENT OF ASSETS AND LIABILITIES<sup>3</sup>

In addition to considering whether natural capital assets used for public purposes should be treated as assets, the fundamental nature and purpose of the balance sheet also warrants re-examination with respect to these assets. There has been much controversy about the nature and purpose of the balance sheet since the publication of Paton and Littleton’s *Introduction to Corporate Accounting Standards* in 1940. The two major points of view are encapsulated in the revenue/expense approach and in the asset/liability approach. It is argued that under the matching principle viewpoint, wherein non-financial assets are costs awaiting assignment to future revenues, assets need not have their own physical existence and be separately identifiable resources of the firm. The resulting balance sheet can be of limited validity in displaying the firm’s financial position, which is considered to be the major purpose of the statement in the asset/liability approach.

<sup>3</sup> The terms ‘balance sheet’ is used here to refer to a business entity, and ‘statement of assets and liabilities’ to the government, so as to distinguish the statement between the two types of entities.

However, this claimed conflict between the two approaches results from the use of the historical cost system of accounting and it does not occur in a current value system of accounting measurement. In a fully articulated double-entry current value system based on an operational capital maintenance concept, there should be no conflict between the two approaches. The balance sheet account records one aspect of the transaction or event while the income statement records the other. The problem occurs in the historical cost system because it is a closed system beyond the initial transaction or event and has no further reference to the real world. There is no external market test to verify the existence of non-financial assets and, as a result, some deferred charges have a questionable classification as assets. The unreliability of historical cost asset valuations is a further cause for concern about the nature and usefulness of the historical cost balance sheet. These problems are avoided in current value systems, whether based on entry or exit prices of assets. They have reference to external market events beyond the initial transaction and there is no conflict between the income determination and the balance sheet approaches once the concept of capital maintenance is appropriately defined.

The primary purpose of the balance sheet should be to disclose the financial position of the entity at balance date. Financial position embraces several elements—investment in assets or the resources available for its future operations; and sources and extent of funding from external creditors, owners and accumulated surpluses. This information measures the firm's financial and operating capacity to carry on operations in the future, its financial structure, its capacity to repay debts in the short run (liquidity) and the long run (solvency), and a part of its financial risk. This information is also required to measure the rate of return on investment, a key measure of financial performance, and assess the long-term financial viability of the firm.

The validity of a statement of financial position depends upon both the inclusion of all assets (resources) and all liabilities (financial obligations), and upon the valuation of the assets and liabilities to give it representational faithfulness. Apart from tax obligations and proposed distributions to owners, all liabilities (the credit entry) fund the acquisition of additional resources by the firm (the debit entry), which may be used promptly (and expensed) or more slowly (and capitalized as an asset). Liabilities need to be matched against the assets in which the funds are invested to help determine the financial position of the firm and its derivative information. All non-financial assets should generate future cash inflows, either directly through realization or indirectly through future productive activities, and thereby provide the means to discharge the liabilities and generate a profit for the benefit of owners. So-called 'assets' which do not have a cash-generation capacity or are not available for the repayment of liabilities are scarcely relevant in a statement of financial position.

A properly constructed balance sheet contains necessary information on the financial position of the firm for creditors, investors and other stakeholders in the business, as well as for management.

**SHOULD NATURAL CAPITAL ASSETS BE INCLUDED IN THE GOVERNMENT'S STATEMENT OF ASSETS AND LIABILITIES?**

The function of the business balance sheet can be readily translated into that for a statement of assets and liabilities for the government. However, it requires some modification in content and interpretation because of the different operating and funding environments of government.

Governments operate in public goods markets which are fundamentally different from private goods markets, as discussed above. Public goods are provided at little or no charge to recipients as a matter of political choice, and the cost of providing them is intentionally borne from taxation and other sources of revenue not necessarily related to the provision of the goods. Governments do not need to raise equity capital from citizens because they have the power to tax in order to fund the provision of their services. Private goods markets are based on consumers' decisions to purchase the goods and firms' willingness to supply them. On average, prices charged must cover the full cost of providing private goods and firms must be self-funding to continue operating. Firms must raise equity capital to help finance a set of resources and working capital.

Because of the above, the government's statement of assets and liabilities will not contain an owners' equity section showing capital invested by owners. It does not need to raise 'capital' from its citizens to fund the purchase of resources from which it provides public goods. As such, the government statement does not show its total 'net worth'. Rather, the government's taxation powers are used as the source of funding, a source private firms do not have.

Second, natural capital assets are provided freely to the government. It does not have to purchase them, as does a firm its assets. It does not have to raise capital or borrow from creditors to fund the purchase of these assets. Hence there is no initial acquisition cost to show in its financial statements as an outlay, and no liabilities are created. Furthermore, the use of these assets does not generate significant future cash flows because their services are provided as public goods to users. Nor is their sale possible in most cases because of the need to retain them for the provision of public services in the future.

Hence, because natural capital assets used to supply public goods have no acquisition cost to the government, the government does not have to raise capital or borrow funds to acquire them, they are not utilized to generate significant cash flows, and they are not normally realizable into cash, it is not appropriate to include them in the statement of assets and liabilities of the government. They are not relevant to the purposes for which the statement is prepared. The statement cannot show the government's aggregate financial position because it does not include its taxing powers, or obligations to provide public goods and pensions to its citizens in the future. The assets do not represent an expenditure of funds borrowed from creditors or from contributed capital. The statement cannot show the government's financial and operating capacity and its financial structure. It cannot be used in the measure of the rate of return on investment as a test of

government performance. Their inclusion in the government's statement of assets and liabilities would seriously distort the representational faithfulness of a report on the government's financial position. Even if the complex valuation problems (to be considered below) for these assets could be overcome, in the Australian case these assets are so vast in quantity that they would dominate the statement and seriously distort it. For example, in the case of the Commonwealth Government of Australia at 30 June 1997, its liabilities were estimated to be A\$256 billion (comprising borrowings of A\$127 billion and provisions and accounts payable of A\$129 billion—largely unfunded superannuation commitments). Its assets were estimated to be A\$182 billion, comprising financial assets of A\$99 billion and non-financial assets of A\$83 billion (Commonwealth of Australia, 1997). The assets and liabilities are genuine ones (in the sense outlined above) and the statement of financial position is a meaningful, interpretable statement. Inclusion of natural capital assets in the above statement would seriously distort its usefulness and validity. Their inclusion in a statement of government assets and liabilities cannot serve the purposes for which assets are included in a business balance sheet and it is difficult to think of a purpose which the information would serve in a government environment. Rather, their inclusion would mix up the operational assets and public goods assets and seriously distort the financial statement and reduce its information usefulness.

The statement of government assets and liabilities can serve a useful purpose and be representationally faithful if it is restricted to financial assets and non-financial assets used for its administrative or commercial activities, but excludes natural capital assets used for public goods purposes. It shows the assets acquired by the government which had a cost and required funding, and the sources of funding for these assets. Those natural capital assets used by the government for administrative purposes (e.g., land) or for commercial purposes should be valued at commercial prices and they should be accounted for as a donation to the government from the public goods sector of society. They should be treated as normal business assets. Relative to the stock of public goods assets in Australia, such transfers would be insignificant.

#### NATURAL CAPITAL ASSETS—THE GOVERNMENT'S ASSETS OR THE NATION'S ASSETS HELD IN TRUST BY THE GOVERNMENT?

In contrast with treating natural capital assets in accrual accounting in the same way as business type assets, the trustee asset proposition made here entails that they should be treated as a special class of assets. It can be argued that these assets belong to the nation as a whole rather than to the government. They are the people's assets, and the government manages and controls them on behalf of the people. The public want these assets to be protected and conserved for the benefit of current and future generations and for fundamental environmental purposes, namely, protection of the biosphere. They are not to be degraded or sold. The present generation of citizens are tenants and not owners of the assets, and they

have an obligation to pass on the assets to future generations. The benefits accrue to the community as the beneficiaries and not to the government.

As trustee of these assets the government is expected to maintain, protect and conserve them for the beneficiaries. The assets do not belong to the trustee and they must not be used for the trustee's personal benefit in any way, including meeting his own debts or operating expenses. They must always be kept separate from the trustee's own assets and be reported separately to the beneficiaries. The government is expected to maintain, protect and conserve these assets. In other words, it should normally follow a policy of sustainability for them.

The concepts of trusteeship and sustainability underlie the philosophies and objectives of the environmentalist movement. In the words of the World Commission on Environment and Development, the generally accepted concept of sustainability is that humanity must: 'ensure that development meets the needs of the present without compromising the ability of future generations to meet their own needs' (1987; quoted in Gray *et al.*, 1993, p. 281).

As mentioned earlier, environmental theorists classify the natural capital available to humanity into critical and other sustainable categories. These are contrasted to the third category of artificial capital. This comprises artefacts created from the biosphere by mankind (e.g., buildings, machines, roads and bridges) and which can be expanded or contracted by human decision. They are normally traded through private markets and they constitute the subject matter for most non-financial accounting assets.

The notion of environmental sustainability is comparable to that of physical capital maintenance which underlies one version of the current cost accounting (CCA) system of accounting measurement (Whittington, 1983, ch. 6). Profit is not earned until the stock of resources owned by the entity is maintained intact. Distribution of CCA profit does not erode the stock of assets of the entity and hence its sustainable operating capability.

Furthermore, this trusteeship approach to the treatment of natural capital assets is in accord with the conceptual basis of modern democratic government. John Locke, the famous political philosopher who developed many of the principles of modern government, argued in his *Two Treatises of Government* (1690) that the whole of government is a trust instituted by and for the people, and therefore dependent on their (revocable) consent.<sup>4</sup> As part of this approach, the government ought to be regarded as a trustee for the natural capital assets of the people. He quotes the Psalms of David as divine authority for this approach: 'tis very clear, that God, as King David says, Psal CVX, xvj, has given the Earth to the Children of Men, given it to Mankind in common'. He argues that God gave the world to mankind in common for the support and comfort of their being, and that this applies throughout all time. Furthermore, Locke argues that it is in accord with natural law that it should be so (Buckle, 1991, ch. 3). A critical aspect of natural law is that the Earth should be preserved for the benefit of the future of mankind.

<sup>4</sup> Quoted in Buckle (1991, p. 125). For a history of the development of the modern concept of the state, see Skinner (1978).

Natural law, or the law of nature, is vitally concerned with self-preservation of mankind. Locke argues that abiding by natural law is a guarantee of social peace and a way to reach happiness.

Locke developed his trusteeship theory for Britain after centuries of conflict and dispute about the roles and powers of the monarchy and of parliament. Ultimately, the concept of the state as an entity separate from that of the monarch, and which was controlled by a parliament responsible to its citizens, came to be envisaged as the basis of government.

Thus, the treatment of natural capital assets used for the provision of a wide range of social functions for the community at large as assets held in trust by government is consistent with both the theory of modern environmental management and the democratic state.

### PROBLEMS IN VALUING NATURAL CAPITAL ASSETS

In addition to the conceptual problems concerning the ownership and use of natural capital assets considered above, major problems are encountered in valuing such assets. Valuations ascribed to them are unlikely to satisfy normal accounting standards of verifiability and reliability, because they are likely to be arbitrary and artificial. The difficulties are a result of these assets having no cost of production, being used as public rather than private goods, not normally being available for sale, and having external effects. As they lie outside the operation of private goods markets and do not generate cash flows, there are no comparable market transaction prices or future cash flows upon which to base their valuations.

In valuing land, for example, professional valuers try to assess the price at which the property should be exchanged between a knowledgeable willing buyer and a knowledgeable willing seller in an arm's-length transaction. In arriving at a valuation, they consider recent market transactions for similar properties and make adjustments for differences in location and so on. The cost of replicating improvements on the land, if any, is deducted from the total value of the property to derive the value of the land. As well, they normally estimate its value from discounted cash flow analysis. The two valuations are compared for consistency and the valuer then decides on a figure which is believed to be the best estimate of a potential market transaction price in an exchange between a willing buyer and a willing seller (Whipple, 1995).

Several aspects of land valuation should be noted. First, values depend upon the use for which the land may be used. The use depends upon zoning specifications, and a change in them can have a marked effect on the value of land, particularly in urban areas. For example, a change from residential to commercial purposes will have a major impact on the potential cash flows and hence on market value. Second, land values are the residual amount in a discounted cash flow valuation of the property. The current cost of improvements is deducted from the total valuation to derive the land value. Third, the discount or capitalization rate used in the valuation process is based upon the long-term bond rate, and variations in the bond rate should affect property valuations. Finally, because the supply of land

zoned for a particular use in a locality is relatively fixed, and because its value is the residual sum in the valuation process, land values tend to be much more volatile than the market prices of man-made assets. Commercial land in particular can be subject to marked price booms and slumps and it can be a very speculative asset from an investment point of view.

These characteristics of land values are not a problem for accrual accounting for business entities. However, they are for land held by the government and used for public purposes, because such land does not generate cash flows, it is not available for sale, and there are no market transactions in land zoned for public use purposes. There is no basis upon which valuers can estimate a value for the land in its present use. If they endeavour to do so, they must assume an alternative use related to private goods markets. However, this is both arbitrary and unreliable, and provides misleading information. The valuations cannot satisfy audit standards for published financial statements to give a 'true and fair view' of the state of affairs of the government.

Furthermore, commercial valuations are not normally relevant for natural capital assets used for public purposes because they are unlikely to encapsulate the external costs and benefits of these assets. Commercial valuations are overstated where they do not include all the external costs resulting from use of the asset, while they are understated if they do not include all the external benefits from the assets. Given that all these assets have significant externalities, the use of commercial valuation formula will result in incorrect valuations to guide decision making about their use or to assess the performance of their management.

Bases used in Australia for valuing Crown land used for public purposes are highly questionable. For example, urban parklands and land under roads are valued on the basis of average values of adjoining land or of land in the municipality. However, this approach ignores the significant externalities resulting from having parks and roads. Properties adjoining parklands generally command higher market prices because of the desirable amenity provided by the parkland. Roads (and other transport corridors) are one of the most significant factors enhancing urban values, particularly those in central business districts. Indeed, the size and value of a central business district and of cities generally, are very dependent on the transport facilities servicing it. The social and economic externalities of the roads flow through to adjoining property values (Barton, 1999). Cities are clearly unworkable without adequate transport facilities, and less desirable to live in without attractive parklands. The values of land dedicated to recreational use and of land under roads, etc. are encapsulated in surrounding (private goods) land values, and their inclusion in the government's accounts involves double counting of the same land values. In Australia, the requirement for local governments to value land under roads, notwithstanding all the limitations mentioned above, has become a controversial issue (Rowles *et al.*, 1998). Unless the land is rezoned for another use in the private goods market, it cannot be sold and generate cash. It is thus not relevant for an assessment of the government's financial position. Comparable problems occur in the valuation of other natural capital assets, such as the land under rivers and lakes, beaches, the 200 mile coastal limit, forests, mineral resources, and so on.

Non-valuation of natural capital assets for accrual accounting purposes does not deny the existence of their opportunity cost. Rather, it signifies the intention to retain the resource as a trustee asset for the benefit of future generations. Furthermore, we are concerned with financial statements as general purpose ones not intended to accommodate alternative uses of the assets included in them. Options for alternative uses, where contemplated, need to be evaluated on their own cost/benefit basis. If a policy decision is then made to transfer a natural capital asset from public goods use to government operational or private goods use, that is the time to value the asset on a commercial basis and to recognize the transfer in the government's accounts.

### MUST NATURAL CAPITAL ASSETS BE VALUED TO FACILITATE GOOD MANAGEMENT?

Finally, it might be argued that natural capital assets should be valued to facilitate their good management, notwithstanding the unreliable nature of their valuation. Accounting systems ought to provide useful financial information, and one of the key tests for inclusion of items is whether the information facilitates decision, control and accountability usefulness. In commercial markets, decisions about acquisition, use and disposal of assets, and costing of their utilization, require information on their current market prices. All measures of capital maintenance, profit, financial position and return on investment require information on asset values. Can informed decisions on natural capital assets be made without appropriate valuation information?

The answer to this question is yes. Asset management in private goods markets requires price information because the primary objectives of commercial firms are financial in nature. Hence their performance should be assessed in financial terms. To operate efficiently and effectively in private goods markets, and to survive, firms must continually adapt their operations to respond to changes in market prices. However, although Pareto optimality conditions are formulated in financial terms, the underlying conditions are in fact measurable in terms of physical opportunity costs of the resources used in production. The basic theory of Pareto optimality is derived in physical terms of marginal exchange rates between various resources used in production and products sold in markets.

The information systems for public goods must be derived from the objectives of providing the services to ensure their relevance. Their provision is not driven by commercial objectives, and management policy formulation and performance assessment should not be undertaken in commercial terms. Rather, a set of ecological and social measures which focus on the utilization objectives and physical characteristics of the resource should be developed and used. Ecologists, for example, use a range of scientific measures about air, water and soil quality to determine policies for a sustainable environment; data on human utilization of national parks can be obtained for management and accountability purposes, and so on. Financial valuations of these resources are not relevant for determining policies for their good management and for performance assessment, particularly where those valuations

are artificial. For example, the recent Auditor General performance audit reports on Commonwealth Natural Resource Management and Environment Programs, and Commonwealth Management of the Great Barrier Reef, did not require the assets to be valued for good asset management and performance evaluation (ANAO, 1996–7). Furthermore, because valuations are not relevant for their good management, they will militate against it and hide these assets in with conventional accounting assets through scrambling them all together. They must be reported on separately from normal accounting assets in order that they can be properly managed and accounted for.

## CONCLUSION

From the above examination of the characteristics of natural capital assets and their role in providing public goods and services to the community, it can be seen why such assets ought to be differentiated from the normal commercial-type assets used by government in its administrative processes and excluded from the full accrual accounting reports of government. They do not satisfy the FASB criteria for asset recognition, and they should not be included in the statement of assets and liabilities of the government if that statement purports to be one of financial position. Furthermore, there are acute problems encountered in valuing these assets. Any valuations are arbitrary and they are not needed to facilitate good management of the assets. Rather, it is proposed that these assets are better treated as assets held in trust by the government for the benefit of current and future generations. This trusteeship approach is in accord with modern theories of environmental management and the modern democratic state.

Full accrual accounting as used in business has many information advantages over cash-based accounting as normally used in government; however, the uncritical application of business accounting principles to the public sector carries many dangers in providing misinformation. Fundamental differences between the two sectors must be allowed for in the application of full accrual accounting to the government environment, particularly those involving externalities. Ström (1997) succinctly sums up these differences with his observation that: ‘In the private sector, the purpose is financial (profit) and the means are activities. In the public sector, the opposite applies: the purpose is activities and the means are financial’. This observation applies in particular to natural capital assets used for the provision of public services.

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