



OVERSEAS DEVELOPMENT ADMINISTRATION  
ELAND HOUSE  
STAG PLACE LONDON SW1E 5DH

Telephone 01-273 0409

From the Private Secretary

Charles Powell Esq  
10 Downing Street  
London SW1A 2AA

13 October 1989

*Dear Charles,*

As you will know the Cabinet Office Climate Change Group chaired by Richard Wilson has been considering Sir Alan Walters' ideas that Britain should take the lead in proposing that the international community should pay a service charge on existing tropical forest areas in developing countries. The objective would be to encourage the governments of those countries to take effective action to conserve forests and thereby reduce carbon dioxide emissions. The Prime Minister asked to be kept informed of progress. I enclose a copy of the latest paper prepared by ODA officials in the light of Cabinet Office discussions.

It is intended that the Prime Minister's speech at UNGA on 8 November should focus upon the environment. The FCO and DOE have been asked to coordinate the drafting of the speech. Mrs Chalker is convinced that the speech should include a substantive passage on the importance of conserving and managing tropical forests, both for limiting global climate change and achieving sustainable development in many poorer countries. She believes that we have already secured considerable credit for our forestry initiative and that we should continue to build upon it.

The issue now is whether the Prime Minister wishes further work to be done to develop Sir Alan's proposals with a view possibly to the Prime Minister including it in her UNGA speech. Ministers would need to agree collectively that a scheme were viable and how the public expenditure consequences would be handled.

Mrs Chalker has commented that Sir Alan's basic idea is disarmingly simple. It involves renting forest areas in order to give developing country governments an incentive to reduce deforestation. The incentive to conserve forests should not exceed the cost of locking up an equivalent amount of carbon dioxide through increased energy efficiency. Developing countries could decide for themselves whether the amount on offer was sufficient to compensate them for the opportunity cost of

/maintaining



maintaining forest areas rather than allow them to be cleared for other, mainly agricultural, purposes.

Mrs Chalker has three main concerns. First any scheme should not involve substantial deadweight expenditure which a government would receive, even if it took little or no effective action to reduce deforestation. She observes that the simpler the scheme the greater the danger of substantial deadweight expenditure. She believes that we should learn from our recent experience, particularly in Africa, in supporting economic policy reform. We have provided balance of payments support only on the basis of strict conditionality and continued good performance.

Secondly, Mrs Chalker is concerned that in many parts of Africa and Asia it is simply not within the power of governments to reduce deforestation in the short term. As is the case with much environmental degradation deforestation is closely related to rapid population growth, putting ever increasing pressure on marginal lands, and rural poverty. In these circumstances it is difficult to see how we might achieve forest conservation without tackling the underlying problems. The answer lies in achieving progress on two fronts simultaneously: agricultural development and sustainable forest management.

Thirdly, it would be very difficult to monitor changes in forest areas in the way required under the scheme.

Mrs Chalker is anxious that the Prime Minister's speech contains something new on forestry. She is content that, if the Prime Minister wishes, officials should do further work to see if, at least for part of the developing world, Sir Alan's idea could be developed to complement longer term assistance. Mrs Chalker believes that the UNGA speech provides an ideal opportunity for the Prime Minister to put fresh political impetus behind the Tropical Forestry Action Plan and to reinforce Britain's commitment to mobilising our tropical forestry expertise which is highly regarded internationally. Mrs Chalker has suggested that the theme of this part of the Prime Minister's speech should be the recapitalising of the world's tropical forests.

I am copying this letter to Bob Peirce, to the Private Secretaries of Ministers whose departments are represented on the Cabinet Office Group on Climate Change, and to Sir Robin Butler.

*Yours sincerely,*

*David Hope*

D J HOPE  
(Private Secretary)



RESTRICTED

## CLIMATE CHANGE

### FOREST SERVICE CHARGES FOR CARBON LOCK-UP

#### A. INTRODUCTION

1. This paper develops a proposal from Sir Alan Walters to pay annual service charges to developing country governments to encourage the conservation of their tropical forests. Sir Alan Walters' proposal supercedes Sir James Goldsmith's earlier proposal involving debt: Sir James appreciates this. The objective is to reduce the build up of carbon dioxide (the main greenhouse gas) in the atmosphere by maintaining and enhancing the stabilising influence of tropical forests. The paper considers the potential costs and benefits of such a scheme and its feasibility.

2. Tropical forests are under continuous pressure from a variety of sources. Sir Alan's idea is a simple one: Britain should lead the international community in offering to pay an annual rent per hectare on existing forest areas in order to provide an incentive to developing country governments to change their policies and programmes in a way that would help conserve forest areas. A sufficient incentive should be that the rent exceeds the value of the land in an alternative use (mainly agriculture). An upper limit on what we should be prepared to pay to avoid deforestation would be the cost of reducing carbon dioxide emissions by an equivalent amount by other means.

RESTRICTED



RESTRICTED

B. DESIGN

3. The largest areas of tropical forest are concentrated in a small number of countries, including Brazil, Indonesia and Zaire. However, areas of vulnerable forest exist in virtually every tropical country. Although the individual areas may be small their aggregate impact is large. Equally, in the key countries concerned, the majority of their forests are not immediately at risk of destruction.

4. In designing any scheme based upon a rent per hectare, it will be important to decide whether we would offer to rent the entire forest area in any country, or only that part of it that is considered to be at risk of being destroyed. Those areas at greatest risk will, by definition, have a higher opportunity cost in an alternative use. Highly inaccessible areas in the middle of large forest areas are usually not at risk and for the time being have an alternative use value close to zero. If a uniform rent per hectare were adopted which was a sufficient incentive for governments to protect the areas at risk, the cost of a universal approach would be many times larger than for a targetted approach under which only areas designated as being at risk were included. Only if we could devise a scheme by which the rent per hectare reflected the opportunity cost of individual forest areas would the costs of a universal and targetted approach be similar.

5. There is likely to be a trade-off between realising the potential benefits and the degree to which a scheme is targetted. The more a scheme focussed only upon areas of high risk the greater the likelihood that other areas currently not at risk would be deforested instead.

6 The incentive to conserve forest areas would be the avoidance of a decline in rental income over time if

RESTRICTED



RESTRICTED

deforestation continues. Developing country governments would have an incentive to conserve only those forest areas whose opportunity cost in other uses (ie mainly agriculture) was less than the rent they would receive. Provided the rent was no more than the cost of locking up the equivalent amount of carbon in other ways, forest land with a higher value in another use would still be cleared, releasing rental payments that could be used to lock up carbon in other most cost effective ways.

7. Any scheme based upon renting forest by the hectare would involve making substantial payments to developing country governments, whether or not, at the margin, forests were conserved. Furthermore, if the annual incremental income loss from continued deforestation was small in comparison to the total rental income received (as might be the case with a universal scheme) not only would much of the expenditure be deadweight, but it might detract from the incentive to take effective action against deforestation.

8. One way of reducing deadweight expenditure would be to offer to rent a forest area en bloc for a given initial annual sum which could be much less than would otherwise need to be the case. The contract would provide for a reduction in the annual rent more than proportionate to the rate of deforestation, thus continuing to provide the incentive to conserve forest areas. This would still involve some deadweight expenditure.

9. While a targeted scheme may be easier to monitor it may prove more difficult to establish and administer. What constitutes an area at risk would need to be defined more clearly for operational purposes. For each participating developing country it would be necessary to delineate the forest areas at risk. Not only would there be scope for honest differences of opinion between professionals, but

RESTRICTED



RESTRICTED

there is likely to be considerable haggling between governments. Furthermore, over time, the areas at risk change. A targetted scheme would need to be tailored to the circumstances of each country, and as far as Britain is concerned this could most easily and effectively be done in countries where we have traditional links, eg Belize, Cameroon, Ghana and Nigeria.

10. The only way to eliminate deadweight expenditure would be to enter into a performance contract with a developing country government. Funds would only be paid to the extent that a country succeeded in reducing the rate of deforestation below current levels. The nature of the necessary contract may be difficult to negotiate but would be essential to provide the incentive.

11. Assuming that a scheme were successful in providing a sufficient incentive for governments to reduce or halt deforestation, it would need to continue either until such time as other non-forestry measures had been taken to reduce the threat of global climate change, or until developing countries had an alternative incentive and the means to manage their forests on a sustainable basis.

#### C. **BENEFITS**

12. The primary intended benefit of the scheme would be in reducing atmospheric carbon dioxide through sustaining carbon lock-up. Depending on tree density and other conditions the amount of carbon fixed in fast growing trees can be as high as 26 tonnes per hectare per year. When forest land is cleared (other than by commercial logging operations) much of the wood is burnt or left to rot (both of which lead to rapid emission of the carbon dioxide) rather than converted to long-lived products. Rainforest destruction at present levels contributes about 20% of

RESTRICTED



RESTRICTED

annual carbon dioxide emissions. It is therefore a significant contributor to the build up of greenhouse gases in the atmosphere. Figures on deforestation in developing countries are given in Annex 1.

13. Mature natural forests lock up substantial amounts of carbon but are not significant net absorbers of carbon from the atmosphere. Absorption by growing trees is roughly matched by emissions from decaying ones. Emissions are much reduced by harvesting mature trees and using the timber in long lived ways (in which the carbon is stored) like construction and furniture. Managing tropical forests in this way, with appropriate protection, regeneration, and planting, can turn them into net absorbers of carbon dioxide for a sustained period. Sustainable management of forests for the benefit of the local economy and the global environment is the objective of the Tropical Forestry Action Plan and ODA's Forestry Initiative.

14. There would be other potential benefits from reducing deforestation. While they do not relate to climate change directly, they are potentially important for other reasons:

- a) tropical forests form a natural reservoir which contains at least half of the world's species of plants and animals, about which we know very little. Taxonomists estimate that only one-fifth of forest species have even been properly classified. Preserving forests would provide extra space within which this biodiversity could flourish. Conversely destroying forests would risk making extinct species of which we are not aware, but which could be of major scientific value. Most pharmaceuticals, for example, have natural origins.

RESTRICTED



RESTRICTED

- b) forests provide a number of important resources for people living at subsistence level in developing countries. These include food, basic tools, and components for building.
- c) forests provide environmental benefits to surrounding areas, including retaining soil, controlling rates at which watersheds drain, modifying local rainfall and temperature fluctuations.

15. Any scheme should therefore be seen as complementary to longer term measures to help developing countries manage their forests on a sustainable basis. Whether the potential benefits of the scheme could be realised in a shorter time frame depends crucially as to whether governments have it within their power, and have the institutional and financial capacity, to reduce deforestation within their countries prior to longer term measures taking effect. This is discussed in Section F below.

#### D. COSTS

16. The scheme would provide for annual retrospective service charge payments to governments, once monitoring reports had been verified. The level at which that payment might be set would require negotiation with the governments of the beneficiary countries.

17. The maximum we should pay is the cost of locking up carbon in alternative ways. This will depend upon the extent to which one seeks to reduce carbon emissions. The Department of Energy estimate that a 20% saving in energy consumption is possible in Britain with existing technologies through investments which are financially

RESTRICTED





RESTRICTED

viable and therefore involve no net cost to the economy. This is equivalent to about 35 million tonnes of carbon per year. This amount of carbon could be locked up in forests by reducing deforestation by 250,000 hectares a year. If similar levels of energy savings could be achieved globally (and there is considerable scope to increase energy efficiency in many developing countries) the reduction in the level of carbon emissions that would otherwise take place would be equivalent to about three quarters of the present level of carbon emission from forest destruction.

18. Further ways of reducing carbon emission from power generation would require incurring economic costs, and include switching further to non-thermal power generation. Department of Energy scientists have suggested that the ultimate cost of preventing emission levels increasing with economic growth would be about £20 per tonne of carbon. On this basis, sustaining one hectare of climax rain forest as an alternative would merit an annual rental in the range £160-£240. Until we have a clearer idea of what costs we would be prepared to incur domestically to reduce carbon emission, it is difficult to say how much we should be prepared to pay to conserve forests purely for carbon lock-up.

19. For a scheme to be effective in reducing deforestation the rent must exceed the opportunity cost of retaining land as forest. It is difficult to place an agricultural value on land, not least because it will vary very considerably from area to area. In some parts of the developing world there is a private market in land which provides a basis for assessing land values. Sir Alan has noted that in parts of Latin America land being cleared for agriculture has changed hands for about £30 per hectare. This would imply an annual rental of only £3 a hectare per year.

RESTRICTED



RESTRICTED

20. In many parts of the developing world, however, land is little traded, so that price data is not available. In many areas of Africa and Asia the main pressure on forests comes from increasing numbers of poor people needing forest land for largely subsistence purposes. We estimate that in the wet tropics such farmers may achieve an annual income equivalent to as little as £50-£100 per hectare, representing the return to both land and labour. One could in theory rent the land as forest for less by compensating farmers for not encroaching further into forest areas. But it is difficult to make a general estimate of the loss of income to a rural community as a result of increasing numbers of people continuing to farm the same area of land, with declining fallow periods and soil degradation.

21. We also considered what the opportunity cost of land might be under modern cash crop farming. Reliable information on actual returns to land under these conditions would require much more work. However the analysis of World Bank and other project reports provides an indication of expected, and therefore possibly optimistic, annual rental values. They range considerably from £25 per hectare (Indonesia); £38 (Ghana cocoa); £62 (Cameroon); £75 (Costa Rica); to £108 per hectare in Brazil. These high values may not only be optimistic, but will tend to reflect prospective values for that land most suited to agriculture. Less valuable land would not have been selected for agricultural development. Against these values should be set the benefit of forest land, which is tentatively put at £10 per hectare.

22. The cost of any scheme would also depend on the delineation of areas at risk. Rates of destruction vary, as shown in the Annex, but are lower in countries with the most forest. We estimate a figure of 0.8% per annum provides a reasonable approximation. The area at risk of destruction

RESTRICTED



RESTRICTED

is greater, as where one plot is protected, adjacent areas will then become at risk. A minimum estimate of the area at risk on this basis could be at least 5%, which represents at least 120 million hectares globally.

23. The maximum cost of any scheme is entirely in our hands. At only £3 per hectare, a targetted rental per hectare scheme (covering 5% of tropical forests) would cost £360 million annually. If, as part of an international effort, we rented 7% of the global area at risk, consistent with our relative economic strength in the OECD, the cost to HMG would be £25 million annually. A universal scheme (covering 100% of tropical forests) would cost the UK £500 million a year, assuming a 7% share. It is very unlikely that this rental would provide a sufficient incentive to affect rates of deforestation. Using returns to land as indicated in paragraph 21, a targetted scheme could cost in the range £2-£10 billion annually, with a cost to HMG of £140-£700 million per annum.

#### E. MONITORING

24. It has been proposed that satellites could be used to monitor such a scheme. The use of satellites for this purpose is unproven. They could not show areas where selective commercial logging had taken place. Nor would they necessarily detect clearance from some areas of shifting cultivation, which is widely practised. Significant advances to overcome these constraints in the near future would require a concerted effort on accelerated research into forest satellite monitoring in the tropics. In the meantime extensive ground truthing would be required to check the present position in areas at risk. We have consulted the World Bank, who agree that while satellite monitoring is a useful tool it is not sufficient on its own. A Swedish survey of forests in the Philippines using

RESTRICTED



RESTRICTED

satellites showed discrepancies of up to 50% in any given area compared to a German survey using aerial photography and ground truthing. Satellite monitoring is however expected to improve significantly over the next five years.

25. Ground truthing on a global scale would be prohibitively expensive. It would also drain scarce skills that might be better deployed in assisting forest management directly.

26. Some recipient countries might be sensitive to the use of satellite monitoring. Images taken in sufficient detail for monitoring purposes could reveal military installations. Such constraints would need to be overcome with diplomacy - but we would clearly not agree to pay a service charge to a country until it had unambiguously agreed to any satellite monitoring and ground truthing we considered necessary. Monitoring of the methods used to achieve conservation might be required to ensure that we did not reward countries which had taken extreme measures against their population to conserve forests.

#### F. ECONOMIC AND SOCIAL CONTEXT

27. The causes of deforestation need to be considered as part of an assessment of the feasibility of the scheme. At the simplest level it is possible to depict two broad models. In one the primary cause is population growth leading to severe pressure on forest lands. This pressure is exacerbated by the degradation of existing agricultural land which forces people to seek new land. This model applies to much of Africa and parts of Asia. For this model, it would be necessary to develop alternative livelihoods for those who would otherwise destroy forests if such a scheme were to achieve its objectives. Even if governments were able to protect those parts of their

RESTRICTED



RESTRICTED

forests which are currently at risk, it is likely that pressure would increase in other areas. It is likely that it would be more effective and cost effective to devote resources directly to activities which take the human pressures off forests rather than paying governments to guard existing forests.

28. A second model is where the primary cause of deforestation is commercial logging or ranching where governments either tolerate or in some cases positively encourage destruction intentionally or otherwise by the policies and programmes they adopt. This might apply to parts of Latin America and some areas in Asia. Here there is scope for encouraging governments to adopt policies to reduce deforestation which might be effective. However it is not clear that in all cases this approach would be cost effective.

Overseas Development Administration  
October 1989

RESTRICTED



|   | Area (Closed<br>Forest and other<br>Woodland)<br>million hectares | Annual Rate of<br>change in area<br>per cent | Average Annual<br>change in area<br>thousand hectares |
|---|---|--|---|
| <u>World</u>  | 4321  | - 0.3  | - 12000   |
| All developed<br>Countries  | 1964  | Negl   | Negl  |
| of which: UK  | 2.3   | 1.1  | ?   |
| All developing<br>countries   | 2356  | - 0.6  | - 12000   |
| of which those where deforestation is greater than 300,000 hectares a year: |   |  |   |
| <u>Africa</u>   |   |  |   |
| Cote d'Ivoire   | 9.8   | - 5.2%                                       | - 510   |
| Nigeria   | 14.8  | - 2.7%                                       | - 400   |
| Zaire   | 173   | - 0.2%                                       | - 347   |
| <u>Asia</u>   |   |  |   |
| Indonesia   | 116.9   | - 0.5%                                       | - 620   |
| Thailand  | 15.7  | - 2.4%                                       | - 379   |
| <u>Central and<br/>South America</u>  |   |  |   |
| Mexico  | 48.4  | - 1.3%                                       | - 615   |
| Argentina   | 44.5  | - 3.5%                                       | -1550   |
| Brazil  | 514.4   | - 0.5%                                       | -2323   |
| Colombia  | 51.7  | - 1.7%                                       | - 890   |
| Ecuador   | 19.1  | - 2.3%                                       | - 340   |

These ten developing countries account for about two thirds of the estimated total deforestation in developing countries.