Response to Federal Government's Critique of *The National Greenhouse Accounts and Land Clearing: Do the numbers stack up?*

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On 17 January 2007, the Australia Institute published *The National Greenhouse Accounts and Land Clearing: Do the numbers stack up?* (Research Paper No. 38). The paper raised questions about the accuracy of the National Carbon Accounting System (NCAS) and its land clearing data and called for an independent inquiry to ensure the accuracy of NCAS outputs. In response, the Federal Government made a number of criticisms of the paper and its conclusions. The Government's claims and our responses are outlined below.

Criticism 1 – The paper is inaccurate and flawed because we do not understand the Kyoto rules

The Government stated that:

> The Australia Institute report is inaccurate and flawed in its analysis of the National Carbon Accounting System. For example, it fails to understand that under the international rules applying to Australia's 108% Kyoto emissions target it is only deforestation (deliberate removal of forest cover) that is allowed to be reported. The accounts for this purpose cannot include other forms of land clearing (e.g. sparse bush) that are measured in the Queensland State measurement program.

Response

The Government's claim is incorrect. In Section 2 of the paper, the relevant Kyoto rules are discussed in detail. For example, page 5 includes the statement that:

> [f]or the purposes of accounting for land use change emissions over the first commitment period, the main requirement is found in Article 3(3) of the Protocol, which states that Annex I countries must include emissions from 'deforestation since 1990' in determining whether they have met their targets. 'Deforestation' is defined for these purposes as 'the direct human-induced conversion of forested land to non-forested land'.

In Section 5, the different definitions of relevant vegetation (i.e. Kyoto forests and woody vegetation) are discussed and the implications of these differences are analysed. Figure 1 on page 11 (in Section 4) compares the raw land clearing data from NCAS and the Queensland Government (or the Statewide Landcover and Trees Study (SLATS)). In Figure 2 on page 13 (in Section 5), a comparison is made between the

NCAS land clearing data and adjusted SLATS data for Queensland. The adjusted SLATS data is limited to vegetation with a foliage projective cover of greater than or equal to 12 per cent, which approximates the 20 per cent crown cover definition used for the purposes of Kyoto accounting under NCAS. The adjusted SLATS data also excludes areas that were not mapped by SLATS as woody vegetation in 1991 (i.e. young regrowth). The exclusion of these areas lowers the adjusted SLATS estimates of clearing.

As the paper explains, although the different definitions of relevant vegetation appear to account for a significant amount of the variance in results, major discrepancies remain. There are still large differences in the clearing numbers in certain years and there is a divergence in the clearing trends with NCAS failing to detect spikes in clearing in the late 1990s and early 2000s.

Criticism 2 – NCAS and SLATS have different objectives and methods

The Government stated that:

> [t]he Queensland SLATS program and the Australian Government's National Carbon Accounting are set up for different purposes, have different reporting requirements, and have significantly different technical methods.

Response

This statement is correct but it is wrong to suggest that it invalidates the Institute's analysis. This issue is discussed at length in the paper, particularly in Sections 3 and 5. Section 3 provides details of NCAS. Section 5 analyses the differences between NCAS and SLATS and attempts to reconcile their land clearing data.

Of particular relevance to this issue is the analysis on pages 15 and 16, which examines the different approaches taken under NCAS and SLATS to satellite interpretation. The paper states (p. 15):

> [t]he methods used to process and interpret the satellite imagery are likely to be a major cause of the differences between the NCAS and SLATS clearing data. The critical questions are whether these methods are defensible from a scientific perspective and whether the results accurately reflect what has occurred on the ground.

While noting that both NCAS and SLATS are peer reviewed, two issues are raised. Firstly, unlike the SLATS outputs, the NCAS land clearing data are not field checked. Secondly, NCAS uses a conservative approach to forest classification, which may be creating a bias in its results. Page 16 of the paper includes the statement:

> [d]ata from SLATS indicate that land clearing in Queensland has moved into more marginal agricultural areas over the past 15 years. By adopting a conservative method of assessing forest cover, there is a risk that NCAS may not be detecting eligible clearing events in these marginal areas because of differences in vegetation types (for example, tall shrubs and more sparsely distributed trees being incorrectly classified as non-forest). This could introduce a bias in NCAS by lowering estimates of recent clearing, while

> ensuring higher estimates in 1990 when the majority of clearing was occurring in more fertile areas.

This issue is alluded to in a number of Government reports. For example, a report published by the Australian Greenhouse Office (AGO) in 2003 states:

> [i]n areas with potential for directly human-induced forest conversion, the mapping of forest extent has been deliberately conservative to be certain there is not a bias toward inclusion of non-qualifying areas to the undue benefit of Australia's 1990 baseline. Benefit accrues to Australia from the inclusion of areas of deforestation in the 1990 baseline, therefore the onus of 'proof' for verification dictates that a conservative treatment of uncertainty bounds be used (AGO 2003, pp. 37 – 38).

The report continues:

> [i]n some regions of Australia (for example, central Queensland) large areas of woody vegetation sit close to the threshold for definition of forests viz 20% canopy cover and 2 metres height. Hence, the National Carbon Accounting System follows a carefully structured approach that ensures confidence in and verifiability of results.
>
> The degree of conservatism applied is determined by the treatment of uncertainty in the interpretation of probability that an area of land meets the forest definition … in 1990. A conservative treatment sets a high probability threshold for inclusion as a forest.
>
> … In areas subject to extensive Land Use Change (e.g. eucalypt woodlands), a large proportion has a crown canopy cover which is close to 20%. The effect of this is that substantial (in absolute terms) land areas may move in or out of a forest designation (errors of co-mission or omission) depending on the treatment of any uncertainty around a 'best estimate' of 20% (AGO 2003, p. 40).

The conservative approach to forest classification that has been adopted in NCAS will reduce the estimate of land clearing in the 1990 base year. However, it will also ensure lower land clearing estimates as clearing moves into more sparsely vegetated areas, which the SLATS data suggest it has. Arguably, if the justification for the existing NCAS method is to be as fair as possible to the international community under the Kyoto Protocol, it would be more appropriate to take a conservative approach to forest classification for the purposes of the baseline and a more liberal (or less conservative) approach in later years. This is because for the purposes of meeting the Kyoto target it is the *decline* in emissions from land clearing since 1990 that matters rather than merely the level of emissions in the base year.

On the basis of the available information, it seems likely that the conservative approach that has been adopted to forest classification in NCAS is a major reason for the observed differences in the land clearing data. However, because the Federal Government does not allow public access to NCAS data there is no means to investigate this issue in greater depth.

Criticism 3 – Outputs from NCAS and SLATS are not comparable

The Government stated that:

> [t]he Queensland Government has stated in successive SLATS reports that the outputs from the two programs are not comparable.

Response

There are two main points about this argument. Firstly, the comments from the SLATS reports about the comparability of the outputs are discussed in the paper on pages 16 and 17. As noted in the paper (p. 17), the SLATS reports state that because of the definitional differences discussed above and different reporting periods (NCAS is calendar year, while SLATS is roughly financial year), 'the NCAS and SLATS estimates are … not *directly* comparable' (our emphasis).

Secondly, simply stating that the NCAS and SLATS data are not comparable is misleading. The data are not directly comparable; however, the trends in the clearing data should be roughly similar. Further, given the nature of the differences between the accounting systems, it is unlikely that the differences in clearing numbers should be as large as they are. Moreover, as discussed, after adjustments to account for the major definitional issues, the data should be very similar, which they are not.

Criticism 4 – SLATS land clearing estimates should be higher than the NCAS estimates

The Government stated that:

> [i]t is to be expected that the areas of land clearing reported by Queensland are higher than the areas of deforestation reported by NCAS.

Response

This argument is misleading as it is implying that the observed differences are a natural consequence of the different objects of the reporting systems. This is incorrect. As discussed above, while SLATS should have higher clearing estimates than NCAS, the differences seem larger than would be expected and NCAS has not recorded significant fluctuations in clearing detected by SLATS in the late 1990s and early 2000s.

Criticism 5 – NCAS does not measure much of the land clearing detected by SLATS

The Government has stated that:

> [m]uch of the clearing goes on in sparse woodlands where only a fraction of the area is forest (deforestation) and the rest is sparse scrub (land clearing).

Response

The major issues raised by this point relate to the definitional differences and NCAS's approach to the classification of forests, which are discussed above (particularly in the

response to Criticism 2). If the differences in the outputs from NCAS and SLATS are merely a product of legitimate methodological issues, the Federal Government should not object to all NCAS data being accessible by the public, or at the very least, for NCAS to be independently audited by a team of experts that include representatives from SLATS.

Criticism 6 – The Australia Institute is wrong when it says Australia's emissions would be higher if the SLATS data was used

The Government stated that:

> [t]he Australia Institute are wrong in their arithmetic – if we used the Queensland figures on land clearing areas, Australia would get a larger reduction in greenhouse emissions than are calculated by the NCAS.

Response

This critique misrepresents the statements made in the media release issued by the Australia Institute on 17 January 2006. The Government is implying that the Institute stated that if the SLATS data were used now, Australia would be well above the Kyoto target. In fact, we argued that if the SLATS data were used, Australia 'may be' (i.e. could potentially be) well above its Kyoto target over the first Kyoto commitment period (2008-12). This is because SLATS is detecting increases in clearing in recent years that are not being detected by NCAS. If this trend continues, and the remainder of the Federal Government's greenhouse data are correct, Australia's emissions could be significantly higher than projected by the Government over the 2008-12 period.

Having said this, it must be noted that SLATS shows a significantly higher rate of clearing in 1990 (the base year for the purposes of the Kyoto Protocol) than NCAS, even after adjustments have been made for definitional differences (see Figure 2 in the paper). This means there is greater scope for a reduction in emissions from land clearing under the Protocol's rules. The extent to which this potential is realised will largely depend on the rate of clearing over the first commitment period. Obviously, nobody knows what the rate of clearing will be over this period, hence our statements are qualified (i.e. we state that it 'may' be higher). This issue, as well as the relevance of the 2004 changes to Queensland's land clearing laws, is discussed in detail in Section 6 of the paper.

Criticism 7 – The areas of deforestation have increased in successive NCAS reports for the whole time period covered in the reports, not just in the 1990 base year

Response

In the paper, variability in the results from NCAS is analysed (see page 17). The NCAS figures for 1990 are selected as an example because of the importance of the baseline for Australia's Kyoto commitments and the fact that the Federal Government has stated that NCAS's first priority was to settle on an estimate of emissions from land use change. Reports published in 2002 noted that the level of uncertainty associated with estimates of emissions from land use change were 'low', or less than

20 per cent. Despite this, significant variability in the estimates of land clearing and emissions from land use change were witnessed over the period 2002 to 2006.

The Government's response that all of the NCAS data has fluctuated does not explain the observed variability. Further, the variation in the 1990 baseline estimates was selected as an example of the variability and the paper does not state that the baseline estimates were the only figures that had changed over this period.

Criticism 8 – The earlier reports did not cover the whole continent and there have been year-on-year technical improvements

The Government stated that:

> [t]he first report in 2002 did not cover the whole continent – just the areas where land use change was expected to have been most intense; subsequent report covered every part of the country.

It continued:

> [t]here has been year-on-year technical improvement in methods which have increased the deforestation measured in more complex situations. When an improvement in method is introduced it is applied to all years in the time series covered. The technical methods will not undergo further change for Kyoto target reporting.

Response

As discussed in Section 5 of our paper, as early as 2002, the Government was indicating that the level of uncertainty associated with its land use change emission estimates was 'low'. It also emphasised that the priority for NCAS was to develop a 1990 baseline estimate of emissions from land use change. Further, in the 2002 report published by the AGO that contained the first results from NCAS, the Government stated that:

> [i]n contrast to the default values used previously, the NCAS is based on resource inventories, field studies, modelling and extensive multi-temporal remote-sensing methods. The NCAS methodology is more demanding than the minimum specified requirements of the IPCC guidelines, and provides more robust and transparent emission estimates (AGO 2002, p. 3).

After noting that forest and grassland conversion analysis was confined to areas where relevant activities were 'known to have taken place' (AGO 2002, p. 3), the report states:

> [t]here is a high degree of confidence that there is little relevant Land Use Change activity outside of the area already completed. This was ascertained from both visual review of the satellite imagery and from a land clearing study, *Land Clearing: A Social History* (AGO 2002, p. 4).

Notwithstanding the AGO's assurance that there was 'little relevant' land use change activity outside of the area completed, a 2003 AGO report containing updated NCAS results states that the completion of the full national geographic coverage 'led to an

increase in national Land Use Change emission estimates for 1988-1998 of approximately 10 per cent' (AGO 2003, p. 37). It is unclear how much additional clearing was added to the baseline or later year estimates due to the completion of the geographic coverage. However, the estimate of land clearing in the August 2003 NCAS report is 20 per cent higher than the estimate in the August 2002 NCAS report (AGO 2002; 2003). Consequently, while the completion of the geographic coverage may partly explain the variation in the NCAS estimates of land clearing, the Government's statements about the accuracy of NCAS, the absence of appropriate caveats and lack of transparency undermine the credibility of the system.

Similar issues arise in relation to the claims about 'year-on-year technical improvement in methods'. Many of these modifications are explained in Government reports. For example, one potential cause of the fluctuation in the NCAS data relates to the conservative approach that has been adopted to forest classification. The 2003 NCAS report states that 'aspects of the methodology have been refined to reduce the degree of conservative treatment for determining instances of forest cover removal, but only to a level which maintains certainty in the results' (AGO 2003, p. 40). However, the lack of transparency prevents detailed evaluation of the impact of these and other similar changes. Further, given the extent of the changes in the data, the Government should consider being more circumspect in its claims about the accuracy of NCAS outputs.

An example of the issues that arise in this context concerns the relationship between land clearing and land use change emissions. For example, between 2002 and 2005, there was a 46 per cent increase in the estimated rate of land clearing in 1990. However, the estimate of greenhouse emissions from land use change in 1990 only increased by approximately 12 per cent over this period. Similarly, between 2005 and 2006, the estimate of land clearing in 1990 fell by nine per cent, yet the estimate of land use change emissions increased, rising from 126 Mt CO_2-e to 129 Mt CO_2-e. If NCAS was more transparent, the reasons for these anomalies could be determined.

Criticism 9 – That there is no need for an independent review of NCAS

The Government stated that:

> The NCAS program includes comprehensive and thorough processes of independent expert scrutiny (by groups like NASA, CSIRO and universities). Each year the NCAS undergoes an independent international expert review under the procedures of the United Nations Climate Change Convention. The most recent UN review report of the 2005 emissions inventory states: 'The (Expert Review Team) note the substantial effort put in and the large amount of resources devoted by Australia to implement this highly sophisticated and very advanced accounting system. … The NCAS is supported by publication of a detailed technical report series, the public release of the data and tools used for inventory compilation, and publication in the peer reviewed literature of the methods used and the results.'

Response

There is no means of evaluating the quality of the reviews that have been conducted. The reports of all reviews of NCAS should be made available on the Department of

the Environment and Heritage's website. More importantly, as stated, if the Government has confidence in the accuracy of the NCAS outputs, why does it refuse public access to its data and why the steadfast refusal to establish an independent review of the system?

Conclusion

In summary, the Federal Government's criticisms of the research paper are either inaccurate or they do not discredit the Institute's conclusions or its calls for an independent review of NCAS. The crucial facts are as follows.

- There are significant differences in the land clearing data generated by the Federal and Queensland Governments that cannot be adequately explained by the available information.

- There are anomalies in the land clearing and land use change emission estimates published by NCAS that cannot be adequately explained by the available information.

- NCAS is not transparent. Members of the public cannot gain access to crucial NCAS data (for example, maps of identified Kyoto forests or relevant land clearing events). In contrast, under the Queensland Government's program, almost all of the relevant data are publicly available.

The Federal Government has not addressed these issues. Until it does, there will remain an urgent need for an independent review of NCAS and for improvements to be made to the transparency of the system.

References

Australian Greenhouse Office (AGO) 2002, *Greenhouse Gas Emissions from Land Use Change in Australia: Results of the National Carbon Accounting System*, Commonwealth of Australia, Canberra.

Australian Greenhouse Office (AGO) 2003, *Greenhouse Gas Emissions from Land Use Change in Australia: Results of the National Carbon Accounting System 1988 – 2001*, Commonwealth of Australia, Canberra.