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# Recording land in the national balance sheet

**Andrew Cadogan-Cowper and Peter Comisari**


**Centre of Environment and Energy Statistics**

# RECORDING LAND IN THE NATIONAL BALANCE SHEET

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**Peter Comisari**

**Australian Bureau of Statistics**
**Centre of Environment and Energy Statistics**

## Introduction

1. A central feature of the 2003 edition of the System of Integrated Environmental and Economic Accounting (SEEA-2003) is its integration of environmental and economic stock and flow information, in both monetary and physical terms. This type of integrated information is an essential input to a capital view of sustainable development. Under such a view, sustainable development occurs when a country achieves non-declining capital wealth by replacing or conserving the source of that wealth—that is, stocks of human, social, produced and natural capital.

2. The SEEA focuses particularly on natural capital to inform the policy objective to 'keep natural capital intact'. It can provide information to explicitly identify the role that natural resources play in supporting economic development, as well as the subsequent impact that economic activity has on those resources. Developing a more complete articulation of these interrelationships provides decision-makers with a rich body of information to support informed decision-making.

3. In those countries where valuation of land has been undertaken, land invariably emerges as a very significant component of national wealth. However, very few countries publish estimates for the value of land. What remains unmeasured cannot be completely understood and is less likely to be appropriately managed. In particular, if we judge sustainable development according to whether we 'keep natural capital intact' then it is important to generate both monetary and physical measures of the stock of land.

4. This paper reports on the experience of the Australian Bureau of Statistics (ABS) in compiling land values for the national balance sheet—both in current prices and in volume terms. Monetary estimates for land have been included in the national balance sheet of the Australian System of National Accounts (ASNA) since the mid 1990s. More recently the ABS has produced experimental estimates of agricultural land degradation. In addition to sharing these experiences, this paper highlights a number of changes to the 2008 System of National Accounts (2008 SNA) with implications for the treatment of land within the revised SEEA.

## Background

5. One of the major innovations of the 1993 SNA—continued by the 2008 SNA—is a full set of accounts culminating in national and sectoral balance sheets. Balance sheets are a useful tool in the assessment of national well-being and in order to provide a more complete reflection of national (economic) assets, the inclusion of land is important. Recognition of the analytic value of balance sheets is now reflected in the OECD-Eurostat questionnaire, where Table 2600 requests balance sheet data by institutional sector.

6. The balance sheet records the value of assets considered to be within the scope of the SNA asset boundary. For an asset to be included within the SNA asset boundary it must have an identifiable owner, and the owner must be able to derive an economic benefit from the use of the asset. In reality some economic assets are also environmental assets by nature, and so the notions of environmental capital and economic capital overlap. It must also be noted that the values assigned in the ASNA to those assets that have both economic and environmental properties are the economic values only. There is no attempt to value the environmental value over and above the economic value of such assets.

7. Environmental assets in the balance sheet of the ASNA include land, subsoil assets and timber. As table 1 shows, these environmental assets comprised more than half the total value of non-financial assets on the Australian balance sheet in 2008. Furthermore, land

represented 90% of the total value of environmental assets (or 45% of Australia's total non-financial assets) in 2008.

**Table 1: Non-Financial assets on the Australian balance sheet, chain volume measure ($ billion)**

| | 2002 | 2004 | 2006 | 2008 |
|---|---|---|---|---|
| Produced | 2586 | 2777 | 3008 | 3288 |
| Non-produced | 3118 | 3199 | 3272 | 3345 |
| Environmental | 3109 | 3199 | 3267 | 3344 |
| *Land*[1] | *2806* | *2872* | *2933* | *2994* |
| *Subsoil assets* | *292* | *306* | *323* | *339* |
| *Plantation standing timber* | *9* | *9* | *9* | *9* |
| *Native standing timber* | *2* | *2* | *2* | *2* |
| **Total** | **5704** | **5972** | **6279** | **6633** |
| % Land assets | 49 | 48 | 47 | 45 |

Source: Australian System of National Accounts 2007-08 (ABS Cat. no. 5204.0)

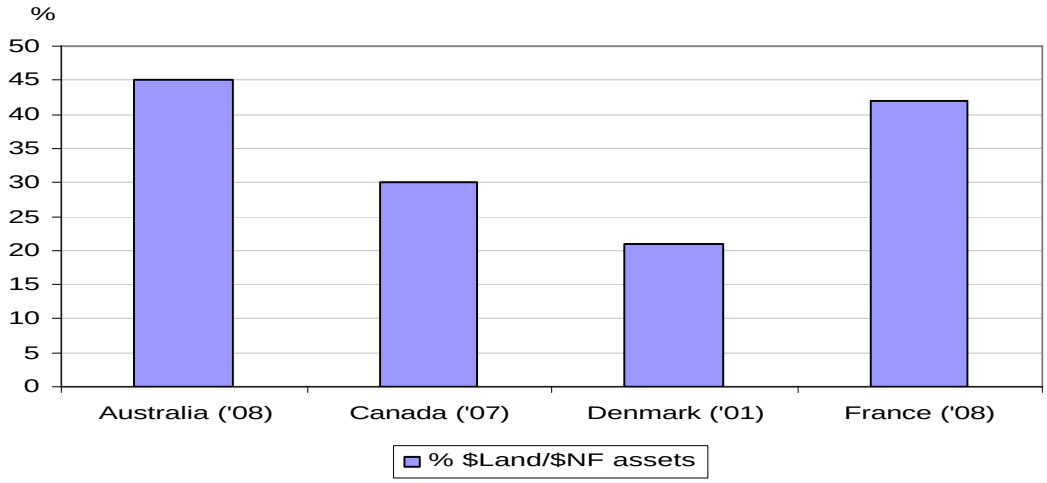
8. There are compelling reasons to measure the value of land used in the economy by various sectors and industries, and to assess the effectiveness of the use of this land. For example, adequately feeding a growing global human population requires ongoing improvements in agricultural production. Land is a crucial input to this production and the assessment of land productivity is a key policy concern. Balance sheet estimates of land can also provide a means of understanding and predicting the behaviour of certain units within the economy. For example, the decline in household savings experienced by a number of countries in recent years might be explained by an apparent increase in wealth of households resulting from asset inflation, especially in the land component of housing.

9. Many countries compile a range of asset and liability items for the national balance sheet; however, relatively few compile complete balance sheets. The principal problem appears to be in generating quality estimates for non-produced assets, particularly for land. A survey conducted by the OECD in 2007[2] revealed that the following OECD countries produce estimates for the value of the stock of land: Australia, Canada, Czech Republic, Denmark, Finland, France, Germany, Japan, Korea, Netherlands, New Zealand and Slovak Republic. In some of these countries, the estimates of land value either did not extend to all relevant land assets or else they were produced intermittently. Among the countries that compile balance sheet estimates for land, the value of land comprised 30% of the value of non-financial assets in Canada in 2007; 42% of the value of non-financial assets in France in 2008; and 21% of the value of non-financial assets in Denmark in 2001.

[1] Includes land improvements as per the 1993 SNA

[2] Aspden, C (2008) Results from a survey on estimating the stock of land. STD/CSTAT/WPNA (2007)8

**Figure 1: Country comparison – land component of non-financial assets**




10. However, in trying to value land, several obstacles often emerge. Obtaining prices for an asset that is generally subject to thin trading, and in many cases never sold in market transactions, is an issue. In addition, separating the value of the land asset from the value of any buildings and dwellings that occupy that land presents complications, because land and any structures attached to that land are typically sold together in a single transaction.

**Early estimation of land and dwellings in Australia**

11. The ABS has been compiling estimates of land value for the national balance sheet since the mid 1990s. Until recently, the ABS estimated values of household land and dwelling stock independently—household land estimates were obtained from State government Valuers-General (VG), while the capital stock of household dwellings was (and continues to be) estimated in a perpetual inventory model (PIM)[3].

12. However, when the ABS estimates were compared to an alternative compiled by Australia's central bank—the Reserve Bank of Australia (RBA), significant differences were revealed. Furthermore, an estimate of the mean value of dwellings owned by households, broadly supporting the RBA estimates, was derived from the ABS Survey of Income and Housing Costs[4]. By comparison, previously published ABS estimates of the mean value of dwellings appeared to be low, so the ABS decided to review land and dwelling values to identify reasons for possible under-estimation.

13. The level of net capital stock of dwellings is heavily influenced by mean asset lives which are difficult to verify. Results of an Australian Housing Survey (AHS)[5] confirmed the composition of dwellings by type, as used by the PIM, was broadly consistent. However, AHS results also implied the mean life of non-house dwellings (such as flats and apartments) was too low. Raising the asset life to that of brick dwellings increased stock level estimates, and substantially reduced the gap between ABS and RBA estimates.

14. The review then focused on reconciling differences in land estimation. Whilst in principle VGs value land at market prices, in practice there are a number of difficulties in

[3] The ABS capital stock estimation system uses a perpetual inventory model (PIM) to build stock estimates based on the flow of capital expenditure, economic life estimates for the various dwelling types and information on the distribution of retirements.
[4] Household Wealth and Wealth Distribution, Australia, 2005-06, ABS Cat. no. 6554.0.
[5] Housing Characteristics, Costs and Conditions, 1999, ABS Cat. no. 4182.0.

applying observed prices to the whole of the land stock. A 2005 report[6] by a State government ombudsman illustrated these difficulties, pointing to systematic under-valuation of land in Australia's most populous state, New South Wales (NSW). The report found that outdated sales data typically remained unadjusted to market trends. Furthermore, "mass valuation" was often used - a technique using available sales data to impute the value of land for the surrounding area. However for this method to have been sufficiently accurate, information on sales data would need to have been regularly updated. In addition, there are incentives to value conservatively to avoid disputes and potential litigation with land owners.

15. The under-estimation of the value of land in Australian states and territories predominantly accounts for the discrepancy between previous ABS estimates and the implied value of land published by the RBA. The RBA avoids these measurement issues by combining mean market values of dwellings with population census based estimates of dwelling stock. As a result the ABS subsequently adopted the combined stock of residential land and dwellings in the RBA estimate.

**Current compilation of land asset estimates in the ABS**

16. The balance sheets of the ASNA contain official estimates of the value of land for Australia. These estimates relate specifically to land as an economic asset (as defined by the SNA), and include freehold and leasehold land in private hands, land owned by public trading corporations, and more recently, land held by the Commonwealth, State and local governments. The ABS makes no attempt to generate monetary estimates for those parcels of land not qualifying as economic assets.

17. As mentioned above, the current methodology for valuing residential land adopted within the ASNA utilises a published RBA estimate of total household dwelling stock (combined house and land) at market value - derived by combining a count of dwellings from the ABS Census of Population and Housing with the mean market value of dwellings. The latter is produced by a private consultant using sales data with a broad geographical coverage, encompassing both metropolitan and non-metropolitan areas. The census data on dwelling numbers are comprehensive in coverage and include all houses, flats and units, both occupied and unoccupied, for all states and territories. For inter-census years, dwelling counts are extrapolated forward using dwelling completions, net of demolitions.[7]

18. However, as the published RBA estimate only relates to the household sector, it is necessary to also include an estimate for values related to other sectors. Accordingly, it is estimated that of all Australian residential land, 92% relates to the household sector (including unincorporated enterprises and NPISH), the remaining 8% to non-household sectors. So in order to extend the scope of the RBA estimate of household dwelling stock (house and land) to all residential land, an estimate covering non-household sectors is added. The ABS then subtracts the current price net capital stock of dwellings for all sectors (from the ASNA capital stock estimation system) to derive total residential land as a residual. To calculate the value of land owned by households, the ABS subtracts the current price net capital stock of dwellings for households from the raw RBA estimate of household dwelling stock (house and land).

19. The difference between the value of total residential land and household residential land is then allocated to the non-financial corporations and general government sectors. The financial corporations sector is assumed not to hold residential land as there are no dwellings allocated to this sector.

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[6] New South Wales (NSW) Ombudsman *Improving the quality of land valuations issued by the Valuer General* presented to the NSW Parliament in October 2005.

[7] Sourced from Building Activity, Australia, ABS Cat. no. 8752.0

20. It is necessary to also estimate the value of land used for commercial purposes, including farm land and other rural land. The value of commercial and rural land is estimated by the VG for each State and territory for revenue compliance purposes. The ABS allocates these national aggregates to institutional sectors using various proportional indicators such as the ratio of land values to structure values. Finally, a category 'Other land' relates to certain types of government-owned land and a value for this land is derived within the Australian government finance statistics system, after deducting a small proportion to be allocated to residential land owned by government units. Because it often occurs in significant locations, residential land owned by government units is estimated to be worth three times the value of government's net capital stock for dwellings. Table 2 contains illustrative estimates of the value of land in Australia in 2006-07.

**Table 2: Estimating land, Australia, 2006-07 ($ billion)**

| | | Dwellings | Land & dwellings combined | **Land by type of use** | | | |
|---|---|---|---|---|---|---|---|
| | | | | Residential | Commercial | Rural | Other |
| **Land by institutional sectors** | Households | 1210.6 | 3316 | 2105.4 | 51.6 | 227.2 | 0.0 |
| | Non-financial corps. | 49.9 | 269.9 | 220 | 175.4 | 19.8 | 0.0 |
| | Financial corps. | 0.0 | 0.0 | 0.0 | 30.9 | 0.0 | 0.0 |
| | General government | 4.6 | 18.4 | 13.8 | 0.0 | 0.0 | 171.8 |
| | All sectors | 1265.1 | 3604.3 | 2339.2 | 257.9 | 247 | 171.8 |

Source: ABS National Accounts balance sheet compilation data

**Measuring the volume of land**

21. In addition to including the value of land on the national balance sheet, the ASNA includes commercial land as productive capital stock (PKS) in its models for generating estimates of capital productivity and multi-factor productivity (MFP) for Australia. Since commercial land is an asset which must be purchased or leased in order to produce economic outputs, it is clearly a factor of production and should be included as a capital input for the purpose of measuring capital productivity. For this reason especially (though there are other reasons) the ASNA produces and uses volume estimates for land.

22. Developing volume estimates for land raises important questions of whether land volumes change over time, or whether changes in land values should be entirely attributed to price change. Under normal circumstances, the physical land area of a country changes little over time. But it is a well-established point of economic theory that volume change may result from both changes in physical quantity and changes in quality and it therefore seems clear that changes to the volume of land can arise from both natural processes and from human activity.

23. The 2008 SNA provides guidance in this area. According to the 2008 SNA, when we compile a volume measure, this measure will reveal the changes in *quantity* of a good or service between two periods of time. However, volume measures differ from a strictly physical quantity measure in that volume measures are adjusted to reflect changes in quality (2008 SNA, para 15.13). Volume measures are preferred.

24. The 2008 SNA discusses at length the relationship between quality differences and price variations (paras 15.64 - 15.76). It is worth noting that, while differences in quality may be attributable to differences in physical characteristics in the goods/services, not all

differences in quality are of this nature. Products that are physically identical must be treated as being of different quality *if* they are delivered at different times (seasonal fruit for example) or in different locations. That is, an asset could undergo a quality change without experiencing any physical change. The 2008 SNA states that:

> *"It is generally assumed in economic analysis that whenever a difference in price is found between two goods and services that appear to be physically identical there must be some other factor, such as location, timing or conditions of sale, that is introducing a difference in quality".* (2008 SNA, para 15.67)

25. The 2008 SNA (para 15.67) goes on to describe volume measures of fixed assets as being "quantities of capital goods". This is certainly true of produced capital in the SNA—which now includes land improvements—but is not strictly accurate for assets such as land, mineral and energy resources, which are not capital goods. Nevertheless, the principles would appear to be equally applicable to non-produced assets such as land. That is, land could be thought of as being 'quantities of non-produced assets used in production'.

26. Urban land is typically more valuable than rural land because it provides a higher utility per hectare to urban dwellers and to economic producers in urban areas. As human population in urban areas increases and as rural land is increasingly rezoned to urban land, it can be argued that land quality has risen and that therefore the volume of land has increased. This rural land need not have undergone any physical improvements (such as roads, utilities etc.), that is, its quality may have increased simply because of a closer proximity to urban centres. And this quality change will be embodied in price rises for this land. That is, location is critical in determining the quality, and hence the volume, of land. Following this reasoning, land in a city's central business district can be considered more valuable than land in its suburbs, or in adjoining rural areas.

27. Balance sheets in the ASNA are compiled on the basis that land volumes do change over time. However, the practical task of splitting value changes into price and volume components is far from straightforward. That is, how best to deflate the current price series for land value into a volume series? For Australia, the case of rural land is the most straightforward because the ABS assumes this land to have zero volume growth. This, of course, implies that the combined volume effects of rural land degradation, deforestation, reforestation, land improvement and rural-urban rezoning net to zero.

28. Measuring the volume of non-rural land is considered to be less straightforward. While VGs in each Australian state and territory can reveal the value of commercial and industrial land for their jurisdiction, the deflation of this current price series into a volume series is problematic. Land values rise over time due to pure inflation and also to changes in the real value of the land caused by changes in its use and the real value of its location. For example, the value of land on Capital Hill in Canberra is higher today than in 1901 partly because all Australian land values have risen but also because a billion dollar Parliament House has now been erected on the hill, and the region surrounding it has changed from a predominately rural area to a city of over 300,000 people. That is, the price of land has risen for reasons both of pure inflation and of increased future real rents expected from the (land) asset.

29. To express this discussion in numeric terms, we can suppose that the current wealth stock of land is $105. Suppose also that the price of a unit of land is 1.05 today, but was 1.00 last year. The real (volume) stock of land in the previous year might be estimated as $100 = $105 / 1.05, but this approach treats all increases in value as a pure inflation effect. If constant dollar rents increase from one year to the next, the present discounted value of the land has also risen and so the real value of the land has risen. If, for example, constant dollar rents increase by 3% then the real land value (volume) has also risen 3% and the pure

inflation effect is only 2%. In deriving volume estimates of land we should therefore deflate the current price estimate of land of $105 by 1.02 rather than by 1.05.

30. In practice the ABS has adopted a somewhat crude method of approximating improvements (increases in volume) in non-rural land within the ASNA. The growth in volume of urban land is thought to correlate with the growth in net capital stock of buildings and structures overlying this land. Specifically, the growth in volume of urban land underlying non-dwelling construction is calculated as half the rate of growth in volume of the associated non-dwelling construction. For land underlying dwellings, the growth in volume of this land is calculated as one third the rate of growth in volume of constructed dwellings.

**Land degradation and 'sustainable' income**

31. In broad terms, land degradation represents a decline in the quality of land, and therefore its value. This value may reflect a combination of many factors including the productive capacity of the land and the environmental services it provides. However, attempts to value land degradation reported in this paper have taken a narrower perspective, focusing on the decline in the capital value of agricultural land caused over time by economic activity. That is, the fall in the future productive capacity of the land. As such, estimates of land degradation included here certainly do not reflect the cost of land degradation to environmental systems more generally.

32. Agricultural land degradation is particularly significant as it impacts agricultural productivity, leads to additional clearance of forests and native grasslands as existing land loses productivity, places additional demands on other natural resources to repair the land (for example, lime for neutralising acidity, water for flushing irrigation salinity), and leads to off-site pollution and the loss of amenity values.[8]

33. In trying to assess changes in the value of agricultural land, data on market values or land rates would be preferred. However market values reflect a number of considerations beyond the productive capacity of the land. These include commodity and input prices, zoning and 'lifestyle' considerations.[9] As such, valuing land degradation on the basis of changes in the market value of land is inappropriate. A more appropriate alternative is to calculate the net present value of the estimated future stream of income (rents).

34. The impact of land degradation on production can be measured as the difference between the value of what was produced, and the value of what would have been produced in the absence of degradation. However, lost production in itself does not provide an estimate of degradation. An assessment of the decline in the value of land due to a loss of productive potential compared with some assumed pristine state is shown by the net present value of future resource rents foregone due to degradation.[10] Therefore, degradation represents the year to year change in the net present value of the lost resource rent.

**Estimating land degradation - experimental estimates for Australia**

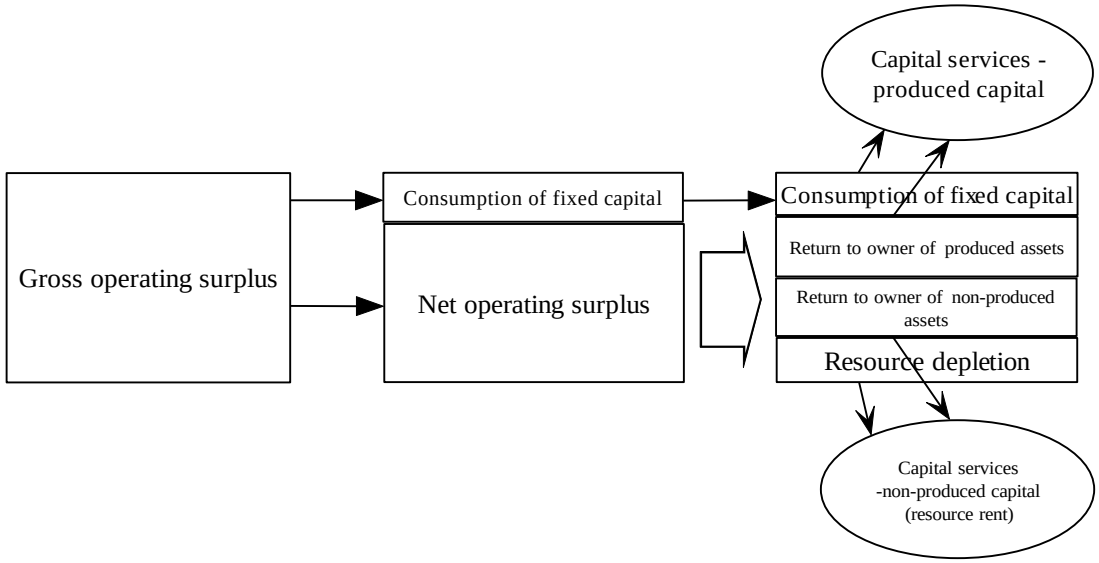
35. Two national studies undertaken in Australia measured economic losses due to land degradation using alternative approaches. Kemp and Connell (2001) combined data from a farm survey with land value data to estimate the difference in the capital value of farms with and without degradation at $14.2 billion in 1999. This represents the total accumulated losses in land value due to degradation.

[8] Gretton and Salma, 1996.
[9] Roberts, 1997
[10] Ryan, 2001

36. In order to estimate the year to year change in land value due to degradation, the ABS has assumed that degradation accrued at a constant rate over the past 50 years ($14.2 billion / 50 = $284 million pa), and will continue at this rate into the future, i.e. $284 million pa. A deflator has then been applied to the constant price time series to derive current prices. The chain volume price index for GDP was the chosen deflator as this gives a more stable time series than deflators related to agricultural income.

37. A second study, the National Land and Water Resources Audit (2002), used models to estimate the lost profit at full equity (PFE) due to soil degradation at $2.6 billion in 1996–97. The PFE includes a return to the owner for the use of produced capital (part of the capital service flow after consumption of fixed capital has been removed), and the resource rent (includes both the resource depletion and a return to the owner for the use of the non-produced capital). For information, a decomposition of the operating surplus for an entity using natural resources is provided in the diagram below.

**Diagram 1: Decomposition of the operating surplus for an entity using natural resources**




38. The return to the owner for the use of the produced capital (63%) is removed from the PFE using ratios from the ASNA. Therefore the lost resource rent is 37% of PFE, or $947 million. The NPV of the resource rents foregone is calculated using the real long term government bond rate (5.8%)[11], and equals $16.4 billion. This represents the value of land that has been lost due to land degradation.

39. The land degradation is assumed to have accrued evenly over a period of 50 years. Hence, the degradation in each year is $329 million ($16.4 billion / 50 = $329 million). As before, the chain volume price index for GDP is used to deflate the constant price time series to derive current prices.

40. Under both methods, the accumulated value of losses in land value due to degradation is determined i.e. $14.2 billion and $16.4 billion. However it is the year to year increment in the value of degradation that should be deducted from income in each period (consistent with the treatment of depreciation of produced assets). Using the $14.2 billion figure of lost land value, the annual increment (in 1999 dollar terms) is $284 million pa. Using the alternative estimate of $16.4 billion, degradation is $329 million pa (in 1997 dollar terms).

[11] adjusted by the consumer price index in 1996-97.

41. The ABS has published experimental estimates for depletion-adjusted GDP incorporating depletion of subsoil assets and land degradation (see Table 3 below). However, as the ASNA does not treat land degradation as a transaction, these estimates are not included in the ASNA itself. Note, the land degradation figures in the table below are based on the figure of annual lost land value (i.e. $284 million p.a.), then converted to current prices using the chain volume price index for GDP.

**Table 3: Depletion-adjusted GDP, Australia ($ million)**

| | 2001–02 | 2002–03 | 2003–04 | 2004–05 | 2005–06 |
|---|---|---|---|---|---|
| GDP | 735 714 | 781 675 | 840 285 | 896 568 | 965 969 |
| Net depletion | 3 451 | 4 007 | 4 537 | 4 544 | 4 656 |
| *Subsoil depletion* | *3 137* | *3 685* | *4 206* | *4 199* | *4 295* |
| *Land degradation* | *314* | *322* | *331* | *345* | *362* |
| Depletion-adjusted GDP | 732 263 | 777 668 | 835 748 | 892 024 | 961 313 |

Source: Australia's Environment: Issues and Trends 2007, ABS (Cat. no. 4613.0)

42. A further issue to consider is whether to deduct degradation from income in the periods when the degradation effect becomes evident, or in the periods in which it was caused (sometimes many years earlier). The latter would seem appropriate in economic accounting, though this approach is difficult to apply in practice and therefore the estimates above apply the former approach.

**The 2008 SNA and implications for the revised SEEA**

43. The SEEA-2003 is a satellite system of the 1993 SNA and the two systems are broadly consistent. Similarly, the revised SEEA and the 2008 SNA should remain consistent unless there are compelling reasons for departure. Therefore, where the 2008 SNA recommends changes related to the treatment of land, the revised SEEA should also adopt these recommendations within its monetary balance sheets and asset accounts unless there are compelling reasons. The 2008 SNA defines land as:

> *"the ground, including the soil covering and any associated surface waters, over which ownership rights are enforced and from which economic benefits can be derived by their owners by holding or using them." (2008 SNA, para 10.175)*

44. So while the SEEA includes all land on the grounds that it might one day provide use benefits, even if it does not today, the 2008 SNA (like its predecessor, the 1993 SNA) only includes land areas over which ownership has been established and that can be put to economic use. Consequently, balance sheets contained in the ASNA exclude land not used in economic production, such as national parks and certain parcels of other government-owned land, as well as land owned by Indigenous Australians under traditional ownership arrangements.

45. The revised SEEA should continue to adopt a broader scope than that used in the 2008 SNA, that is, it should not restrict its 'Land' asset to economic assets, but should continue the SEEA-2003 practice of including all land providing environmental 'functions' leading to use or non-use benefits (SEEA-2003, paras 7.35-7.40). This simply acknowledges the fact that land may have environmental value, even if it does not qualify as an economic asset. The following paragraphs of this section describe relevant changes arising from the implementation of the 2008 SNA and implications for the revised SEEA.

46. The 2008 SNA asset classification (2008 SNA, *Annex 1: The classification hierarchies of the SNA and associated codes*) recommends that the value of land be shown against 'Land' (AN211) under the broader category of 'Natural resources' (AN21). Land improvements continue to be recorded as gross fixed capital formation in the 2008 SNA, but within the balance sheet such improvements are now recorded as a fixed asset called 'Land improvements' (AN1123), distinct from the non-produced asset of 'Land' (AN211). The revised SEEA should follow this treatment as it maintains consistency between the SNA and SEEA systems, but importantly it also avoids mixing natural assets (land) with produced assets (land improvements). In addition, consumption of fixed capital can now be applied to land improvements—an adjustment that is not applicable to the natural resource asset of 'Land'.

47. The 2008 SNA continues to treat costs of ownership transfer on land as a fixed asset, but in the balance sheet it is now recorded as 'costs of ownership transfer on non-produced assets'(AN116), separate from the associated non-produced asset of 'Land'. This treatment represents a distinct improvement on the 1993 SNA / SEEA-2003 treatment and should be applied to the revised SEEA. Within the balance sheet of the ASNA, costs of ownership transfer have always been shown as a separate fixed asset, with these costs being depreciated independently of the asset to which they relate. Again, it avoids mixing a natural asset (land) with a produced asset (costs of ownership transfer). Previously, where costs of ownership transfer on land were melded into the underlying land asset, the natural asset of land could be increased by the simple act of selling it from one party to another. That is, under the 1993 SNA and SEEA-2003 treatment, it was possible to 'keep natural capital intact', to some extent, simply by selling it. The 2008 SNA treatment avoids this result—a result that is both counter-intuitive and also inconsistent with the SEEA objective to appropriately measure natural capital and to inform the policy objective of 'keeping natural capital intact'.

48. The 2008 SNA treatment also allows application of an appropriate asset life to the costs of ownership transfer and to write this asset down with a consumption of fixed capital charge. As recommended by the 2008 SNA, the appropriate asset life of ownership transfer costs is the expected period of ownership of the asset to which the transfer costs relate. In contrast, the 1993 SNA approach presented a number of concerns. Firstly, it was not possible to apply an independent asset life to the costs of ownership transfer because these were simply combined indistinguishably with the broader non-produced asset. Further, under the 1993 SNA approach, it was not even possible to depreciate ownership transfer costs associated with land since these costs were combined into the category of 'Land' and land is not subject to consumption of fixed capital.

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