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An Evaluation of HMG's Response to the Montserrat Volcanic Emergency

Volume I

By

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The former Overseas Development Administration (ODA) became the Department for International Development (DFID) in May 1997. References in this report to the ODA apply to events and actions prior to this change.

The opinions expressed in this study are those of the authors and do not necessarily represent the views of the Department for International Development.

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PREFACE

Each year the Department for International Development (DFID) commissions a number of ex post evaluation studies. The purpose of the DFID's evaluation programme is to examine rigorously the implementation and impact of selected past projects and to generate the lessons learned from them so that these can be applied to current and future projects.

The DFID'S Evaluation Department is independent of DFID's spending divisions and reports directly to the Principal Finance Officer.

Evaluation teams consist of an appropriate blend of specialist skills and are normally (but not in this case) made up of a mixture of in-house staff, fully conversant with DFID's procedures, and independent external consultants who bring a fresh perspective to the subject-matter. Particulars of the seven team members are listed in the study's Foreword.

The evaluation involved the following stages:-

- initial desk study of all relevant papers;

- consultations with individuals and organisations concerned with the project, including field missions to collect data and interview those involved;

- preparation of a draft report which was circulated in June 1999 to HMG Departments involved in the response and the Government of Montserrat;

- submission of the draft report to DFID's Portfolio Review Committee, to note the main conclusions and lessons to be learned.

This process is designed to ensure the production of a high quality report and Summary sheet (EVSUM) which draws out all the lessons from the study on the basis of the draft report.

Evaluation Department

FOREWORD

The Evaluation Study of HMG's Response to the Montserrat Volcanic Emergency is funded by the Evaluation Department of the Department for International Development and undertaken in accordance with the Terms of Reference circulated to involved Government Departments, the Government of Montserrat and the House of Commons Select Committee for International Development. The final Terms of Reference for the whole study are attached (Appendix A).

This independent evaluation was undertaken by the Overseas Development Institute in London, and began on 27 September 1998. The study involved a 7 person team whose responsibilities have been broadly as follows. Edward Clay (Team Leader) drafted the report with assistance throughout from Nita Pillai and contributions by Charlotte Benson on economic and financial aspects. Background research and initial drafting on specific aspects of the emergency and HMG's response involved: Christine Barrow - accommodation and education; Charlotte Benson - economics and aid expenditure; Edward Clay - history of the emergency and management; Jim Dempster - civil engineering, cartography and graphics; Peter Kokelaar – volcanology; Nita Pillai - chronology, food vouchers and the role of home departments; and John Seaman – health. A short biographical note on the team members is given in Appendix D.

The report is based on a review of official and other relevant documentation in London and Montserrat, interviews with British officials in Montserrat and the UK, Government of Montserrat, some staff and representatives of civil society institutions concerned with the island as well as other professional persons who have been involved with Montserrat. A selective list of those contacted for the study is attached as Appendix C (not everyone contacted by the team in group discussions was separately identified). The evaluation has largely focused on the period up to the team's visit to Montserrat in November 1998. However, later developments in a few key areas are noted. In particular, the appearance of a new lava dome in November 1999 just as the report was being finalised has underlined once again the uncertain future course of the continuing eruption. However, the implications of this development necessarily fall outside the scope of this enquiry. A Draft Report was circulated in June 1999 to HMG departments involved in the response and to the Government of Montserrat. The Final Report has taken account of comments received.

The team would like especially to acknowledge the co-operation of many people in Montserrat during two fact finding visits in October and early November 1998, and a third visit in September 1999 for reviewing the Draft Report, as well as all those contacted in the UK. Alice Baker edited the Final Report; the editorial assistance of Margaret Cornell and Mavis Clay and the secretarial support of Terry Henson are also gratefully acknowledged. Bernard Jordan and Doreen Amphlett, DFID's editing team for its series of evaluation reports, also provided invaluable support. Finally, the team would like to acknowledge with sadness all the support and advice which they received from the late Christopher Raleigh as Head of DFID's Evaluation Department before his untimely death in November 1999.

Edward Clay
Overseas Development Institute
December 1999

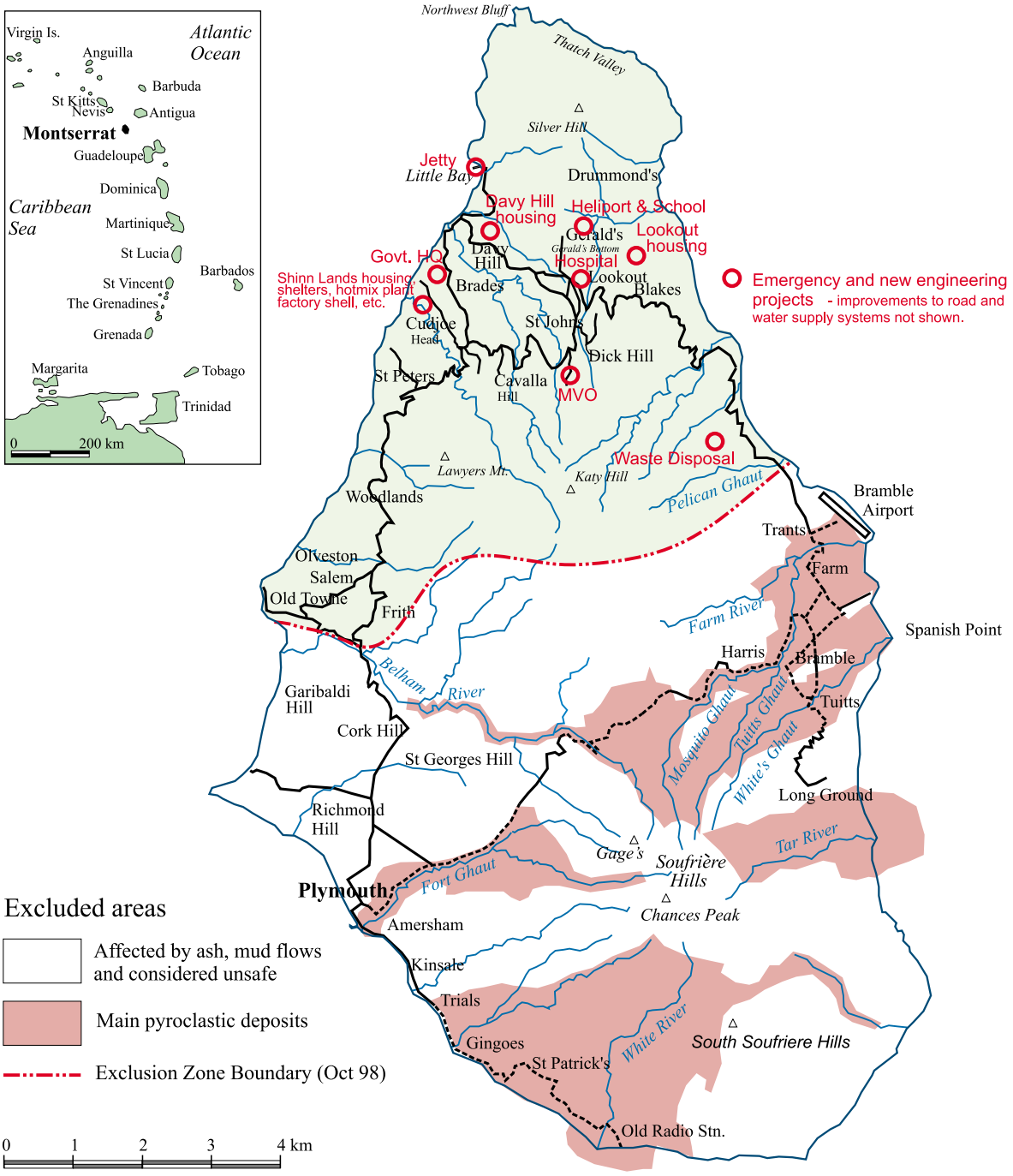
LIST OF ABBREVIATIONS & ACRONYMS

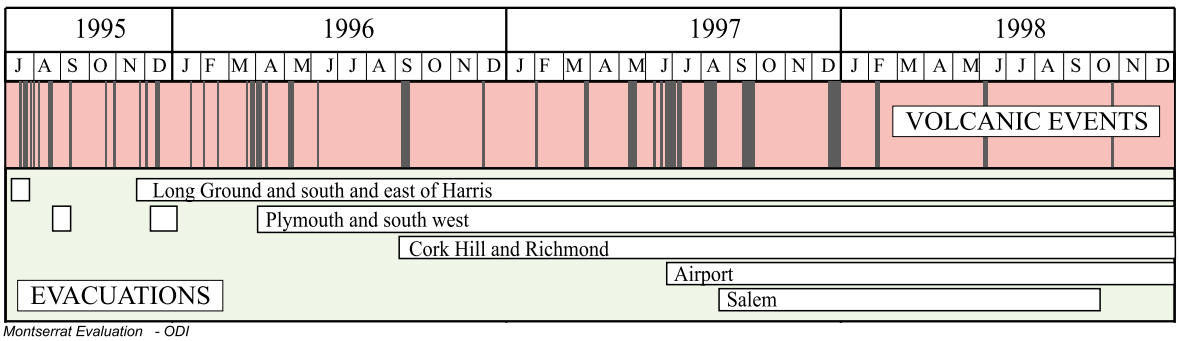
AMO	Aid Management Office
APS	Assisted Passage Scheme
ARVRS	Assisted Regional Voluntary Relocation Scheme
BDDC	British Development Division in the Caribbean
BGS(I)	British Geological Survey (International)
BoM	Bank of Montserrat
BVI	British Virgin Islands
CARICOM	Caribbean Community
CDB	Caribbean Development Bank
CDERA	Caribbean Disaster and Emergency Relief Agency
CHAD	Conflict and Humanitarian Affairs Department
CIDA	Canadian International Development Agency
CPP	Country Policy Plan
CXC	Caribbean Examination Council
DETR	Department of the Environment, Transport and the Regions
DfEE	Department for Education and Employment
DFID	Department for International Development
DHSS	Department of Health and Social Security
DoH	Department of Health
DTRS	Dependent Territories Regional Secretariat
DU	Development Unit
EC$	Eastern Caribbean Dollars
ECCB	Eastern Caribbean Central Bank
ECHO	European Union (formerly Community) Humanitarian Office
ED	Emergency Department
EDF	European Development Fund
EIB	European Investment Bank
ELMT	Emergency Logistics Management Team
EMAD	Emergency Aid Department

EOC	Emergency Operations Centre
EPD	Emergency Planning Division
ERC	Emergency Relief Coordinator
ESU	Emergency Supplies Unit
EU	European Union
ExCo	Executive Council
FCO	Foreign and Commonwealth Office
FVO	Food Voucher Office
FVS	Food Voucher Scheme
GDP	Gross Domestic Product
GGF	Good Governance Fund
GHQ	Government Headquarters
GoM	Government of Montserrat
HEO	Higher Executive Officer
HMG	Her Majesty=s Government
IDC	House of Commons Select Committee on International Development
IND	Immigration and Nationalities Directorate
LegCo	Legislative Council
LSE	London School of Economics
MAG	Montserrat Action Group
MATE	Ministry of Agriculture, Transport and Environment
MBS	Montserrat Building Society
MDF	Montserrat Defence Force
MoD	Ministry of Defence
MoE	Ministry of Education
MOPPA	Montserrat Overseas Peoples Progressive Alliance
MU	Montserrat Unit
MVEG	Montserrat Volcanic Executive Group
MVO	Montserrat Volcano Observatory
MVSG	Montserrat Volcanic Support Group
NDF	National Development Foundation

NERC	Natural Environment Research Council
NGO	Non-Governmental Organisation
NIP	National Indicative Programme
ODA	Overseas Development Administration
ODI	Overseas Development Institute
OFDA	US Office of Foreign Disaster Assistance
OST	Office of Science and Technology
OT	Overseas Territory
OTD	Overseas Territories Department (FCO)
OTU	Overseas Territories Unit (DFID)
PAHO	Pan American Health Organisation
PTR	Pupil: Teacher Ratio
PUSS	Parliamentary Under-Secretary of State
PS	Private Secretary
PWD	Public Works Department
RAR	Resource Allocation Review
RCSA	Resource Centre Scheme Agreement
REU	Race Equality Unit
RMPF	Royal Montserrat Police Force
SDP	Sustainable Development Plan
SEO	Senior Executive Officer
SRU	Seismic Research Unit
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USGS	United States Geological Survey
USVI	United States Virgin Islands
UWI	University of the West Indies
VES	Voluntary Evacuation Scheme
WIAD	West Indies and Atlantic Department
WIGS	West Indies Guardship

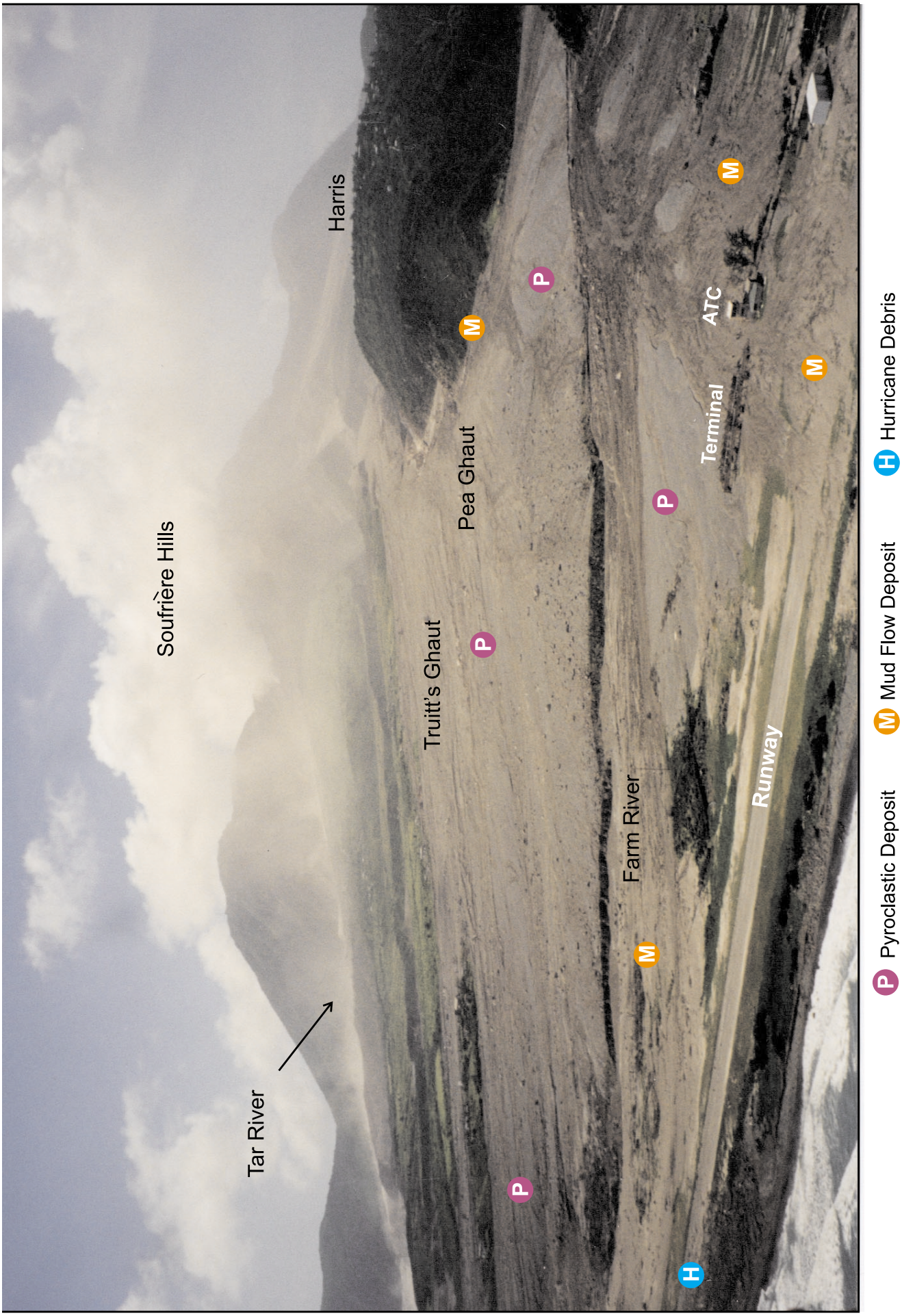
Figure 1
Montserrat at the end of 1998 and a chronology of volcanic events and evacuations





Montserrat Evaluation - ODI

Figure 2 Bramble Airport and the Volcano -November 1998



SUMMARY OF MAIN FINDINGS AND KEY LESSONS

This report focuses largely on the period from July 1995 up to the evaluation team's visit to Montserrat in November 1998; later key developments are also noted.

MAIN FINDINGS *(cross-references are to paragraphs of Main Report only)*

An achievement for Montserratians and a qualified success for HMG

1. The volcanic eruption, which began on 18 July 1995, has devastated Montserrat. By 26 December 1997 when the most extreme explosive event took place 29 months later, approximately 90% of the resident population of over 10,000 had had to relocate at least once and over two-thirds had left the island. Virtually all the important infrastructure of the island was destroyed or put out of use for the short to medium term. The private sector collapsed and the economy became largely dependent on British aid.

2. The considerable achievement of the people of Montserrat is to have coped with the continuing volcanic menace that was wholly outside their experience, and then adapt to the loss of homes and livelihoods and the disruption to their community. Since volcanic activity reduced, from March 1998, people have begun to return, aided since May 1999 by the UK's assisted return passage scheme. Reconstruction is focused on the previously undeveloped northern third of the island. Rehabilitation of the least affected central areas is under consideration.

3. The disaster response by HMG since July 1995 in supporting the Government of Montserrat (GoM) and assisting the island's people has been a success in comparison with many other recent natural disasters elsewhere in the developing world.

- There were only 19 confirmed fatalities directly attributable to the eruption and hardly any measurable increase in communicable disease and physical ill health.
- Throughout the emergency, involving four major evacuations at little notice, everyone has had a roof over their head, no one has gone hungry and there have been no reported cases of child malnutrition, and social order has been maintained.
- Scientific monitoring was rapidly enhanced and sustained throughout the crisis.
- As volcanic activity diminished in 1998, planning for recovery and reconstruction has gone forward. A Sustainable Development Plan (SDP) and Country Policy Plan (CPP) for 1998-2001 were agreed in November 1998 and January 1999 respectively, combined with a commitment in July 1998 of £75m. over 3 years to 2001 and a subsequent indicative £25m. for 2001-2002. *(4.5-15, 4.25, 5.13, 7.2)*

4. That success has to be qualified by less satisfactory aspects of the response and its consequences.
   - Relocation forced most people to accept difficult crowded living conditions: up to 1,600 in August 1997, living in temporary public shelters with very basic facilities and little privacy. Even in late 1998 around 400 people or 10% of residents were still living in these shelters, and a year later 322 people were still in shelters. *(5.4~5.7)*
   - Several of the urgent actions agreed between June and September 1997: the 'Immediate Housing Project' of 255 directly built houses; the temporary Government Headquarters; the upgrading of the hospital; and the Soft Mortgage Scheme to support private housing, were all substantially behind schedule 14 months later, at the time of the evaluation. The housing programme and Soft Mortgage Scheme remained so in September 1999. *(5.8~12, 6.4~7, 7.14)*
   - The majority of the on-island population is at least partially dependent on social assistance, which is not targeted on the basis of need. *(5.13&14)*
   - The economy is virtually non-existent, apart from the public sector and linked public construction, retailing and transport, which are all dependent directly or indirectly on British aid. *(2.12)*

5. The Montserrat emergency has had some distinctive aspects – important in any assessment of HMG's response.
   - Standards (e.g. of living, health care and education) are not those typical of a developing country, as the publicly aired differences between HMG and the elected Government of Montserrat showed. *(4.22&23, 5.2, 9.5~12)*
   - There has been exceptional uncertainty throughout about the progress of the eruption. *(2.10, 3.11, 4.5~12)*
   - The island's volcanic terrain and geography severely constrains on-island solutions to volcanic hazards, most infrastructure being in highly vulnerable locations and the island's small size precluding duplication of facilities. *(2.8~10, 4.22, 4.27)*
   - HMG has become progressively more directly involved in managing the emergency. Since the return to budgetary aid in 1996, GoM finances have also come under the supervision of the Secretary of State for International Development. *(3.7~3.18, 7.9, 8.2~8)*
   - Montserrat has been self-governing since 1961. Ministers and the Legislative Council (LegCo) have understandably sought to find on-island solutions to the effects of the eruption and preferred to avoid steps that would jeopardise a rapid return to pre-eruption normal life, so long as that was even a remote possibility. *(3.11, 4.17, 5.9)*
   - As an Overseas Territory virtually all emergency funding was provided by HMG. *(3.23, Annex 9, section 9.3)*

6. There was apparently no contingency planning on how FCO and the then ODA would manage an emergency in an Overseas Territory (OT) in circumstances that raised difficult issues of governance and risk management as well as the detailed practicalities of emergency management. *Ad hoc* arrangements had to be put in place, and this was done reactively as the eruption progressed. The protracted eruption has involved four closely related stages in HMG's emergency response. *(3.6, 4.3&4)*

7. *Initial crisis: July – September 1995.* The eruption was not predicted. HMG's crisis response, as coordinated on-island by the Governor, contingency planning by Ministry of Defence (MoD) personnel, and assistance by ODA were prompt and appropriate to the highly uncertain situation. *(3.7-10, 4.18)*

8. *'Waiting on the volcano'.* HMG's (and GoM's) response, from September 1995 up to the fatal events of June 25 1997 and the destruction of Plymouth that happened shortly after, is the least impressive aspect of the emergency. Very basic health, shelter and social assistance were provided following evacuations of Plymouth and the south. HMG also began to fund, albeit slowly, infrastructure – jetty, roads, water, electricity - necessary to permit a substantial part of the population to live temporarily in the north. However, housing needs were not effectively addressed and no assistance was provided to those leaving the island. The strengthening of FCO and ODA emergency management capacity on-island also proceeded slowly. *(3.11-13)*

9. Careful examination of the risk management strategy followed by HMG and the GoM suggests that there was an element of 'good fortune'. The micro-zonation policy adopted in early-1996 and the continued use of facilities in Plymouth and the airport were necessary because the facilities for the safer strategy of restricting occupation and activity to the north were not in place. The GoM preferred 'wait and see' options that assumed less serious impacts, with HMG having, because of its ultimate responsibility for Montserrat, to prepare for the worst case. Many within HMG were equally prepared to accept a 'wait and see' approach which limited resource commitments, including staff for managing the emergency. *(4.5-11, 4.19, 5.9, 6.5, 7.7)*

10. *The volcanic crisis from July to September 1997.* During this period HMG adopted the lower risk strategy of supporting those wishing to remain on-island and assisting temporary settlement in the UK and within the Caribbean region. There was initial indecision and public disagreement between HMG and GoM, but nevertheless a crisis package was agreed of actions to support continued occupation in the north and also for subsequent reconstruction. This package of actions, with the contractual arrangements for its implementation, has formed the basis of much subsequent HMG assistance. There were also significant improvements in management and the use of scientific advice. *(3.14-19, 4.10, 5.13)*

11. *Moving from emergency to reconstruction.* The precise moment at which the balance of HMG's efforts shifted from crisis management to rehabilitation is difficult to pinpoint. The scientific assessment confirming that magmatic eruption had halted (July 1998) and DFID's commitment of £75m. funding, in June 1998, indicate that this threshold had already been crossed. DFID and then FCO established simpler direct administrative arrangements for Montserrat and the other OTs. However, DFID continued in a crisis management mode effectively for the whole of 1998 through the centralisation of funding decisions in London with ministerial approval of levels of spending that had previously been delegated to its Montserrat office. The start of reconstruction is too recent to be evaluated except as a process. *(3.20&21, 5.20, 7.2-5)*

Resources

12. Meeting the reasonable assistance needs of the OTs is a first call on DFID's development programme. However, from early-1996 onwards the absence of a clear budgetary ceiling or jointly accepted standards on what was appropriate resulted in negotiation and delay. There was a growing perception on the Montserratian side that DFID, in particular, was acting ungenerously, preferring cost-minimising solutions to immediate needs which jeopardised longer-term development. *(4.23, 6.7, 7.7-10 7.1, 9.13-15)*

13. Up to March 1998, DFID had spent £59m. in emergency-related aid, of which around £53m. was additional expenditure, allowing for previous aid projections. DFID has committed an additional £75m. up to 2001. Projected HMG expenditure will be at least £160m. over six years, taking into account additional expenditure in the UK on relocating Montserratians. The total capital loss, including real estate, is unofficially estimated as up to £1 billion, mostly only partially recoverable or uninsured. *(2.12, 3.22&23)*

Use of scientific information

14. *Identification of issues.* The procedures in place in 1995 in FCO, the then ODA and their joint Dependent Territories Regional Secretariat (DTRS), or in the region dependent on the Seismic Research Unit (SRU) were not adequate to ensure that the increasing volcanic risk would be anticipated and then effectively monitored. *(3.6, 4.3-4)*

15. *Building science into policy.* Prior to the eruption the Head of SRU advised only GoM's Chief Minister, with HMG indirectly involved. This was inappropriate. Once the extreme risk was recognised, HMG progressively availed itself of the best scientific advice from within and outside government, and supported the development of the Montserrat Volcano Observatory (MVO) to provide adequate monitoring and as a centre for complementary research. However, arrangements were ad hoc and short-term until British Geological Survey (International) (BGS(I)) was given a 2-year contract in September 1997. HMG has also brought together a sufficiently wide range of expert advice - including its Chief Medical Officer (CMO) and Chief Scientific Adviser (CSA) - and has organised this through periodic formal elicitation meetings to provide a clearer and consistent basis for policy making. *(3.12, 4.3-11, 4.14, 4.18, 9.17-21)*

16. *Presenting policy.* Public information on the eruption and its implications was limited and unsatisfactory at the outset. This increased uncertainty and made it more difficult for people to plan. From October 1995 onwards, public information improved considerably, with direct involvement by scientists. Efforts were made to strengthen public information through the use of radio, meetings and, since August 1997, by appointing information officers and publishing monthly newsletters. DFID has not given special attention to public information, either on-island or to Montserratians who relocated elsewhere. *(4.11, 4.13, 4.20, 5.18-19, 9.22-25)*

17. The use of scientific advice has had to take into account the strong preference of many to remain on the island and the practicalities of making this possible. *(3.11, 4.9~11)*

Effectiveness and efficiency of emergency actions

18. *Appropriateness.* The emergency has obliged HMG together with GoM to intervene in almost every aspect of on-island socio-economic activity. In an emergency there are sharp trade-offs between urgency, specification and costs. The initial response between July and September 1995, involving rapid preparation of an evacuation plan and the first evacuation in conditions of extreme uncertainty about the scale and timing of a possibly catastrophic eruption, was largely effective, but with much messy detail. *(4.18, 5.4, 9.22~25)*

19. *Timeliness.* Emergency aid by DFID's Emergency Aid Department (EMAD), now the Conflict and Humanitarian Affairs Department, was put in place quickly. Earlier delegation of management and spending authority to project managers would have been preferable to micro-management on-island or in London. The processing of development aid projects, especially up to June 1997, was too slow. Budgetary aid was, on the whole, provided in a flexible way. *(3.9, 4.7, 4.16, 4.18, 6.14, 7.9~12, 8.9)*

20. *Social sectors.* These were and are a GoM responsibility. The measures taken were effective in minimising the threat to life and health. However, the severe social disruption and the economic effects were mitigated to only a limited extent, and the impacts of relocation and massive emigration have been large and traumatic. A high proportion of vulnerable groups, the elderly and those without family support, are in public accommodation. Social assistance has been transferred from direct relief to a more general food voucher and the cash benefit system, but there is no effective targeting. An earlier move to income-tested benefits as cash payments would have avoided fostering welfare dependency and been cost-effective. *(4.22~27, 5.12~14)*

21. *Economic impact.* Little was attempted to address the economic effects of the emergency prior to August 1997, except through budgetary support. The subsequent accelerated programme of infrastructure investment has had indirect benefits for the private sector. The very few actions specifically to sustain the economy have been very slow in delivery. *(7.2~12)*

22. The response on financial regulation, to address the effects of the loss of insurance cover, the knock-on insolvency of the Montserrat Building Society and the position of the Bank of Montserrat, has been characterised by extreme caution and procrastination because of contingent liability. Decisions have been made without regard to their aggregate economic consequences and, on balance, have had a detrimental impact on the island's short-to-medium-term economic prospects. *(7.13~18, 9.9~10)*

23. The partial separation of emergency and economic and development responsibilities, at least up to late-1997, and the strenuous attempt by HMG departments to work within existing managerial arrangements impeded an effective response. *(8.2~11)*

24. *Connectedness.* Addressing urgent emergency requirements, through measures which had a joint objective of promoting development, proved a flawed concept. Too often it was not possible to reconcile timely response to immediate needs (HMG's priority) with durability and reusability (GoM's concern). In addition to short term actions and preparations to prevent loss of life, complementary measures were needed specifically directed to limiting damage to the private sector and assisting its recovery and for protecting financial institutions. *(5.7, 7.7~8, 7.15, 9.47~51)*

25. *Cost-effectiveness.* Cost minimisation was a major consideration and may in some instances have been over-done (as in the sourcing of tents in 1995). The provision of infrastructure through roads, storage and the emergency jetty appears to have been a necessary and cost-effective investment. The construction of a temporary Government Headquarters appears to have been poor value for money, taking into account the delays and cost overruns. Overall construction and adaptation using local materials, know-how and labour appear to have been more cost-effective than solutions based on the importation and assembly of prefabricated structures. Emergency logistics were handled reasonably: the use of military transport in August 1995 was justified; emergency sea and air links since June 1997 were cost-effective. *(4.26~33, 5.4, 6.8~11)*

26. *Coherence (co-ordination).* Many of the delays, omissions and shortcomings in HMG's response are linked to the complexity of HMG management and the administrative system for Montserrat as a self-governing OT. Up to mid-1997 there was poor internal communication, separating information from points of decision, and a lack of clarity about the point of final responsibility for action. The changes made since September 1997 have considerably simplified management arrangements within FCO and DFID. But there is a triangular relationship in which the Governor/FCO and the GoM have different administrative responsibilities, whilst DFID provides finance and most technical advice. For a year from late-1997, DFID centralised authority in London with ministerial approval required for decisions previously made in Montserrat by the Aid Management Office (AMO) and before that by the DTRS. High turnover of DFID staff also contributed to poor management and supervision of investment implementation on-island was inadequate. Practically, there have been occasions on which no one had clear authority to force through actions to completion. The three-year funding commitment and CPP process provide the opportunity to achieve coherence. *(6.14, 7.14, 8.2&3)*

27. In the early stages of the emergency the overall co-ordination of HMG's response was weak. Only after the establishment of the inter-departmental Montserrat Action Group in August 1997, ultimately chaired at Ministerial level and with Cabinet Office monitoring, did a crisis programme rapidly take shape, with regular performance monitoring. This has reduced but not prevented substantial delays in implementation. *(3.15~18, 5.11~13, 8.4, 9.55)*

28. The reactions of other governments and regional organisations confirm the extent to which the emergency is viewed as a British colonial and financial responsibility. Positively, there have been consultation and co-operation with neighbouring Antigua and the French authorities in Guadeloupe over off-island evacuation planning. East Caribbean states have allowed temporary residence and employment of departing Montserratians. France and the Netherlands assisted with search and rescue and evacuation of the injured in June 1997. *(9.56~58)*

KEY LESSONS *(cross-references are to paragraph numbers in this Summary only)*

A proactive strategy for "capping" emergency problems

29. HMG departments attempted to manage the Montserrat emergency within normal institutional arrangements both in London and the Caribbean. This led to a reactive, catching-up strategy and ad hoc adjustments to management. The alternative is to attempt from the outset a more ambitious strategy of "capping" the problem. This is likely to require a task force approach which involves a temporary crisis management team, a senior task force leader with considerable delegation of authority who reports to the highest level, and an inter-departmental Emergency Room. *(6, 8~10, 15, 23, 26&7)*

30. Both FCO and DFID experienced difficulties in posting staff for urgent assignments in Montserrat through normal procedures. It may be appropriate to review procedures for more effective, timely internal placements of staff in an emergency. *(8, 26)*

Fast-tracking emergency responses/investment

31. The evaluation identified a number of delays which reduced the impact and cost effectiveness of emergency measures/investments. It supports the near unanimous view of Montserratians and most of those involved from the UK that there is a need for fast-tracking emergency investments to meet short-term, i.e. up to 3 year, requirements, which should be considered separately from longer-term development needs and temporarily given priority. This would be facilitated by: placing a multi-disciplinary team in-country or in-region with sufficient delegated authority; establishing a sub-set of procedures for a limited range of exceptional circumstances within DFID development project guidelines; and building an institutional culture that supports rather than deters urgent more risky actions. *(4, 8, 15, 19, 25&26)*

32. Contracting an agency to supply a range of management, logistical, social, and institutional skills would have provided valuable services from the outset of the Montserrat emergency in contingency planning, procurement and co-ordination. *(15, 19)*

33. Disaster preparedness, including contingency plans that identify what may be required, will also facilitate fast-tracking in an emergency. This is a priority for the more disaster-prone OTs, including Montserrat. *(5 bullet 3, 6, 14)*

Promoting partnership in the Overseas Territories

34. There are no agreed standards for infrastructure, social assistance or social service provision, health and education in OTs. There is an urgent need to clarify appropriate standards to which the "reasonable claims" of the OTs on British aid are to relate, especially in an emergency. The smallness of Montserrat raises a special problem of diseconomies of scale. For example, what is the appropriate on-island or within-territory level of provision of health care or education? This is a potential problem for other OTs and should be explicitly addressed in considering disaster preparedness arrangements and in any future emergency. *(5 bullet 1, 12, 20, 28)*

35. Effectively self-governing at the start of the emergency, GoM has had to work very closely with HMG as the emergency progressed and has seen a shift of responsibility to HMG. The elected members of LegCo and senior GoM officials should have been given familiarisation in HMG practice and procedures. Had this happened some delays and misunderstandings might have been avoided and some important projects might have moved forward more quickly. *(5 bullet 3, 8, 12)*

Facilitating post-disaster reconstruction

36. One of the biggest challenges in the aftermath of a crisis on the scale of the volcanic emergency which has devastated the economy of Montserrat is how to get larger scale international – UK, Caribbean, European – private sector involvement in reconstruction and renewal. A coherent consultative framework for development is needed, which should include land development and private sector participation, as well as the elected government and – in the case of OTs - HMG as the primary funder. The New Town Development Corporation might provide a relevant model for the development of northern Montserrat. It would enable the GoM to concentrate on the normal responsibilities of government and DFID to withdraw to its usual aid management role. *(4 bullet 4, 11, 21-22)*

Volcano-seismic monitoring and scientific advice

37. In the best-case scenario in which no new magma is emplaced in or outside the volcano, it will need close monitoring for at least ten years, after which monitoring will need to be continued for the foreseeable future. The pattern of volcano-seismic crises in the past suggests elevated risks of another eruption on Montserrat around the year 2025. The volcano needs an Observatory with a wide range of functions – certainly scientific research and co-ordination of research, and monitoring duties alongside that research. The Montserrat Volcano Observatory is to be put on a statutory, permanent basis and will

need to take its place in the regional network of observatories. This will require the commitment of sufficient staffing and long-term UK financial support. *(5 bullet 2, 15)*

38. The lessons of Montserrat are profound for the rest of the Caribbean region, which needs to reinforce the SRU in Trinidad as a strong regional scientific seismicity and volcanic activity surveillance organisation. *(7, 14)*

39. In the case of Montserrat, tracking the progress of the volcano relies heavily on visual observation from helicopters. This is not always feasible and is relatively risky. High-resolution satellite imagery of an erupting volcano would usefully supplement direct monitoring on a daily basis. The practicality and cost of such additional monitoring need to be considered by volcanologists and remote-sensing specialists in consultation. All countries with interests in the region should be involved. *(5 bullet 2)*

Disaster preparedness in the Overseas Territories

40. All the volcanic islands in the Caribbean region and several OTs elsewhere require periodic up-to-date hazard assessment with associated scientific studies. The aftermath of the Montserrat crisis seems an ideal time to raise levels of awareness and preparedness. *(6-7, 14)*

41. The risk assessment for Montserrat prepared in 1987, which considered the possibility of an eruption, was overlooked. A mechanism - such as an advisory panel – is needed to ensure that concerned officials in the FCO and DFID are kept informed of scientific developments regarding natural hazards. *(14)*

Summary

CHAPTER 1
INTRODUCTION

1.1 The Evaluation Study of HMG's Response to the Montserrat Volcanic Emergency was commissioned by the Department for International Development (DFID), in response to a recommendation of the House of Commons Select Committee on International Development.[1] It was undertaken in accordance with the Terms of Reference (ToR) attached as Appendix A. Its purpose is to review HMG's response to the Montserrat crisis and identify findings and lessons learnt particularly with general application to aid responses to prolonged natural disasters.

1.2 An evaluation often involves assessing a moving target, and this has been an especially difficult problem in this case. First, the volcanic emergency on Montserrat has been exceptional in being so lengthy and in the uncertainty about how the eruption would progress. Most natural disasters involve a single, fairly discrete destructive event, with public action focused on preventative or preparatory actions to mitigate effects and, after disaster strikes, responses to provide relief or assist recovery. In contrast, the Montserrat eruption has not been a single crisis, but crisis points within an extended and continuing eruptive episode and emergency. Public action has been and still is organised on a special, exceptional basis. Actions on the part of both HMG and the GoM have been driven by volcanic events whilst also being influenced by changing perceptions of what further volcanic activity there will be. This is a model of physical 'shock' and social reaction, influenced by often divergent perceptions of what is expected. This is a first finding and the underlying assumption for the assessment that follows.

1.3 The scientific assessments of the volcanic situation, major aspects of HMG's response such as assistance for evacuees and returning residents, as well as institutional arrangements of HMG departments specifically for Montserrat, have changed in the course of the evaluation, as have institutional arrangements for the Overseas Territories more generally. This has made the task of assessment especially difficult. The focus of this evaluation is therefore on how HMG responded to the crisis and the emergency actions begun, if not completed, in the three and a half years from the start of the Soufrière Hills eruption in July 1995.

1.4 The evaluation focuses on 7 key criteria with regard to the response: appropriateness, cost-effectiveness, social and economic impacts, coverage and effectiveness of the interventions, coherence, involvement of the affected people in the process, and connectedness. The way in which these criteria have been applied requires a fuller explanation.

1.5 *Appropriateness:* The timeliness and overall suitability of the responses are highlighted because of the importance of timing in an emergency. A further issue is the balance between emergency aid, development (project) assistance and budgetary aid, all of which were provided by HMG.

[1] IDC. 1997, para 69 iv. *Montserrat.* House of Commons, Session 1997-98, International Development Committee, First Report, together with the Proceedings of the Committee, Minutes of Evidence and Appendices. London: Stationery Office, 18 November. The IDC followed up with a second report: International Development Committee. 1998a. *Montserrat – Further Developments.* House of Commons, Session 1997-1998, International Development Committee, Sixth Report, together with the Proceedings of the Committee, Minutes of Evidence and Appendices. London: Stationery Office, 28 July.

1.6 *Cost-effectiveness.* Assessment of cost-effectiveness in an emergency is made difficult by the overriding humanitarian and political considerations involved. From HMG's point of view, a primary concern was saving human life and protecting the health of potentially vulnerable people. At the same time there was a commitment to support the community on-island, irrespective of whether this was economically viable in the short to medium term. In such circumstances a widely accepted criterion of cost-effectiveness is that of minimising the cost of agreed outcomes. Wherever feasible, tendering or market testing provide evidence of efficiency.

1.7 *Social and economic impacts:* Protecting lives and safeguarding the health and the general wellbeing of the affected people are the usual objectives of an emergency response to a natural disaster. Because of the catastrophic economic effects of the Montserrat eruption, the evaluation has paid special attention to how these effects have been addressed. Impact assessment also raises issues of coverage and connectedness.

1.8 *Coverage:* To what extent did effectiveness involve the targeting of interventions on the affected population?

1.9 *Connectedness:* Responses are considered in terms not only of the immediate emergency, but also of the longer-term developmental implications and the connections between the different forms of aid. Rehabilitation and reconstruction were affirmed as a joint commitment by HMG and the GoM in November 1997, with the Sustainable Development Plan as the basis for these activities.[2]

1.10 The *involvement of the affected people* in the process of planning and implementing emergency assistance is important both in ensuring sensitivity to their situation, and because participation in determining ones own fate has a value in a democratic society.

1.11 *Coherence* in terms of consistency and co-ordination between the key actors, particularly the GoM, DFID, FCO, and other UK Government departments, is a critical issue for the evaluation.

1.12 The Office of Science and Technology (OST) has issued Guidelines on the use of scientific advice in policy making, particularly on issues that are potentially sensitive. Three key principles are set out in the Guidelines: early identification of issues, building science into policy by a sufficiently wide range of best expert sources, and presentation of policy ensuring publication of the scientific evidence and analysis underlying decisions.[3] The evaluation has followed these principles in assessing HMG's use of scientific advice in disaster preparedness and in mitigating the effects of the eruption.

[2] Government of Montserrat. 1998. *Montserrat Social and Economic Recovery Programme – a Path to Sustainable Development.* (Sustainable Development Plan). Plymouth, Montserrat: November.

[3] The three principles are most clearly set out in the first annual report on the use of the Guidelines - Office of Science and Technology. 1998. *'The Use of Scientific Advice in Policy Making: Implementation of the Guidelines.'* London: Department of Trade and Industry, July: p7, 11, 16.

1.13 The evaluation has had to be highly selective. It has focused on aspects of the emergency and components of HMG's response that appear to be critical to understanding both what happened and what has relevance for future practice. These aspects include:

- Scientific monitoring and risk assessment.
- Protecting lives and health from the direct effects of the eruption.
- Provision of social support and services to people affected – accommodation, food vouchers and education.
- Emergency investment and civil engineering to enable social life and administration to continue on-island.
- Economic and financial consequences of the eruption and how these are being addressed.

1.14 The report is based on a review of official and other relevant documentation in London and Montserrat, interviews with British officials in Montserrat and the UK, Government of Montserrat, some staff and representatives of civil institutions concerned with the island as well as other professional persons who have been involved with Montserrat. A selective list of those contacted for the study is attached as Appendix C (not everyone contacted by the team in group discussions was separately identified).

1.15 The scientific evidence is that the magmatic eruption ended in March 1998. The considerably reduced risk from residual volcanic activity and unstable deposits from the eruption to the populated areas of the island therefore allowed the Government of Montserrat and HMG to move, from mid 1998, from crisis management to concentration on rehabilitation and reconstruction. The appearance of a new lava dome in November 1999 also makes the prediction of the future course of the eruption more uncertain. These developments are too recent to allow a systematic evaluation.

1.16 The rest of the main report is as follows. Chapter 2 sets the context with a brief account of the eruption and its impacts. Chapter 3 provides an account of HMG's response. Chapters 4 to 7 assess the major aspects of HMG's response, focusing on those that have been subject to criticism, particularly by the International Development Committee. Chapter 8 considers HMG's management of the response. Chapter 9 presents the main conclusions of the study and draws lessons for emergency aid management and scientific monitoring.

1.17 Volume I, which is intended as a stand-alone document, includes in addition to the Main Report, three appendices: the ToR (Appendix A), Key events of the Montserrat volcanic emergency and a volcanological note on the eruption (Appendix B) and a List of persons contacted (Appendix C).

1.18 The eruption has affected every aspect of the life of the island and accordingly HMG's involvement has concerned most aspects of public action during the emergency. There are many stakeholders and many elements of HMG's response have received considerable attention in Parliament and the media both in the UK and the Caribbean. Consequently, the evaluation's findings and conclusions on some of

the aspects of HMG's response that have received attention, or that some stakeholders consider to be important, could only be summarised or mentioned in passing in the Main Report. Many of these are considered more fully in supporting studies included as technical annexes in Volume II. Annex 1 is a fuller account of the eruption, its environmental and demographic impacts. Annex 2 follows with a description of HMG's response. Organisational arrangements in the UK and regionally and the shifts in delegations and responsibilities between 1995 and 1998 are reviewed in Annex 3. A detailed account and assessment of the main components of HMG's response is included in Annexes 4 to 7. Scientific monitoring, advice and input into risk assessment and policy, emergency management and health are covered in Annex 4. Selected social sectors: accommodation, social assistance, and education are considered in Annex 5, and emergency investment and engineering programmes in Annex 6. The economic and financial consequences of the eruption and HMG's response are considered in Annex 7. HMG's assistance to evacuees in the Caribbean region and those relocating to the UK, which are strictly outside the scope of the evaluation, are briefly described in Annex 8. Annex 9 reports and analyses HMG's and other external assistance during the first three years of the emergency. The chronology of the emergency in Annex 10 covers volcanic events, relocations and the public actions of HMG and the GoM. Lastly, Annex 11 is a list of references.

CHAPTER 2
THE SOUFRIÈRE HILLS ERUPTION SINCE 1995 AND ITS IMPACT

2.1 Background

2.1 Montserrat is one of five Overseas Territories in the Caribbean.[4] Formerly a Crown Colony, it became effectively self-governing in 1961. During the 1970s and 1980s, the economy expanded steadily. In 1989, GDP per capita was US$ 4,000. British budgetary aid ended in 1981 and development aid focused on capital projects and technical assistance. Standards of health, housing and education were relatively high for the region, and this in turn contributed to the island's development. A banking scandal in 1989 hit the island's economy and the licences of over 90% of off-shore banks on the island were revoked. In the same year Hurricane Hugo caused very severe damage to the island, including over 90% of the buildings. Despite these major setbacks, by early 1995 Montserrat had largely recovered. An HMG-funded reconstruction programme was almost completed and the economy was in budgetary surplus. In 1994 GDP per capita had recovered to around US$ 5,000. The prospects for this relatively prosperous small island with a vibrant economy and society seemed favourable.

2.2 The eruption of the Soufrière Hills Volcano

2.2 The volcano is in the south, only 4km from the capital, Plymouth. The island's volcanic terrain and geography severely constrain on-island solutions to volcanic hazards: most infrastructure is in vulnerable locations and the small size of the island means there is no duplication of facilities. Five main phases were involved in the eruption and associated socio-economic emergency.

2.3 First, there was an extended pre-eruptive period from 1989 until July 1995, when precursors of the eruption began. The eruption which began on 18 July 1995 was not anticipated by any of the public bodies involved.

2.4 The second phase involved immediate crisis management extending through July/September 1995, when the major eruption began, ending with the return of the administration and population to Plymouth, including many who had temporarily left the island.

2.5 The third phase of the eruption, characterised as 'waiting on the volcano,' lasted from late September 1995 until June 1997. During this period, the full extent of the risk and likely impacts became only gradually apparent as the volcanic activity escalated.

2.6 The fourth phase began with the violent, destructive events from 25 June through August and September 1997. These events, involving fatalities and the partial destruction of Plymouth and associated

[4] The others are Anguilla, British Virgin Islands (BVI), Cayman Islands and Turks and Caicos Islands. These five, with Bermuda (not strictly in the Caribbean), during the period under evaluation came under the West Indies and Atlantic Department (WIAD) of the Foreign and Commonwealth Office. Since July 1998 the OTs come under a new FCO Overseas Territories Department (FCO. 1999. *Partnership for Progress and Prosperity: Britain and the Overseas Territories.* Cm 4264. London: Stationery Office).

economic facilities, resulted in a second major crisis of evacuation, resettlement and disruption of socio-economic activity. With half the island in an exclusion zone and activity effectively restricted to only 30%, the continuing viability of the island for human habitation was in doubt during this period, the only settlement possibilities being confined to the northern third of the island. There was also growing concern about the safety and health of people in the buffer Central Zone.

2.7 A fifth phase in the emergency, that of rehabilitation and reconstruction, began during the first half of 1998 and is still under way. The renewal of ascent of new magma (end October 1999) and growth of a new lava dome (early November 1999) with possibilities for further years of risk and disruption constitute a twist in the tale of the already protracted emergency. The chronology of events and responses of the various stakeholders are summarised in Appendix 2, supported by Figure 1, and described more fully in Volume II in Annexes 1 and 10.

2.3 Impacts of the volcano

a) Physical environmental

2.8 The volcanic crisis has dramatically affected the physical environment of the island. Over 60% of the land area is now in the Exclusion Zone, officially designated as unsafe for human habitation or activity. At least 25% of the Exclusion Zone of September 1998, more than 15% of the total island area, has been affected by pyroclastic flows and lahars (Figure 1). Massive ash and rock fall deposits cover most of the southern and western side of the island south of the Belham River. Formerly verdant hillsides now deeply covered in unstable ash deposits, have the aspect of dusty deserts. New fans of unstable volcanic material close to the volcano will continue to be eroded and to produce lahars that deposit material on previously affected areas. The currently abandoned Bramble Airport is on the north-eastern extremity of the area of recent flows and, unless protected by civil works, would be affected by future lahars. Effects of the eruption on the island's flora and fauna are still being assessed.

2.9 From a socio-economic perspective, the major losses have been the most suitable areas for settlement, including over 70% of the buildings. Most of the higher potential agricultural and pasture land has been lost or is cut off by pyroclastic flow deposits or lahars and made inaccessible. There has also been a loss of environmental features with amenity value. Human settlement is now spread through ribbon development around the north of the island with a few public housing estates, whereas previously it was concentrated in Plymouth and the southwest.

2.10 There is also continuing uncertainty, underlined by the appearance of the new lava dome in November 1999. Dangerous pyroclastic flows will continue to occur for several years, as well as groundwater steam and magmatic gas explosions. The period for vegetative regeneration is estimated to be 10–20 years, once ash deposition and lahars have ended. The time for safe access to the least affected areas in the current Exclusion Zone will also depend on the pattern of rapid post-eruptive erosion, including the high risks of relatively catastrophic lahars that will be associated with intense tropical rainstorms.

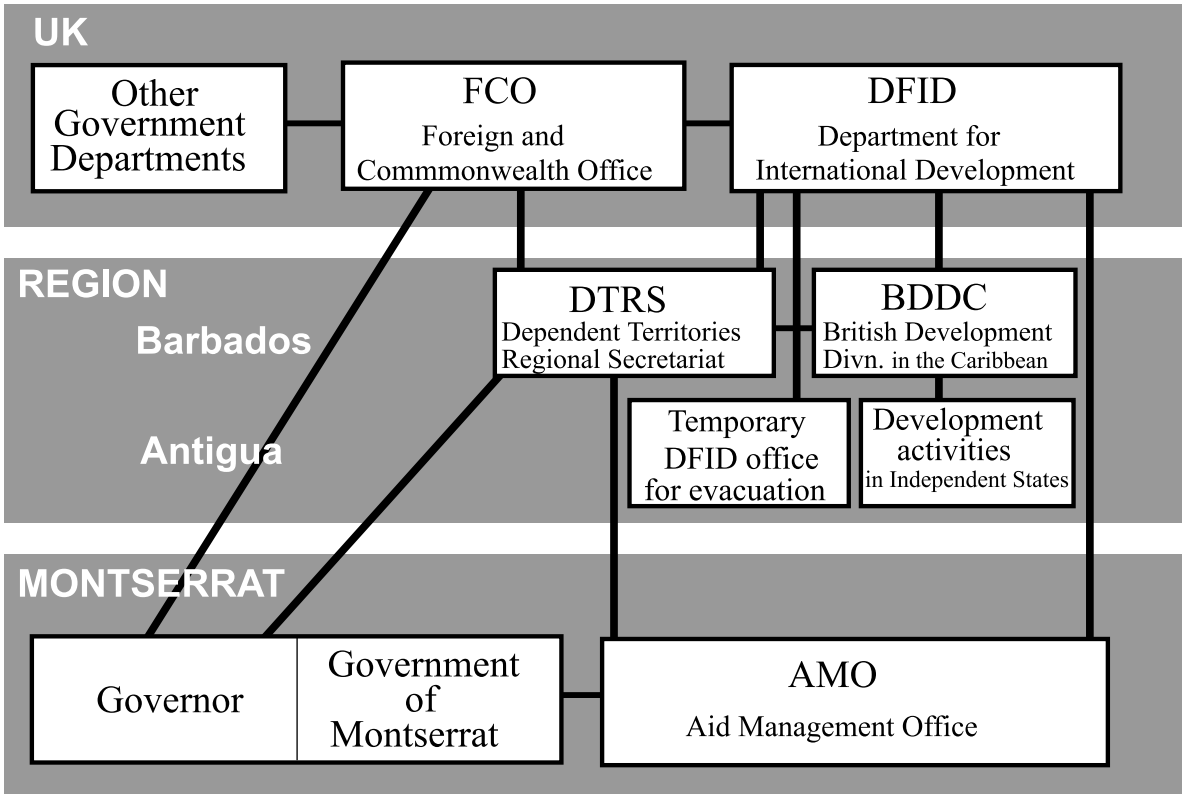
b) Demographic

2.11 The socio-demographic effects of the eruption have been massive. The country has been fragmented by migration and relocation, and community and household structures have broken down. Demographic information for the period of the crisis has been difficult to obtain: the available figures are incomplete and include some estimates. What they show is that by late 1997 to early 1998, two-thirds of the pre-eruption population of over 10,000 had left the island. Some 35% had migrated to the UK and about 25% were in the Caribbean region. Three quarters of those remaining on-island had also relocated at least once, 20% were sharing accommodation as hosts or guests, and 18% were in public shelters. This means that since July 1995 around 90% of the pre-crisis population have had to move from their original residence. Subsequently during 1998-99 returnees have increased the population to around 4,500.

c) Economic

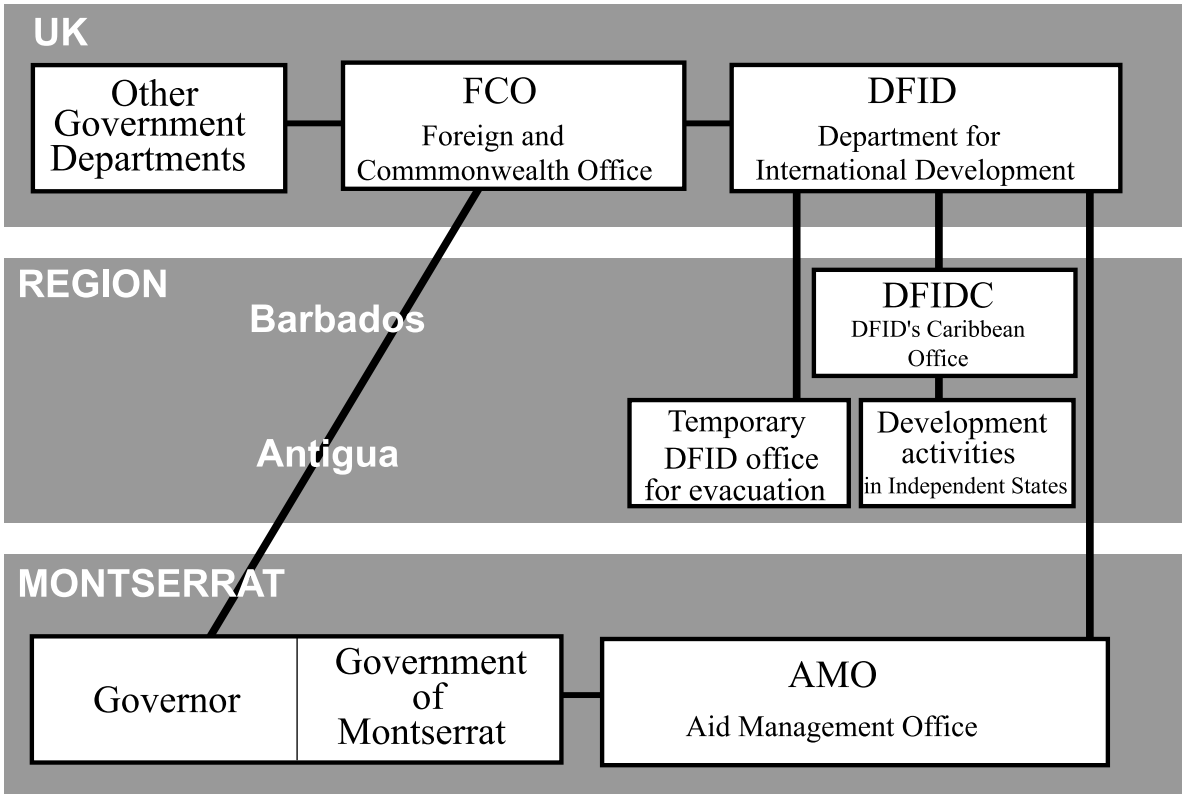
2.12 The volcanic crisis has had a devastating economic impact (considered in more detail in Annex 7). Most of the island's administrative, commercial and industrial facilities as well as much of its infrastructure (including tourism) and prime agricultural land have been destroyed or are inaccessible in the short to medium term. The Sustainable Development Plan (SDP) estimates total damage to buildings alone at around £40m. The GoM's work to determine the scale of total losses is incomplete: unofficial insurance industry sources put it as high as £1bn. Many firms have been forced to close and the real estate market has collapsed. Reflecting these impacts, real GDP fell by 44% between 1994 and 1997. Problems have been exacerbated by the impact of the crisis on the financial sector. Most of the insurance industry withdrew cover at the height of the crisis in August 1997, leaving homeowners and businesses to bear a considerable share of losses. There were major implications too for the availability of new lending and the viability of financial institutions themselves. The Montserrat Building Society (MBS), which had accounted for approximately 90% of mortgages on the island and a high proportion of savings, collapsed. This in turn undermined people's capacity to cope without public support – both housing and other needs - and has had multiplier impacts throughout the economy. There is a pervasive problem of negative equity. Losses at individual level have caused considerable psychological distress and related health problems. The distribution of impacts has been very unequal. No formal assessment has been made of relative impacts but, on balance, the poorer segments of society appear to have fared particularly badly. The economy will not be viable in either the short or medium term without large-scale subventions.

Figure 3 Montserrat Volcanic Emergency: HMG Management Structure



derived from IDC 1997, p.37

a. Management Structure, June/July 1997



b. Management Structure, October 1998

CHAPTER 3
HMG'S RESPONSE: JULY 1995 – OCTOBER 1998

3.1 Introduction

3.1 To assess the response to the emergency by HMG and by other key bodies, it is important to understand the arrangements for administration and disaster response in place when the eruption began and how these developed and changed over the period since 1995. Annex 3 describes more fully the organisational arrangements in the UK, regionally and in Montserrat, and the shifts in delegations and responsibilities, particularly between 1995 and 1998.

3.2 The elected GoM was responsible for most normal areas of Government activity in Montserrat. The Governor had responsibility for external affairs, defence, law and order, the public service and, since the financial crisis of 1989, international financial regulation. Disaster preparedness was the responsibility of the Chief Minister. The Governor helped to fund the 1995 National Disaster Action Plan, which envisaged that the Governor would take the lead in an emergency in directing the National Emergency Organisation and supervising the Emergency Operations Centre.

3.3 The FCO had primary responsibility for the administration of the then Dependent, now Overseas Territories (OTs). The Governor of Montserrat was responsible to the West Indies and Atlantic Department (WIAD). Supervision and advice on external affairs, civil order and financial matters for the Caribbean Dependent Territories had been delegated to the Dependent Territories Regional Secretariat (DTRS), based in Barbados (see Figure 3).

3.4 The Overseas Development Administration (ODA) (since May 1997 the separate DFID) was in 1995 part of FCO but with its own budget and administrative structure. Within ODA the British Development Division for the Caribbean (BDDC) was responsible for the provision of development cooperation in the Caribbean. The heads of BDDC and DTRS had, in effect, dual key arrangements for commitment and approval of development aid.

3.5 ODA's Emergency Aid Department (EMAD) was responsible for approval and supervision of ODA's response to rapid onset disasters. EMAD assistance would normally be for a maximum of 6 months. Projects lasting beyond 6 months would be the responsibility of BDDC.

3.6 The complexity of this set of institutional arrangements implied some unclear areas of responsibility and a fragmentation of authority. There was no contingency planning on how the FCO and the then ODA would manage an emergency in an OT in circumstances which raise difficult issues of governance and risk management as well as all the detailed practicalities of emergency response. Ad hoc arrangements had to be put in place and this was done reactively as the eruption progressed. There were 4 closely related stages in HMG's response.

3.2 Initial crisis: July - September 1995

3.7 HMG's crisis response, as coordinated on-island by the Governor, in contingency planning by MOD personnel and in assistance by ODA, were prompt and appropriate to the highly uncertain situation (Annex 2, paras 2.3.5-16).

3.8 The Emergency Operations Centre (EOC) was quickly activated. Work focused on key areas of scientific assessment of risks, and planning for the evacuation and support of people moved from their homes. Within days the scientific monitoring and assessment capability on-island had been increased but opinion among scientists ranged widely from scepticism about the risk of a major eruption to concern that a full explosive eruption might happen within weeks. In these circumstances, officials planned for worst case scenarios requiring evacuation - at least temporarily - to the north and possibly off-island.

3.9 The Governor established a regular framework for consultation and decision-making, involving weekly consultations with the Chief Minister and visiting senior scientists. The Governor also initiated an immediate Evacuation Plan exercise, with the involvement of MOD personnel in the region following military exercises. Accommodation would be in public buildings and in tents. US tents and bedding were airlifted in and emergency rations stockpiled. Plans were made for emergency hospital facilities. Other requirements were identified by the military and arrangements for providing them set in train. EMAD in London played a key role in guaranteeing the funding. Over 6000 people were temporarily evacuated in July-August and returned to their homes in early September.

3.10 The crisis was successfully weathered, albeit with specific problems that reflected the lack of preparedness. Temporary evacuation – on and off island – had gone smoothly. Montserratians had themselves contributed considerably to easing the situation by their own voluntary movement off-island.

3.3 Waiting on the volcano: September 1995 - June 1997

3.11 During this period the volcanic situation deteriorated but the pattern was one of periods of intense volcanic activity followed by quieter phases. The perspectives of scientists, Montserrat politicians, officials and people were often inconsistent and changing. Right up to the catastrophe of June 1997 many Montserratians assumed or hoped for a rapid return to life centred on Plymouth. Up to the end of 1996, successive Chief Ministers and other elected Members of LegCo were concerned to avoid actions that might damage business expectations and so jeopardise the possibility of a rapid return to normality. British officials more quickly abandoned expectations of a return to normality. As early as September 1995, the Governor was the first to propose improving infrastructure in the north. From April 1996, when Plymouth and most of the south of the island was again evacuated, British officials did not expect reoccupation of the evacuated zone in the foreseeable future. The responsibility of HMG

officials in DTRS and London was to prepare for a worst-case scenario, which might involve evacuation from the whole island. But this role tended to make it seem less worthwhile to invest in anything other than the most immediate emergency facilities and to reinforce, some argued, the case for waiting and reacting to events.

3.12 Scientific monitoring and risk assessment capacity on the island was stepped up during this period, but this was done in an ad hoc way, with funding initially on a short-term basis.

3.13 The third evacuation of Plymouth and the south in April 1996 involved the relocation of 7,000 people. This highlighted the need for a programme to address immediate social needs and infrastructure improvement in the north of the island. Under a Voluntary Evacuation Scheme agreed in April, with the aim of relieving pressure on limited accommodation in the north, Montserratians who made their own way to the UK could stay for two years. A £25m aid package over 2 years was announced in August. By June 1997, very basic health, shelter and social assistance were provided to evacuees. HMG had also begun to fund, albeit slowly, infrastructure - jetty, roads, water, electricity, hospital - necessary to permit a substantial part of the population to live temporarily in the north. However, housing needs were not effectively addressed and no assistance was provided to those leaving the island. The strengthening of FCO and ODA's emergency management capacity on-island also proceeded slowly (see paras 8.2-8.4).

3.4 Volcanic crisis: June - September 1997

3.14 On 25 June, large pyroclastic flows led to the deaths of 19 people in exclusion zones and the zone of exclusion was extended (and its definition simplified), putting greater pressure on remaining facilities in the north. The airport and Plymouth port were closed. Emergency ferry and helicopter services were financed by DFID. Search and rescue helicopter operations were involved.

3.15 In London a special Task Force under DFID chairmanship was formed to co-ordinate responses to the crisis, with the Secretary of State for International Development taking the lead in reviewing the situation. HMG adopted the lower risk strategy of supporting those wishing to remain on-island and assisting temporary settlement in the UK and within the Caribbean region. A £6.5m emergency housing scheme was announced in July 1997 to provide homes for up to 1,000 people in the north.

3.16 Further intense volcanic activity in July and August destroyed part of Plymouth and caused a further extension of the Exclusion Zone. This, together with growing concern about the health situation in the buffer 'Central Zone', which included most of the remaining villa and potential office accommodation, brought the crisis to a head. DFID prepared a programme for assisted evacuation to the UK, consulting other UK government departments. It also offered assistance to evacuees elsewhere in the Caribbean. A full reassessment of the health situation, to be validated by the involvement of the Chief Medical Officer (England and Wales), was also agreed.

3.17 In August the three insurance companies announced the withdrawal or non-renewal of cover, the Montserrat Building Society suspended operations, and Barclays Bank ceased on-island operations. The continuing viability of an on-island population became in doubt because of direct pressures on accommodation, uncertainties over schooling, especially at secondary level, and the collapse of the private financial sector. For many, the choice was between assisted relocation to the UK or remaining in Montserrat but dependent on relief or facing very high living costs, indebtedness for destroyed or inaccessible assets, and no insurance or job security.

3.18 There was an unequivocal commitment on the part of HMG to sustain as long as was reasonably safe the option of people remaining on-island. In September 1997 a crisis programme of actions to support occupation in the north and for subsequent reconstruction was agreed between GoM and HMG, and included:

- Emergency investment and technical co-operation to ensure maintenance of essential facilities, including healthcare, education, utilities, and communications.
- Accelerated action on construction, including an immediate housing programme, upgrading the hospital at St John's and the construction of new temporary Government HQ.
- A soft mortgage scheme to be launched by December 1997 for those wishing to construct homes and for small-scale enterprise development.
- Re-establishing a fixed-wing air link.
- Joint preparation within 6 months of a Sustainable Development Plan (SDP) for infrastructure and community needs to be implemented jointly over 5 years.

3.19 These actions and the contractual arrangements for implementation have formed the basis of much subsequent HMG assistance. There were also significant improvements in management and the use of scientific advice.

3.5 Moving from emergency to reconstruction and sustainable development

3.20 Since the crisis action plan was agreed in September 1997 there has been a gradual shift from emergency measures to a more systematic plan of reconstruction focused on a safer northern zone.

3.21 The precise point at which the balance of HMG's efforts shifted from crisis management to rehabilitation is difficult to pinpoint. The December 1997 scientific assessment only indicated that it was sufficiently safe to continue to occupy the north. In July 1998 the scientific assessment confirming that magmatic eruption had halted and DFID's commitment of £75m funding over 3 years, in June, indicate that this threshold had been crossed by then. DFID and then FCO established simpler direct administrative arrangements for Montserrat and subsequently for the other Overseas Territories. EMAD phased out its involvement in Montserrat by early 1998. However, DFID continued in a crisis management mode effectively for the whole of 1998 through the centralisation of funding decisions in

London with ministerial approval of levels of spending that had previously been delegated to its Montserrat office. The Sustainable Development Plan (SDP) was broadly completed by July 1998 and jointly accepted in November. A Country Policy Plan (CPP) for 1998-2001 was formally signed in January 1999. Measures to support the settlement of Montserratians in the UK became normalised and the interdepartmental Montserrat Action Group, established in August 1997 and chaired at Ministerial level from November 1997, stopped meeting in November 1998. The start of reconstruction is too recent to be evaluated except as a process.

3.6 Resources

3.22 Up to March 1998, DFID had spent £59m in emergency-related aid, of which around £53m was additional expenditure, allowing for previous aid projections. In July 1998 DFID committed an additional £75m up to 2001. (Annex 9 provides a detailed breakdown of DFID spending on Montserrat.) Projected HMG expenditure will be at least £160m over six years, taking into account additional expenditure in the UK on relocating Montserratians. That is equivalent to £2600 per person a year, based on a pre-eruption population of 10,000 or over 80% of the 1994 GDP per capita. For a comparison with these considerable sums, the loss of GDP by 1997 was over 40% and the likely total capital loss, including real estate, is estimated as up to £1bn, most of it only partially recoverable or uninsured.

3.23 There was a considerable increase in HMG expenditure as the crisis escalated: some £30m. was spent in the first 23 months up to June 1997 and a further £40 m. in the following 16 months with subsequent planned expenditure of c£25m. a year. In 1997/98, Montserrat was the sixth largest recipient of DFID bilateral assistance. Such a substantial cost was to be expected because of HMG's responsibility in light of a small OT being unable to insure or make provision against such an extreme loss and the associated social assistance. Because of Montserrat's OT status, non-British external assistance has also been extremely low relative to the scale of the crisis. The pattern of expenditure has also changed through the crisis from largely emergency aid (two-thirds in 1995/6 but less than 10% in 1998/9) to budgetary assistance and, especially since 1997/8, development project aid to replace infrastructure and fund reconstruction.

3.7 The components of HMG's response

3.24 Since 1995 HMG's response has concerned almost every aspect of Montserrat's social and economic life and administration. As well as FCO, DFID as the primary source of financial assistance has been particularly closely involved. The Ministry of Defence and most other government departments have also contributed to aspects of the response, on and off-island. The evaluation has looked particularly at the effectiveness and efficiency of certain key aspects of the response as follows:

- Disaster-preparedness for the volcanic emergency prior to the eruption and scientific monitoring and risk assessment (Chapter 4).

- Actions to protect lives and safeguard pubic health (Chapter 4).
- The provision of accommodation, food vouchers and education (Chapter 5).
- Selected emergency engineering and investment projects (Chapter 6).
- Measures to sustain and revive the private sector and address problems of financial regulation (Chapter 7).

CHAPTER 4
RISK MANAGEMENT: SCIENTIFIC MONITORING AND PROTECTING LIVES AND HEALTH

4.1 A reactive strategy

4.1 From July 1995 when the eruption began, the strategy adopted on Montserrat was to react to changing risk levels as they were identified. This is in contrast to immediate withdrawal to areas likely to be safe except in the case of an extreme cataclysmic event (the strategy adopted on Guadeloupe in 1976). Only when full-scale evacuation to the north became unavoidable from July 1997 onward did complete withdrawal happen. HMG's policy was that people would be supported in continuing to occupy the island as long as there was a viable safe area. This accorded with the determination of most of the population to remain on-island and of their political representatives to continue their pre-emergency lives as normally as possible.

4.2 This reactive strategy places enormous importance on scientific monitoring and risk assessment and it imposes special problems in emergency planning, preparedness for evacuation and other associated measures that would be necessary in cases of more extreme eruptions or with complete withdrawal. This chapter considers HMG's response in terms of disaster preparedness, risk assessment, emergency planning operations and public health. Annex 4 provides more detail on scientific monitoring, advice and input into risk assessment and policy. It also describes the main scientific bodies involved: the Seismic Research Unit (SRU), the Montserrat Volcano Observatory (MVO) and the British Geological Survey (International) (BGS(I)).

4.2 Disaster preparedness

4.3 The procedures in place in 1995 were not adequate to ensure that any increasing volcanic risk would be sufficiently well anticipated and then effectively monitored.

- Until the first eruptions in 1995, the SRU's monitoring was limited in scope and follow-up analysis. SRU was insufficiently proactive in advising the Government of possible, and then likely, increased volcanic risk between 1989 and 1995.
- The Wadge and Isaacs Report, commissioned by the Pan Caribbean Disaster Preparedness and Prevention Project (CDPPP), which highlighted the risks to Plymouth, made no impact on authorities responsible for disaster preparedness or scientific monitoring for Montserrat.[5]
- The Disaster Action Plan prepared with FCO funding following Hurricane Hugo, had virtually no scientific input and effectively ignored volcanic hazard.

[5] Wadge, G. and Isaacs, M.C. 1987. *Volcanic Hazards from the Soufrière Hills Volcano, Montserrat West Indies.* A Report to the Government of Montserrat and the Pan Caribbean Disaster Preparedness and Prevention Project. Reading: Department of Geography, University of Reading.

4.4 There is no simple explanation for this lack of preparedness. Hurricanes were a frequent and more immediate threat in the region. Seismic monitoring and volcanic preparedness appear to have had a relatively low priority. Prior to the eruption, disaster preparedness was largely an activity within the Chief Minister's Office. The effects of a volcanic eruption were potentially so serious economically and socially that those in elected public office on Montserrat were prepared to ignore some of the implications until it became impossible to do so. The failure of FCO and ODA and their regional divisions in volcanic preparedness had three sources:

- lack of channels for ensuring relevant scientific information (such as the Wadge and Isaacs study) would be taken into account;
- no-one had substantial separate responsibility for all aspects of disaster preparedness;
- the culture of the regional divisions of FCO and ODA (BDDC and DTRS) was to be responsive to proposals from regional bodies; but regional bodies were giving inadequate funding priority to volcanic hazard preparedness. Millenium

4.3 Scientific monitoring and risk assessment

4.5 The slow build-up of volcanic activity exacerbated the position over time. Risk situations evolved which would have been unacceptable had they developed at the outset; the slow build-up led some people to expect more in the way of precise timing predictions than was possible and long periods of slowly escalating, or apparently minor, activity led some Montserratians to ignore advice/instructions (leading in one instance to the tragic deaths of 25 June 1997).

4.6 The SRU had a mandate to maintain a volcano surveillance and early warning system for Eastern Caribbean islands. It reacted immediately to the initial eruption in July and, within its limited human and technical resources, engaged in intensified monitoring and risk assessment. Senior SRU scientists continued to play an important role in directing and staffing the Montserrat Volcano Observatory (MVO) but, from early on, SRU became progressively displaced as the main effective monitoring and assessment body, first by the United States Geological Survey (USGS), and then by UK agencies which became increasingly involved.

4.7 The MVO has played a key role in the emergency, evolving from a loose association of scientists and volcanologists in July 1995 to an organisation with a management structure and formalised procedures by autumn 1996, and in 1999 into as a statutory body of GoM. The BGS(I) has managed DFID - funded monitoring during the emergency, initially under a range of small contracts and later under a two-year contract. The involvement of scientists from British universities was crucial for supplementing the expertise provided by SRU and BGS(I). With leading scientists from many other countries, UK scientists evolved and enhanced capability at MVO to anticipate developments of the volcano and so to mitigate risks and protect life.

4.8 It is a common misconception that the job of scientists at the MVO was to predict the timing of volcanic events. The central process was to use scientific monitoring and understanding to anticipate activity and areas of potential impact, and then, using risk assessment techniques, to make recommendations to mitigate risks. The monitoring team developed new procedures for deriving the best scientific judgements and then translating these into communicable risk assessments, alert levels and risk zone maps. Monitoring included visual observation involving daily helicopter flights. Occasionally satellite data was available and provided valuable supplementary information.

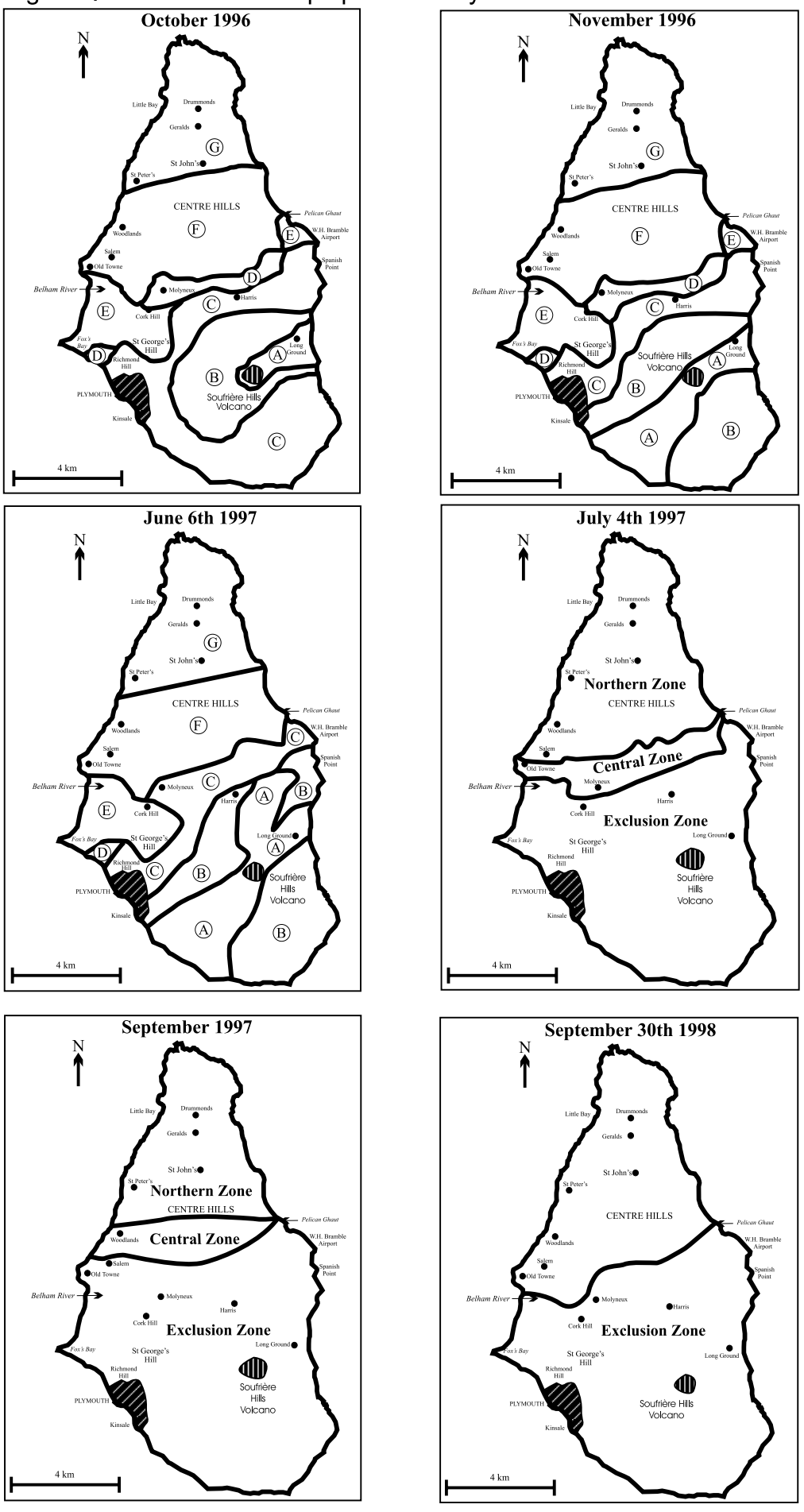
4.9 A micro-zonation system (Figure 4-page 28) was developed and proved successful in late 1996 and early 1997 in keeping risk zones as narrow and precisely located as possible. The zoning maps, which involved trade-offs between risk and short term socio-economic advantages, were changed frequently in response to changing circumstances. After the fatalities of June 1997, the escalation in volcanic activity threatened a wider area. The zone maps, which were relatively difficult to communicate and enforce, were therefore replaced by a simple tripartite division of the island into an Exclusion Zone, a safe zone, and an intervening Central "buffer" Zone.

4.10 In July-August 1997 MVO scientists organised the first informal wider elicitation process which resulted in the assessment on 14 August which indicated the risks of continuing to occupy Salem. Meanwhile between July – December 1997, HMG was also re-examining the ways in which scientific advice was provided. In December 1997 the first of a series of formal jointly prepared six-monthly scientific assessments was produced. These would in future be a major input to policy decisions.

4.11 The Chief Medical Officer (England and Wales) and HMG's Chief Scientific Adviser (CSA) were also involved in reviewing advice. Both CSA and CMO endorsed advice that the level of volcanic risk was low enough to allow continued occupation of the north, but because of the health risk from ash they recommended in the strongest terms that everyone, especially children and asthmatics, should leave the Central Zone (Figure 4). The authorities' approach was to tell people what the risks were and leave them to make their own decisions about whether to leave the central zone. All residents were made aware of the volcanic hazard and health risks and provided with advice on minimising health risks on a day-to-day basis. The choice between using emergency regulations to exclude people or giving them advice on safety and health risks was closely linked to the slow pace in making adequate and timely provision of housing and other facilities in the north.

4.12 Several MVO Chief scientists have commented that they repeatedly signalled to HMG agencies the need to strengthen monitoring and assessment capability but without result. Procrastination by HMG agencies was perceived but, in terms of senior scientific personnel, there were real problems of people simply not being available. It is surprising that DFID on Montserrat was not actively engaged in monitoring the Observatory and its needs. The long delay in processing the BGS(I) two-year contract was also unhelpful, but mitigated by good day-to-day relationships. DFID did meet the costs of the Observatory (about £2.6m.) and the costs of the helicopter (£1.2m.). Monitoring was not constrained by the setting of financial limits but short term contracting in the initial stages presented problems of management for BGS(I). MVO did and is doing a commendable job for Montserrat and HMG in informing its analyses of risk.

Figure 4 Selected risk maps produced by MVO



Risk decreases from A to G (earlier maps) and advice related to each area changes according to contemporary Alert Stage.

4.13 Scientists also played a crucial, if initially reluctant, role in public information. In the phase July – September 1995, there was criticism of the lack of information on the eruption and its implications, which increased uncertainty and made it more difficult for people to plan how to respond. From October 1995, scientists were encouraged to be directly involved in public information and to encourage relocation they began to provide reports on radio and TV and to speak at public meetings and meetings with groups of people living in dangerous areas . This public information activity has probably contributed directly to saving lives and creating a calm social situation, despite the emergency.

4.4 Building science into emergency policy

4.14 The Office of Science and Technology guidelines on the use of scientific advice in policy suggest that:

'Once a potentially sensitive issue has been identified, departments should consider how to access the best available scientific advice. They should ensure that they draw on a sufficiently wide range of the best expert sources within and outside government.' (OST, 1998:p11 – see footnote 3)

4.15 Prior to the eruption the head of SRU advised only GoM's Chief Minister, with HMG indirectly involved. This was inappropriate. Once the potentially extreme risk was recognised, HMG progressively availed itself of the best scientific advice from within and outside government, and supported the development of the MVO to provide adequate monitoring and as a centre for complementary research. However, arrangements were *ad hoc* and short-term until BSG(I) was given a 2-year contract in September 1997. HMG has also brought together a sufficiently wide range of expert advice including the CMO and the CSA and has organised this through periodic formal elicitation meetings to provide a clearer and consistent basis for policy making.

4.5 Protecting lives: emergency planning and operations

4.16 The Emergency Department (ED), formerly the Emergency Operations Centre (EOC) has been the key institution in Montserrat managing the response to the volcanic eruption, with a key role in relief coordination – managing evacuation, supplies and the requisitioning of buildings, the administration of shelters and the distribution of emergency supplies. EMAD funded emergency supplies and equipment and provided technical support – largely successfully, though there were, inevitably in a crisis of this kind, some poor decisions. By August/September 1997, ED had 57 staff although only 4 of them were key professionals. The police and the Montserrat Defence Force (MDF) also had crucial roles in emergency operations. The police were involved in warning of and assisting in organising evacuations, and in manning check posts around the exclusion zone. The MDF supported the police operations, and helped in the construction of wooden buildings as shelters and temporary schools.

4.17 Vulnerability analysis, looking at which areas and buildings were at risk, and identifying which people were at risk and ought to go into shelters, has been difficult. MVO provided spatial vulnerability information that was initially too complex for the administration to use to best effect. And there were issues about whether politicians and groups would accept the implications of the advice being offered about risks. On the whole the interface between MVO and GoM was reasonably successful. However, with the benefit of hindsight, some decisions were over-optimistic with regard to the possibilities of continuing safe occupation of Plymouth and important facilities including the airport, and health risks in the Central Zone.

4.18 The first emergency plan was prepared within 11 days of the emergency, with the help of British military personnel in the area. This plan provided the basis for the programme of supplies and site preparation that made possible the first successful evacuation and identified the emergency investments that would be required in the event of further relocations. Further plans both for on-island and off-island evacuation were prepared involving other Caribbean islands. Emergency planning was strengthened by contracting the Emergency Logistics Management Team (ELMT) in 1996 to provide continued support.

4.19 Scientists believe they should have had a more substantial and formal input to contingency planning in the period up to June 1997 than was the case, a view endorsed by this evaluation. In the case of the airport in May-June 1997, for example, MVO scientists had warned that there was a serious risk involved in maintaining airport facilities. In the worst case scenario, the time available between onset of a catastrophic event and likely impact on the airport could have been as little as 90 seconds. When the authorities decided to keep it open, scientists and airport staff felt bound to assist. MVO personnel were stationed at the airport to provide confirmation of immediate safety. On 25 June 1997, the pyroclastic flow reached within 100 metres of the airport and everyone was evacuated safely (Figure 2-page vi). But it was only a late minor physical change at the summit of the volcano, which, perhaps fortuitously, caused the flow to follow a longer and less direct route.

4.20 The GoM and HMG were not at all prepared for the communications and public information roles that managing the emergency would necessitate. There is scope for learning from this experience, in other OTs and elsewhere in the region in both contingency planning and disaster response. Those responsible for managing the emergency were untrained and inexperienced in what was required in terms of types of communication and skills. The efforts made by EOC/ED to learn during the emergency are impressive. Through radio, community meetings, small informal discussions, simulation exercises and a monthly newsletter, all residents were informed of risks and almost all of them were persuaded to accept relocation as necessary despite the immediate high personal costs. The commitment, at an individual level, of ED/EOC, Police and MDF was also impressive.

4.21 Perhaps the most controversial aspect of the emergency has been the provision of accommodation for those evacuated. The scale and unpredictability of the emergency required the commandeering of churches, schools and other public facilities for emergency accommodation – with important

implications for education. Progress in enabling people to leave temporary shelters has been slow and raises questions about the effectiveness of the emergency housing programme.

4.6 Safeguarding public health

4.22 Health service management, prior to the crisis was essentially a GoM responsibility, with ODA providing limited technical support and substantial capital investment. People enjoyed a relatively high standard of health care and services. As HMG became progressively more involved because of the emergency, ODA advisers came to play a more important role, and the effective demarcation of responsibilities between them and GoM grew increasingly unclear. From early in the emergency HMG brought in specialist advice on volcanic health issues. Later, in September 1997, the CMO led a review on the health implications of the eruption. These specialists, interacting with DFID advisers, played an important role in shaping the response in terms of protecting lives and ensuring health. However, owing to the paucity of relevant data, there remains uncertainty regarding the long-term health effects of inhalation of fine ash.

4.23 Following early ash falls on Plymouth the hospital was transferred to temporary premises at St John's School. A continuing area of disagreement between GoM and HMG has been about the level of facilities to be provided at either an upgraded or new hospital. There were also differences of view within HMG on the latter issue and related problems of coordination. The PUSS (FCO) announced support for a new hospital in mid-June 1997, when DFID had already decided to support only upgrading.

4.24 Throughout 1996/97 conditions at the St John temporary hospital were very unsatisfactory. From August 1997, the conversion of St John's into a permanent facility began promptly. But the delay in its basic upgrading was unsatisfactory. With the benefit of hindsight it is obvious that a new hospital would have taken so long to complete that the initial priority should have continued to be the rapid upgrading of conditions at the St John's site. The success of protective and health safeguarding measures during the emergency can be attributed to the:

- timely evacuation of the population away from the immediate physical, and potentially lethal, volcanic hazard
- emigration and evacuation of a large proportion of the population off-island
- high level of social order shown by the shelter population
- comparatively good infrastructure established in the north of the island.
- dedication of health personnel.

4.25 The measures taken by HMG, the GoM and the Public Health Officer with respect to the health needs of the population were, in general, timely and appropriate and contributed to a good outcome. Communicable disease surveillance was promptly initiated. Accessible primary and secondary health services, including off-island evacuation, were maintained throughout the crisis, and steps were taken to investigate the possible hazard from ash, gas and volcanic emissions, and to protect the population from

their effects. Primary health care services were expanded and developed, in step with the changing needs of the displaced shelter population. The requirements of special needs cases were largely met through primary care and off-island evacuation. Coverage was generally good, with limited exceptions.

4.26 In technical terms, HMG's response was delayed or otherwise unsatisfactory in three areas:

- a delay of approximately 6 months in upgrading the temporary facilities at the St John's hospital which exposed patients and staff to very inadequate conditions. Although there was no incident leading to an adverse outcome, facilities fell below the people's reasonable expectations and contributed to difficulties in retaining health staff.
- limited delays in establishing a clear system for providing public advice and protection against the health risk from ash.
- a failure to make adequate provision for the health of psychiatric cases.

4.27 The continuing problem of exposure of the population to ash, in particular in Salem and other reoccupied areas, may need further action by DFID and the GoM in public education. Finally, there is the challenge of reorganising the health system to take account of the reduced population and the changed pattern of health needs.

4.28 The reasons for the delays and omissions are to be found in the complexities of HMG's management system and the system of GoM, as discussed in Chapter 8.

CHAPTER 5
SOCIAL SECTORS: ACCOMMODATION, FOOD VOUCHERS AND EDUCATION

5.1 Accommodation

5.1 The relocation of nine-tenths of Montserrat's pre-eruption population, and three-quarters of those still on the island, created severe socio-economic problems: most obviously the need to accommodate and provide social assistance for those who had lost their homes, their livelihoods, their savings, and were struggling to survive and sustain a community and a way of life. Accommodation is generally recognised as the central social issue, because of the unacceptability of people continuing to live in temporary public shelters.

5.2 Three issues are highlighted in the International Development Committee's first report and have been the subject of much concern. First, the conditions and length of time that people have had to endure living in public shelters have been regarded as unacceptable in terms of British and industrial country standards of social well-being. Second, the provision of public housing is considered to have moved too slowly and to have been inappropriate to the needs of the people being re-housed. Third, there is the alleged inadequacy and slowness of actions to facilitate and support 'self-building' or private housing development in the safer northern zone.

5.3 The evaluation's investigations broadly confirm the findings and conclusions of the Select Committee for the period up to September 1997. It explores two further aspects that have current and future policy relevance. First, there is the problem of providing appropriate, immediate, temporary shelter during a natural disaster. Second, this chapter and, from a civil engineering perspective, Chapter 6, examine the performance of the direct-build housing programme and measures to support private housing initiatives, since these were jointly confirmed as priorities in September 1997. There is a fuller assessment of these accommodation issues in Annex 5, Sections 2-4.

5.2 Public shelter for displaced people

5.4 The first large evacuation of Plymouth involved emergency shelters in public buildings – schools and churches – and encouraging people to make private arrangements. However, because of the numbers involved, tents were also provided in a temporary encampment at Gerald's Park. Tents are not particularly appropriate for civilian evacuees in humid tropical environments but the scale and speed of the evacuation and GoM's refusal to consider off-island accommodation seem to have precluded any alternative in August 1995. Most of the tents were flown in from US second-hand stockpiles in the Cayman Islands and proved to be unsatisfactory, suggesting that attempts to cut costs prevailed over a need to ensure adequate standards. Sanitation was provided by pit latrines. At that initial stage, there

was little appreciation that longer-term relocation might be necessary, and that this would require different, higher standard temporary shelter including the provision of sanitation, public utilities and access.

5.5 After the first temporary evacuation of Plymouth, the need to provide more substantial shelter was accepted. Progress however, was slow, partly because of differences of opinion on appropriate temporary shelters, and little was achieved before the second evacuation of Plymouth in December 1995.

5.6 At the time of the second Plymouth evacuation, the Public Works Department (PWD) proposed demountable timber 'chalets' accommodating about 20 people, which could be built by the MDF using readily available materials at a unit cost of under £7,000 and within 5 days. Initially these were rejected by the Chief Minister as 'not good enough for Montserratians'. In fact they were the most cost-effective and flexible temporary shelter solution on the basis of costing comparisons. Later this type of building was used extensively as barracks, classrooms and, with modifications, dormitory accommodation. A project to provide aluminium shelters was approved on the basis of unrealistic costings and involved unsatisfactory contracting practice and supply chains. They turned out to be inflexible and very hot. This undermined HMG's confidence in GoM's capacity to act efficiently in emergency off-island procurement.

5.7 The public shelter programme was basically successful in providing everyone with immediate shelter, but was unsatisfactory in providing for more extended occupation. Between September 1995 and April 1996, GoM bears considerable responsibility for the failure to prepare quickly and adequately against the eventuality of further mass evacuations. The lack of agreement on technical choices reflects a fragmentation of responsibility. Tents and plastic-covered frame structures, as well as metal shell shelters, were imposed solutions. The attempt to combine immediate emergency and longer-term uses succeeded only in compromising the emergency need for timely, flexible-use buildings. Finally, the failure to agree on an immediate programme for the longer term, condemned many of those wishing to remain on, or unable to leave, the island to what were, by local or British standards, wholly unacceptable living conditions. There were still 427 people in 22 temporary shelters in October 1998, and even a year later there were still 322 people resident in shelters.

5.3 Emergency housing

5.8 The International Development Committee wrote critically in October 1997 that 'confusion plaguing the delivery of aid' was evident in the provision of emergency housing. It went on to ask:

'With the resources and expertise at the disposal of the United Kingdom Government, we must ask why, nearly two and a half years after the eruption began, there is not a single person in emergency housing.' (IDC, 1997: para 50 – see footnote 1)

5.9 This evaluation supports the findings of the IDC on the reasons for the delay in providing emergency housing prior to July 1997. In autumn 1995, only the Governor took a lead in proposing an Emergency Housing Programme in the north. At the time the GoM did not regard housing provision in the north as a priority, preferring to develop Salem as a temporary centre for administration and commerce. Following the third and final evacuation of Plymouth in April 1996, HMG began to favour a public housing initiative. But GoM did not seek UK assistance for this as part of the £25m aid package agreed in August 1996, hoping to secure housing from other aid sources. In fact very limited help came from other sources and in November 1996 the new GoM requested HMG support for housing and an initiative to fund a land bank to make land available for development in the north. HMG argued for an immediate housing initiative for 50 houses on Crown land close to Little Bay. GoM preferred HMG to fund compulsory acquisition of land so that the Crown land could remain available for future commercial development and an administrative centre. The matter remained unresolved in June 1997. The acquisition and availability of land for direct-build housing has remained a constraint.

5.10 Between July and September 1997, HMG took the initiative in proceeding with a £6.5m direct-build "Immediate" Housing Programme to provide 250 houses (see paras 6.3-6.7). The programme was subsequently increased to 255 houses as well as providing land and infrastructure for 30 houses to be funded by CARICOM. An additional £1.5m was earmarked to support a self-build housing scheme of 200 new and 31 completed or repaired houses. In September a commitment was made to a Soft Mortgage Scheme to fund construction of 65 houses to be launched before the end of 1997 (see para 7.14). There was also provision for 3 homes for the elderly to accommodate over 150 individuals.

5.11 Progress in implementing key aspects of the highest priority housing has continued to be slow since the IDC's first report. The emergency housing initiatives have so far provided housing for only a minority of the displaced persons on Montserrat and there have been unacceptable delays, which have, in turn, prolonged the time spent in shelters and overcrowded private accommodation. By November 1998, only 105 of the 255 planned houses had been occupied, accommodating 338 people (Figure 5-page 38). The facilities for the elderly were completed. The self-build project funds were fully committed and a second project had been started, but the Soft Mortgage Scheme had yet to be launched.

5.12 Although an important aim of the housing programmes was to provide for people living in shelters, the new housing has often not gone to shelter residents. The self-build materials schemes that began as a relatively rapid emergency response are providing assistance to a significant number (370) of applicants and their families. But because applicants were required to have access to land and the capacity for completing construction, the majority of shelter residents and others among the poor and needy have been ruled out of the Self-Build schemes. Of the direct-build housing, the initial tranche of 50 houses targeted the shelter population, but very few of the second tranche of houses were allocated to shelter residents. Pressures of numbers on minimal space has meant that single-person households who constituted the bulk of the shelter population were excluded from consideration.

5.4 The social safety net: from relief rations to income support

5.13 Following the evacuations of December 1995 and April 1996, relief rations, intended to supply one main meal a day, were distributed to between 3,500 and 4,600 people. Ration distribution was well organised but its focus was too narrow to act as a continuing safety net for people requiring support covering a wider range of expenditure. The administrative costs of direct distribution were also very high. From September 1996 to November 1997, GoM introduced a Food Voucher scheme covering all foods and basic toiletries and exchangeable in local shops. It was available to evacuees outside shelters and to safe zone residents who had lost their jobs because of the emergency. In December 1997, food vouchers were replaced by cheques to the same value. This was a pragmatic response to pressure from participants wanting more flexibility to use income support to meet other expenses (such as rents); and also to the heavy administrative burden of the voucher scheme. The Select Committee's criticisms, published in November 1997, may also have been a factor. During 1997 it was decided that there would be a DFID-funded social welfare review to move to more targeted forms of benefit based on means testing. This was still incomplete in September 1999.

5.14 The switch to a voucher system in 1996 was a practical and probably an appropriate development when it became clear that people would be remaining in the north of the island indefinitely and that large numbers were in need of assistance. It was also a transfer from the over-stretched public sector to using and supporting the fragile private sector. However, the introduction of an exchangeable voucher was used to extend the categories of people receiving support. In view of the subsequent problems of targeting, a more rapid move to some form of income support might perhaps have been more appropriate. The availability of British bilateral financial support facilitated the switch from direct assistance, with high transaction costs, to vouchers and then financial assistance. Administrative constraints, and perhaps a lack of political will on the GoM side, have impeded a move to a more effectively targeted and more efficient system. A difficult-to-quantify negative impact has been the growth of a welfare dependency culture amongst many remaining on-island.

5.5 Education

5.15 Prior to the volcanic emergency the GoM operated a comprehensive and good quality education system for primary, secondary and tertiary levels. Since the emergency began there have been massive reductions in the numbers of teachers, children and school buildings. By September 1998, education enrolment overall had dropped by over 80% and staffing by over 70%. (Table 5.1.)

Table 5.1 Educational Provision in Montserrat, June 1995-September 1998

	June 1995	May 1997	Sep 1998	Sep 1998 as a % of June 1995
	(no. of enrolments, institutions and teaching staff)			
Nursery School	336	N.A	66	20
Primary School	1437	N.A	304	21
Secondary School	899	N.A	251	28
School Population	2672	1774	620	23
Education Institutions	25	13	5	20
Teaching Staff	200	168	54	27

Source: Government of Montserrat, Ministry of Education

5.16 Despite recognition that the future of education will be a critical component of the development strategy for the island's future, education was given relatively low priority during the first 3 years of the emergency. A major problem has been the unavailability of buildings in the north suitable for use as school premises, but more significant is the continued use of school buildings for shelters and as a hospital compound. New purpose-built classrooms were used for shelters. This situation persisted up to the time of the evaluation and is inextricably linked to the delays in the provision of housing.

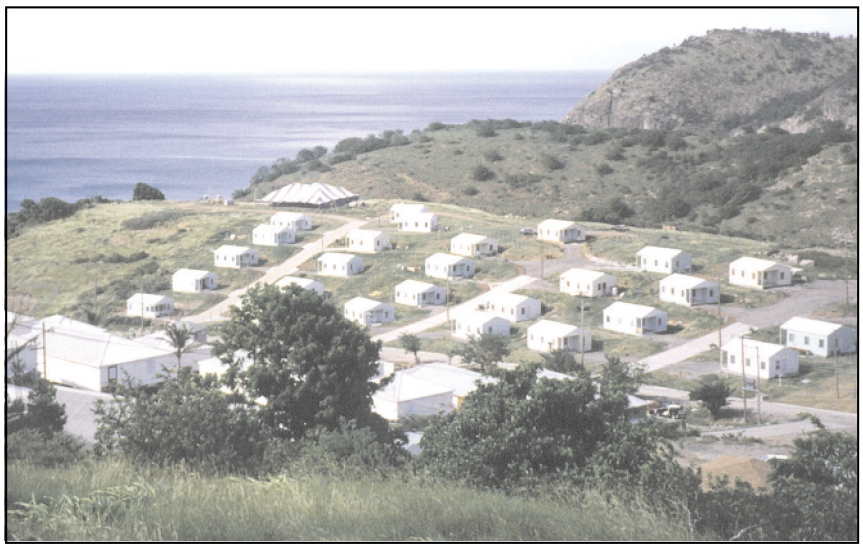
5.17 HMG's response has been almost entirely in terms of funding the construction of new and alternative school space. This has been largely appropriate. By April 1998 DFID had funded purpose-built classrooms at 2 primary and 2 secondary schools, as well as a portacabin and wooden classrooms at the new Look Out Secondary School and Blake's Primary School.

5.18 Public communication and consultation with educational professionals has been a less satisfactory aspect of the emergency response. Teaching professionals were overburdened and under stress. Many felt they had been operating in isolation and without adequate support. There appears to have been little communication on plans for the immediate future and, in particular, the implications of the EOC's continuing requisition of buildings for shelter. The major concern reported to the evaluation was the continuing appropriation of purpose-built classrooms as shelter space on an indefinite basis, whilst classes were conducted in makeshift temporary buildings.

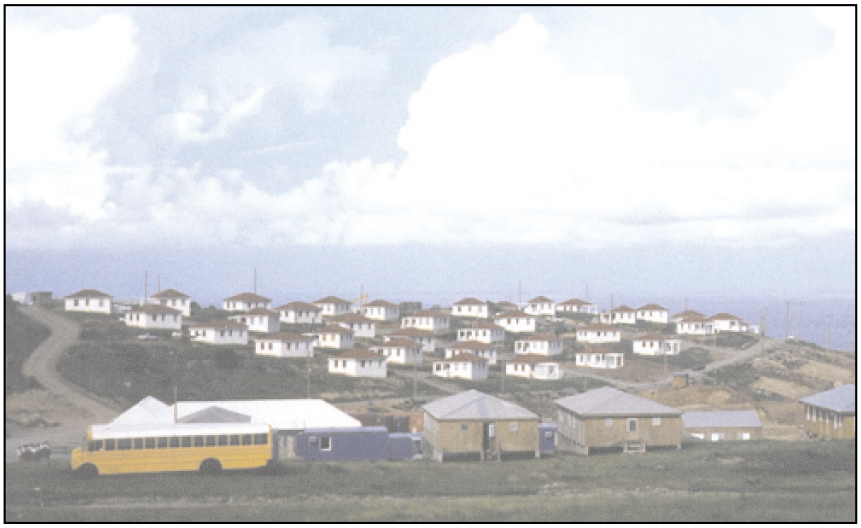
5.19 Parents also appear not to have been kept well informed during the crisis. In mid-1997 the lack of official information led many to assume that schools would not re-open on time and, as a consequence, to leave the island with their children to seek provision elsewhere.

5.20 Finally there is the difficult issue of rethinking educational objectives in the light of a substantially reduced school age population. So far DFID advisers have done little to consider with GoM the role of education in the process of social reconstruction and development. The resilience of education owes most to the extraordinary efforts of educational professionals and the commitment of Montserratians to education as a critical aspect of their private and social aspirations.

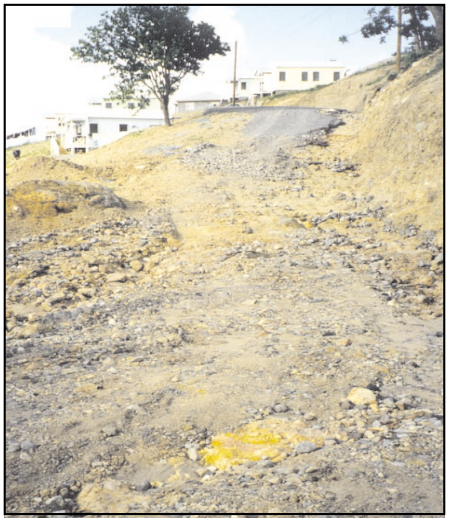
Figure 5 Public Housing: housing types, access roads and an abandoned school bus - November 1998



Davy Hill prefabricated houses with shelters in foreground



Lookout block built houses with school and 72 seater bus in foreground



Prefabricated housing at Shinn Lands showing road deterioration

CHAPTER 6
EMERGENCY INVESTMENT AND ENGINEERING PROGRAMMES

6.1 Introduction

6.1 The engineering evaluation concentrates on selected programmes/projects which were critical to the success of the emergency programme:

- the immediate housing project.
- the temporary Government Headquarters(GHQ).
- the emergency jetty.
- external transport.
- studies for replacing port and airport facilities.

6.2 This chapter will assess whether the projects were taken forward in a timely way; whether the decisions on the type of investment and quality of its components were appropriate. And it also addresses cost control and cost-effectiveness. More detail is provided in Annex 6.

6.3 Table 6.1. summarises the position in November 1998. This is a useful point for an assessment of progress, more than a year after the June – August 1997 crisis and HMG and GoM's joint commitment to a crisis programme in September 1997.

Table 6.1 Selected emergency investment programmes - general status

Programme	Primary Objective	Cost (Nov 1998)	Status
Immediate Housing: 255 houses and 280 serviced plots	To resettle displaced persons living in shelters	£13.9 m estimated	100 completed, rest by late 1999
Government HQ: Temporary building complex at Brades	To provide temporary office accommodation to avoid high rentals	£2.25m estimated	Occupied Jan – March 1999
Emergency Jetty: at Little Bay	To re-supply the island and for evacuation	£2.6m	Completed Feb – June 1997
Hospital: Upgrading at St Johns	To meet the island's requirements	£1.4m estimated	Progressive completion by May 1999
External Transport: Ferry and helicopter services from July 1997	Temporary replacement of Bramble air links	£5m to end 1998	Continuous for foreseeable future

6.2 Timing and appropriateness

6.4 The primary areas of poor performance have been delays in bringing projects to successful completion and increasing costs. The impact of delay in the provision of housing has been particularly severe. It has been a major factor in people having to continue to suffer the unsatisfactory conditions of temporary shelters and has contributed to other difficulties – such as migration of key personnel and the unavailability of buildings for use as school premises.

Table 6.2 Time taken in processing emergency engineering projects (in months)

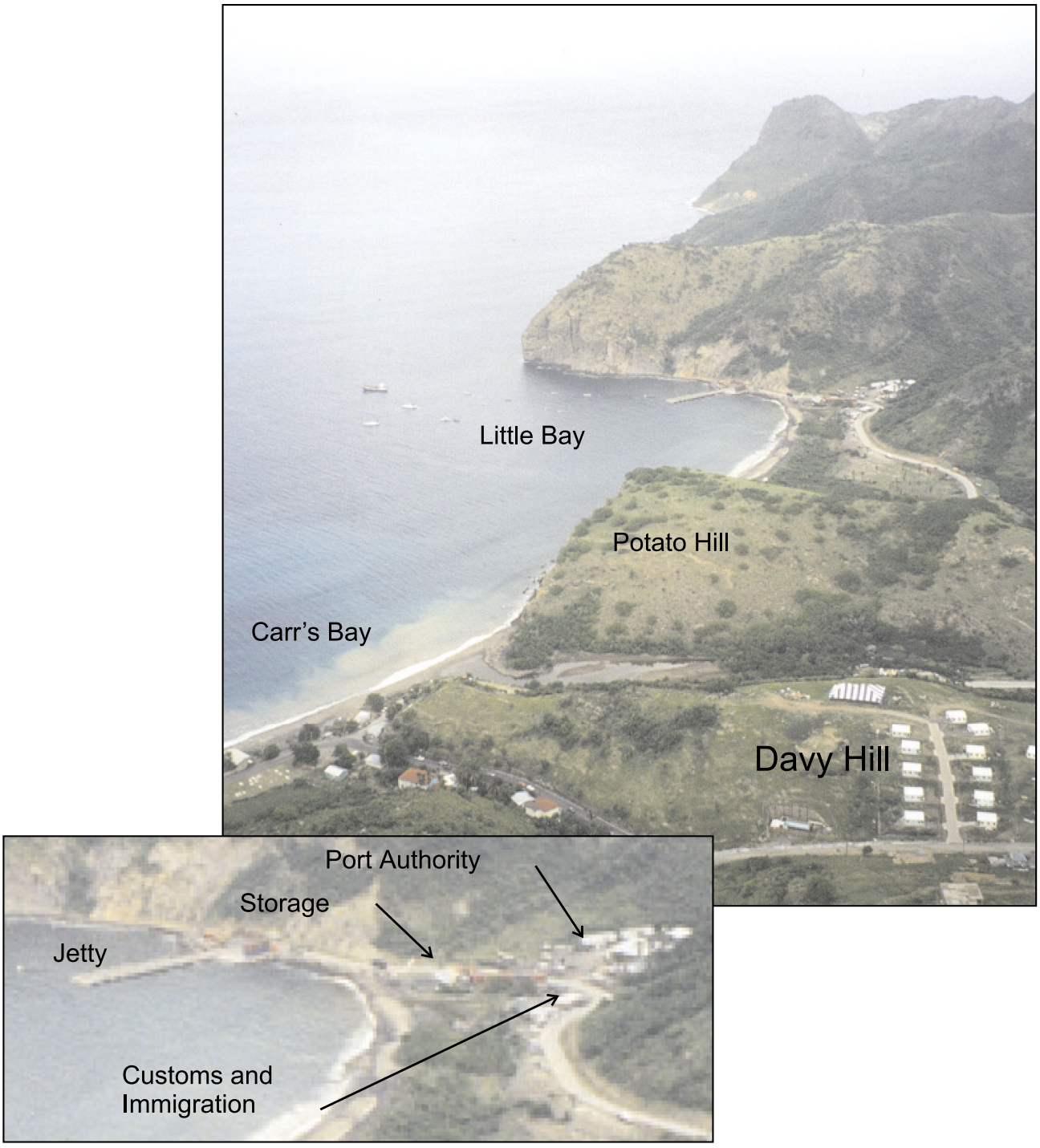
	From identifying the need to agreement to fund	From agreement to fund to approval to proceed	Total processing time
Emergency Jetty	5	4	9
St John's Hospital	11	7	18
Immediate Housing	7a	2	9a
Government HQ	6	2	8

Note: (a) Immediate housing does not include a 5-month initial delay from mid 1996 when GoM declined HMG aid.

6.5 The time taken for processing the four main projects is summarised in Table 6.2. All four projects experienced substantial delay in the approvals process. The emergency jetty decision was particularly tortuous. The need for the jetty was identified by the Governor and the UK military team, preparing evacuation plans, in September 1995. But FCO, ODA and GoM accepted the need only in January 1996 and funding was agreed in June with approval to proceed in September – 13 months after the need was identified. Fortunately, it was possible to use the jetty for evacuation from February 1997 and for resupply in June 1997 just before loss of the port and airport made this the primary route for resupply, voluntary evacuation and passenger traffic (Figure 6).

6.6 Decisions on the type of investment and the quality of components were probably the best that could be made at the time. There was good and effective co-ordination between HMG and GoM in the conceptual stages of investment programming. However, differences arose when it came to details of design, specification, layout and construction. GoM's aim was to secure provision to standards which addressed long-term development needs, whereas HMG (DFID) wanted to address the emergency issues as expeditiously as possible; development was not the priority before mid-1998.

Figure 6 Emergency Jetty at Little Bay - November 1998



6.7 The main differences – reflecting the priorities of each party - arose over the type of houses. DFID preferred prefabricated houses because of anticipated speed and cheapness. GoM preferred block built houses because they were more permanent, more hurricane-proof, more socially acceptable and used more local resources. DFID's initial decision to go for prefabs was correct at the time, July-August 1997, because of uncertainties about construction capacity, particularly for the temporary GHQ and the first phase of the housing programme. DFID subsequently adopted block-built houses and superior prefabs sourced from Australia for the remainder of the housing programme, the latter a poor decision in view of the considerable completion delays.

6.3 Costs and cost-effectiveness

6.8 Except for the jetty and external links, the programmes ran over budget with the biggest escalations in costs in the immediate housing and GHQ programmes. Annex 6 provides more detail on how and why the costs rose and on the cost -effectiveness of the projects.

6.9 In summary, the conclusion of this evaluation is that the GHQ was the least cost-effective. Only if it had been completed much more quickly might it have been cost effective. The objective of moving out of rented accommodation was achieved in Jan-March 1999 but the resources involved would have been more usefully directed towards completing the immediate housing programme (Figure 7).

6.10 The immediate housing programme has been marginally cost-effective. The objective of moving people from the shelters was only partly achieved. It could have been achieved if the programme had started sooner; six months sooner would have been possible. The self-build alternative has proved a more cost-effective housing option than the direct-build programme.

6.11 The hospital is partly cost-effective and despite the delays the upgrade probably represents a better value solution than the alternative of building a new hospital. The emergency jetty, helicopter and ferry services were undoubtedly cost-effective. But given that a fixed-wing air link may not be available for up to 3 years, the current costs of helicopter and ferry provision needed to be reviewed.[6]

6.4 Emergency or development investment?

6.12 There has not been a clear-cut distinction between emergency and development programmes. The problem in Montserrat has been that neither the full extent of the damage nor the length of time over which the crisis would continue were predictable. It has therefore been very difficult for HMG to determine the dividing line between undertaking emergency actions and providing development aid, with its more complex procedures.

[6] In 1999 helicopter services for MVO monitoring, inter-island and emergency services were reviewed and reduced to a single craft.

Figure 7 Temporary Government Headquarters at Brades - November 1998

6.13 Work to identify an alternative fixed-wing airlink illustrates the advantage, in changing and uncertain circumstances, of attempting to separate urgent emergency requirements from potentially extremely costly longer-term reconstruction decisions. A feasibility study looked at 3 options, including one for a new facility comparable to Bramble Airport with wider development benefits. Since the study was completed, the evolving volcanic situation means that it is possible to prepare for rehabilitation of Bramble Airport, combined with only an emergency grass strip at one of the other sites. The volcanic situation in 1997-98 was still too uncertain to allow appropriate and cost-effective decisions about a longer-term solution, but immediate action in 1997 to construct an emergency grass strip would have had early benefits.

6.5 Institutional and management aspects

6.14 The number of institutions involved and their overlapping roles resulted in delays in decisions and confusion. Three particular problems affected the investment programme – lack of delegated authority, high staff turnover and poor consultation with GoM. DFID's office in Montserrat, the Aid Management Office (AMO) was established in early 1997 (see paras 8.2-8.4). It was handicapped during the main construction period by not having delegated authority and capacity to supervise Brown and Root, the contractor managing the immediate housing and GHQ programmes. Proper on-island supervision would have reduced cost overruns but at the time of the evaluation Brown and Root was effectively responsible to DFID in London through its UK head office. GoM has complained about the lack of proper consultation by AMO and other DFID representatives in the region. Several staff did seek to consult effectively and to understand GoM's views but there was sometimes a lack of sensitivity in dealings with GoM.

CHAPTER 7
RESPONDING TO THE ECONOMIC AND FINANCIAL CONSEQUENCES OF THE VOLCANIC EMERGENCY

7.1 Introduction

7.1 The economic effects of the volcanic eruption were catastrophic; a 44% decline in GDP by the end of 1997 and estimated losses of up to £1bn. Montserrat has effectively become dependent on British financial assistance. The evaluation has looked at how economic impacts have been addressed: through strategic economic planning; through measures to support and promote the private sector; and through budgetary aid. Financial sector aspects have also been reviewed. Annex 7 provides a fuller account of the economic and financial impacts of the eruption and HMG's response.

7.2 Economic development strategies

7.2 Until mid 1997 HMG activity was essentially focused on funding measures in the north to meet the immediate needs of the remaining population. The GoM was also addressing the emergency and, at the same time, pursuing economic objectives but they were substantially the same objectives as existed prior to the eruption. The crisis events of 25 June 1997, the loss of Plymouth and evacuation of Salem marked a shift in attitudes and priorities: from this point on, both HMG and GoM accepted that the future of the island would be dependent on economic development and social structures in the north. Both recognised that they would have to invest to attract private investment. In September 1997 both sides committed themselves to a Sustainable Development Plan (SDP) to be jointly agreed. The plan would provide a context and structure for the programmes under way in the north and it would identify economic development goals and ensure policy consistency across the sectors. The Plan was finalised in November 1998 to cover the 5-year period 1998 – 2002. By early 1999 GoM had also (in consultation with DFID) formulated the new Country Policy Plan (CPP) covering 1998/99 – 2001/2.

7.3 Had a clear medium term economic strategy existed prior to 1997, HMG aid resources might have been spent more effectively. However, it is doubtful that a coherent strategy could have been formulated until the loss of Plymouth in mid-1997 narrowed development possibilities and a report on the ash, available in January 1998, eased concerns about long term health risks in the north. That said, there were opportunities, even in the first two years of the crisis, to address the potential economic impacts of the eruption, which could have been taken sooner.

7.4 First, the GoM's draft National Physical Development Plan of 1995 did include a strategy to disperse development and economic activity away from Plymouth and the south west of the island, but there were no moves to implement this. Secondly, more could have been done to sustain economic

activity. There were delays in implementing high priority infrastructure projects, which indirectly benefited the private sector, and direct support for the private sector has been slow. There has been a fundamental failure to appraise individual actions or projects in a broader framework, taking into account the aggregate economic effects of individual decisions.

7.5 The size and composition of Montserrat's future population are clearly essential to any planning exercise. Perhaps reflecting the enormous uncertainty about the eruption and its effects, until mid-late 1998 neither HMG nor the GoM had been able to make explicit demographic assumptions. DFID-funded projects also typically omitted explicit population projections. HMG, in conjunction with the GoM, should have made more explicit efforts to forecast future levels of population since mid-late 1998. Such forecasts would help to prioritise activities and make decisions more transparent.

7.3 The private sector

7.6 The Sustainable Development Plan states that 'the redevelopment of Montserrat will not be possible without the involvement of the private sector." Nevertheless, there is a widespread sense on the island that, to date, very little has in fact been done to support the private sector through the volcanic emergency and that the assistance which has been provided has come too late. This is an assessment with which the evaluation agrees.

7.7 DFID assistance was sought particularly to provide storage and factory space in the north of the island and to secure a small-scale credit scheme. All three types of assistance were fully justified in that they helped overcome some of the principal constraints faced by businesses in re-establishing operations. Funding was increased under the credit schemes, but other assistance was limited in the first three years (see para 7.10). Assistance to the private sector could have been provided much more quickly and if it had it would almost certainly have helped reduce the scale of economic decline. Instead, delays increased the assistance required. For example, because businesses did not have storage or operating space in the north, they lost assets and stock which were left in the exclusion zone. It also meant that numbers of people were facing increased risks when they visited the exclusion zone to get access to those assets.

7.8 That DFID found it so difficult to respond quickly to these requests for assistance is partly a reflection of too narrow a focus and a failure to look at individual decisions in the broader context of an assessment of the medium to long term future of the island.

7.4 Budgetary assistance

7.9 Prior to the eruption Montserrat had a balanced recurrent budget. Because of reduced revenue and increased expenditure the island now receives budgetary aid and as a consequence its finances are now under the supervision and, in effect, control of the Secretary of State for International Development. The

purpose of budgetary aid has been to ensure that the population remaining on the island is provided with a reasonable level of essential services. Largely timely and adequate levels of budgetary assistance have meant the GoM has not had to resort to borrowing or a rundown of reserves. DFID has been flexible in identifying and responding to changes in budgetary assistance requirements.

7.10 The GoM would have favoured tax reductions as a means of encouraging economic recovery. DFID has preferred to maintain revenue income in order to minimise budgetary aid. With the benefit of hindsight a tax incentive strategy review should have been undertaken in 1996, when GoM first proposed fiscal incentives to the private sector. Instead reviews were only undertaken in 1997 and 1998, with few tax concessions before March 1998.

7.11 Monitoring and report requirements have increased over time to a level which the already over-stretched Ministry of Finance in Montserrat has found difficult to cope with, and which is possibly excessive.

7.12 More positively, DFID did recognise the need to stem the out flow of key public sector workers, approving a variety of measures (including pay increases, bonuses and special allowances) in 1997 – though these incentives should perhaps have been offered sooner.

7.5 The financial sector

7.13 The emergency has had serious implications for Montserrat's financial sector. The situation became most acute with the effective withdrawal of insurance cover in August 1997. The availability of new lending to both businesses and households contracted sharply, and the already severe problem of default on private loans was intensified. These developments threatened the viability of the two on-island financial institutions, the Bank of Montserrat (BoM) and the Montserrat Building Society (MBS). HMG has had very little direct involvement in addressing the impact of the crisis on the financial sector, but has been under strong pressure from the International Development Committee (IDC 1997; 1998a – see footnote 1), the GoM and business and civil society institutions on Montserrat to intervene. Annex 7, section 5 provides more detail of the financial sector issues.

7.14 A Soft Mortgage Scheme, aimed at financing housing for those in work, was agreed in principle in September 1997. The principle behind the scheme is clearly appropriate, helping to restore private housing construction, rather than forcing people to rely on the provision of houses built under various forms of external assistance. The fact that the scheme had still to be launched (as of September 1999) reflects poorly on all concerned – HMG institutions, the GoM, the BoM and the Eastern Caribbean Central Bank (ECCB) (see Annex 7, especially Box 7.1).

7.15 DFID's commissioning of a study to address problems related to insurance cover was well motivated, but it was too late. The study has apparently achieved very little while the withdrawal of

insurance cover has had disastrous consequences, precipitating the effective collapse of the MBS and resulting in the temporary halt of the issue of new loans, whether for private housing or business.

7.16 The MBS is an apparently wholly reputable local institution and had failed through no fault of its own. The decision not to provide support reflected the concern to avoid setting a precedent for the UK or OTs and also the view that the needs of the less well-off Montserratians affected by closure would be met from welfare schemes.

7.17 HMG's decisions on GoM mortgages and MBS were based on carefully researched reasoning, which HMG has been careful to explain. However, again the focus has been too narrow; issues were analysed without regard to their aggregate consequences. The consequences have proved disastrous both for individuals and for the wider economy.

7.18 The fact that Montserrat did not have a qualified financial regulator from mid-1998 to March 1999 is also very unsatisfactory.

CHAPTER 8
MANAGING THE EMERGENCY IN MONTSERRAT, BARBADOS AND LONDON

8.1 Introduction

8.1 The complex and changing lines of management and responsibility for Montserrat have been strongly criticised, notably by the International Development Committee, for reducing the effectiveness of HMG's response to the volcanic emergency. These criticisms were acknowledged in HMG's response to the Committee's First Report.[7] The evaluation has looked at how management arrangements and lines of responsibility have evolved since 1995 – particularly in terms of efficiency and effectiveness. We have also looked at the distribution of responsibilities in London, Barbados and Montserrat. The roles of the principal bodies are summarised in Chapter 3 and Annex 3 provides a full account of the institutional arrangements and changes since 1995.

8.2 HMG's changing management arrangements and the shifting locus of responsibility

8.2 At the time of the emergency, there were 4 key HMG officials involved with Montserrat, all at Grade 5 level: the Governor in Montserrat; the heads respectively of FCO's Dependent Territories Regional Secretariat (DTRS) and ODA's British Development Division in the Caribbean (BDDC) in Barbados; and the head of the Emergency Aid Department (EMAD) in London. They reported to 3 separate Directors in London. In what was an unprecedented emergency involving a rapidly changing and uncertain situation, overall supervision could only be achieved by co-ordination at the highest level.

8.3 EMAD became involved immediately in 1995, and in September 1995 an Emergency Relief Co-ordinator (ERC) was placed on-island reporting to the Head of Unit in London. As the need for budgetary assistance emerged DTRS and BDDC were directly drawn into reviewing requirements and supervising the GoM's public expenditure. In February 1996 DTRS decided to put a First Secretary (Aid) at G7 level on-island in the Governor's office. There followed lengthy discussions about the division of responsibility between this post and the ERC so that the First Secretary was not in place until 5 months later in October. Between January and April 1997, ODA set up an Aid Management Office (AMO) on Montserrat, reporting direct to EMAD in London for emergency spending and also to DTRS. The triangular relationship between Montserrat, Barbados and London had many disadvantages. In particular many activities could be DTRS, BDDC or EMAD-funding responsibilities. But the different funding routes imply different procedures and the involvement of different departments. More positively, DTRS and BDDC had easy access to substantial advisory capacity on development and governance, familiar with the island and the regional context, which was useful throughout the emergency.

[7] IDC. 1998b. *'The Government's Response to the International Development Committee's First Report of 1997-98: Montserrat'.* Memorandum from HMG. Appendix to the First Special Report. London; Stationery Office, 3 February.

8.4 As the situation on Montserrat became more complex and critical, its profile within FCO and ODA/DFID grew. The FCO-led Interdepartmental Committee was broadened to include wider representation, including other Government Departments and scientists. The Voluntary Relocation Scheme of April 1996 required interdepartmental Ministerial approval. The responsible FCO Minister visited Montserrat in June 1996 and the £25m programme was announced in August. In December 1996 a higher level inter-departmental official committee was established. Following the election in May 1997, DFID was established with consequent changes in the regional secretariat. Baroness Symons, the responsible Government Minister visited Montserrat in June 1997. Following the fatal events of 25 June, there was a more proactive determination to co-ordinate activity and to achieve results. A special FCO/DFID Task Force under DFID chairmanship was formed. In August 1997 the interdepartmental Montserrat Action Group was set up, chaired by FCO, from November 1997 at Ministerial level. In September 1997, DFID announced the Crisis Investment Programme as part of a new coherent response to all aspects of the emergency. Authority became more concentrated in London. In November 1997 the Montserrat Unit was established and the separate responsibility of EMAD was finished. Delegated authority was largely withdrawn from the AMO. DTRS was wound up in September 1998. Most spending decisions after November 1997 were taken at Ministerial level.

8.3 The Government of Montserrat's role

8.5 An assessment of the performance and effectiveness of the GoM is outside the Terms of Reference of this evaluation. However, in dealing with public action the distinction between GoM responsibilities and those of HMG is often more formal than real, and so aspects of GoM performance need to be taken into account. The important role and achievements of the ED have already been noted. The superhuman efforts of many officials and public employees on-island, including the Police and Montserrat Defence Force (MDF), in warning people directly, organising evacuations and putting themselves at risk, is not just part of the normal course of duty. Teachers and nurses worked in extraordinarily difficult circumstances to maintain services.

8.6 As the emergency continued there was a shift of responsibility and authority from the elected Government to HMG. The Governor's increased role in emergency management planning, formalised in the establishment of the separate Emergency Department responsible to the Governor, was a change in the balance of responsibilities. The return to budgetary aid represented a major shift in authority from GoM to HMG. The growing role of DFID advisers and the direct involvement of the AMO in the work of many government departments also reinforced the fact that, although constitutionally nothing had changed, in fact the shift was enormous.

8.7 An underlying management problem was the lack of experience and expertise available to the GoM in dealing with the crisis. The public sector was much reduced by the migration of key personnel but had to deal with problems on a scale it had not previously encountered. For example, there was no extensive experience of preparing and contracting major projects or of the constraints implied by cost-

effectiveness. Nor was there the capacity within the Land Development Authority to develop a housing and land zoning policy to push forward land issues which were not resolved between GoM and HMG.

8.8 GoM did not have experience in dealing with large complex bureaucratic structures, and their legal and regulatory basis. Nor did it have the capacity to undertake the work on project appraisal sought by HMG officials, advisers and contractors. The evaluation was frequently told that Montserrat was a special case and that HMG ought to make exceptions regarding financial regulations, procedures for development aid and approval of activities.

8.4 Emergency or development aid?

8.9 These management issues are most clearly exposed in the shift from emergency to development aid. Emergency aid projects were dealt with quickly on the basis of little documentation. The procedures for development projects are much more rigorous. There is no fast track approach in the sense that aspects of DFID's normal procedures can be set aside for particular projects. The procedures themselves contributed to many delays in the processing of proposals into projects.

8.5 Assessment of management performance

8.10 A consequence of the concern to work within normal arrangements for Dependent Territories was that key officials in London and in Montserrat, and contracted managers worked under exceptional pressures. Most met this challenge efficiently and with commitment. In particular the two Governors took on very demanding and pressured roles with only very limited additional support.

8.11 There were good reasons for the FCO's desire to avoid unnecessary changes in relations with the Government of a self-governing territory. Nevertheless this resulted in ad hoc arrangements and constant adjustment and catching up as the situation evolved. For example, although scientific monitoring and risk assessment were crucially important, scientific funding was until 1997 on a short-term budgetary basis, making it difficult for scientists to play their part. As it became clear that responsibilities had to be changed, there was indecision and uncertainty in taking matters forward, with the changing lines of responsibility for the AMO the most serious case. Since September 1997 funding approvals have all been made in London and this is seen by many as a cause of delay.

8.12 GoM's responsibility and authority have been much reduced. Until May 1998, GoM had no clear overall budget within which to plan. It has had to argue case by case on e.g. housing specification – and has not felt properly consulted. The different priorities of HMG and GoM have led to problems. For example, GoM was not fully involved in the early contingency planning for off-island evacuation, and formal demographic and social situation assessments that could have helped to shape the social aspects of the response were delayed.

8.13 It was very difficult in the circumstances of Montserrat to balance immediate and longer-term objectives. HMG was slower than GoM to want to address longer-term economic prospects for the island. The crisis programme and the bringing together of responsibilities within the DFID Montserrat Unit was a major step towards connecting emergency actions and planning for reconstruction. It also resulted in the Sustainable Development Plan. The setting of a 3-year financial provision of £75m in June 1998 and the CPP process have taken the process further.

CHAPTER 9
CONCLUSIONS AND LESSONS

A. AN ACHIEVEMENT FOR MONTSERRATIANS AND A QUALIFIED SUCCESS FOR HMG

9.1. The disaster response by HMG in supporting the Government of Montserrat and assisting the island's people since July 1995 has been a success in comparison with many other recent natural disasters elsewhere in the developing world. But that success is qualified by less satisfactory aspects of the response and its consequences. The considerable achievement of the people of Montserrat is to have coped with the continuing volcanic threat and then adapt to the devastating effects of the eruption.

Risk Management

9.2 Careful examination of the risk management strategy followed by HMG and the GoM and of how scientific information and contingency planning were taken into account in emergency policy, suggests that some successful outcomes were achieved more by luck than judgement. The long delayed construction of the emergency jetty left the island's population vulnerable. The airport itself was kept open in the face of mounting risks and only the fortuitous direction of pyroclastic flows prevented damage and possible fatalities.

9.3 The micro-zonation policy adopted in October 1996 was necessary because the facilities for the safer risk-averting strategy of restricting all activity to the north were not in place. This management strategy involved higher than necessary risks and reflected the adaptive response adopted by HMG and GoM. It meant that the progress of the eruption dictated what was done. It accorded with the GoM's desire to avoid anything that would reduce the chances of sustaining or quickly returning to something near the pre-eruption situation. However, it placed scientists in the challenging position of providing fine-tuned risk assessments that were at the limits of what is scientifically and practically possible. The micro-zonation policy was abandoned after the fatalities of 25 June 1997 and in response to increased volcanic activity.

9.4 The lower risk strategy of supporting occupation of the north or assisted settlement in the UK and limited assistance within the Caribbean region was unavoidable from July-August 1997. Even in this strategy some compromises were made on the uncertain health hazard from ash falls. In late 1997 official scientific advice from the CMO and CSA was that all, especially children, should leave the still occupied Central Zone. Public information on safety hazards and health risks was provided to all, targeting especially residents in the Central Zone. Whilst consistent with official scientific advice this response was insufficient to ensure compliance. Complementary action such as rapid provision of more acceptable emergency public shelter was set aside by DFID in favour of waiting for completion of direct-build housing and then giving priority to those in shelters in the Central Zone.

Governance

9.5 The strategies which HMG followed were broadly those preferred by the GoM at the time. Nevertheless, relationships between HMG and the GoM became increasingly discordant. Specific criticisms put by GoM representatives to the evaluation team related to housing provision that is 'socially, culturally and structurally unacceptable'; and of the failure to give sufficient weight to local knowledge or genuinely to consult or keep local counterparts properly informed. Attention was repeatedly drawn to the Secretary of State for International Development being reported in the press since August 1997 as negatively stereotyping Montserratians about their expectations.

9.6 The constitutional status of Montserrat would have permitted the Governor to take full responsibility by imposing direct rule under the State of Emergency. Instead HMG worked in partnership with the elected GoM and sought to respond to the emergency through normal channels, making ad hoc and temporary additional arrangements as dictated by events. Nevertheless the responsibility and authority shifted to HMG and, as the crisis developed, to London. Actual decision-making authority became increasingly unclear. The management of health and decisions on the specifics of emergency housing are important examples. There have been benefits in remaining within normal arrangements for a self-governing territory. Montserratians, through their elected representatives are engaged in the decision-making process and can influence, if not determine, outcomes. This was also felt by many to have contributed to exceptional social stability in a catastrophic situation.

9.7 There have been some problems in working within existing arrangements. Consultation and negotiation have led to delays, particularly in taking forward investment proposals.

9.8 The division of responsibilities implies that HMG, through the Governor and therefore the FCO, is ultimately responsible and accountable to Parliament for life and safety. The elected GoM is greatly concerned as well, but also has social welfare and developmental goals. During the earlier phases of the emergency up to June 1997 the GoM preferred 'wait and see' options that assumed less serious impacts: to defer UK-funded public housing construction in the north, to draw out the negotiations over site selection for the jetty and housing, and to oppose assisted relocation to the UK. This was a high-risk strategy from the viewpoint of preparedness for and handling of mass evacuation, which was inhibited by the reluctance of the GoM to engage in explicit planning. Many within HMG were equally prepared to accept a 'wait and see' approach, which limited resource commitments. MoD felt it necessary to undertake its own internal contingency planning assessment, should it be suddenly called upon to intervene in a mass evacuation.

9.9 Much attention has been accorded to HMG's contingent liability.[8] A potential consequence of this responsibility is a possible problem of moral hazard. The GoM initially preferred more risky options that would, if successful, have done less damage to economic development, but if unsuccessful, as they were in 1997, would have their costs underwritten by HMG as the underlying guarantor.

[8] National Audit Office. 1997. *Report by the Comptroller and Auditor General: Liabilities in the Dependent Territories.* House of Commons, Session 1997-98. London: Stationery Office, 30 May.

9.10 Since mid-1997 the GoM perspective on many issues has suggested a reversal in attitude from risk taking to a high level of risk aversion. For example, GoM argues that direct construction under the Immediate Housing Project or of GHQ should be to a level that would be resistant to the Hurricane Hugo and Hurricane Mitch so-called 'once in a 100 years' intensities (about 150 mph), instead of the Eastern Caribbean standard of 125 mph. Similarly, the preferability of the least risk, highest cost (up to £90m.), siting at Thatch Valley for a replacement airport was strongly argued, while the risks associated with the rehabilitation of Bramble airport - aeronautically the best location - were strongly emphasised.

9.11 Friction in relationships between key parties was partly a consequence of the uncertainties of the volcanic emergency which made budgeting of HMG's commitments difficult and renegotiable. The steps towards reconstruction involving the SDP and the CPP, setting a three-year provision of £75m. for DFID assistance in June 1998, are important in enabling a return to a more normal relationship in which the GoM will be able to play a fuller self-governing role in determining priorities within a known budgetary ceiling.

9.12 Unresolved issues include the fact that there are no agreed standards for infrastructure, social assistance or social service provision, or health and education in Overseas Territories. Clearly the relevant standards are not those for minimal basic needs in low-income countries. Are the relevant standards those for remote rural areas in the UK or other middle-income Caribbean countries? There is also the issue of establishing an effective, coherent consultative framework for redevelopment based on northern Montserrat or any other OT that might be massively affected by a natural disaster. This should include land development and private sector participation, as well as the elected government and HMG as the primary funder.

Resources: an adequate response?

9.13 The 1997 White Paper on International Development makes clear that meeting the reasonable assistance needs of the then Dependent Territories is a first call on DFID's development programme.[9] From early 1996 onwards the absence of a clear budgetary ceiling or jointly accepted standards on what was appropriate resulted in negotiation and delay, and a growing perception on the Montserratian side that DFID, in particular, was acting ungenerously, preferring cost-minimising solutions to immediate needs – a policy which jeopardised longer-term development. Implementation of the £25m. programme agreed in August was hampered by lack of agreement on standards and siting.

9.14 There is the still unresolved issue of the population levels for which to make provision immediately and in the medium term. HMG's position has been to concentrate more on a rapid solution for current needs, e.g. housing for those in shelters even if this is not necessarily most cost-effective in the long-term. The GoM has been more concerned that emergency investments will provide facilities and accommodation that will meet expectations defined in terms of pre-crisis standards, will maximise the use of local businesses and labour, and will make possible an early return of those relocated. The

[9] DFID. 1997. *Eliminating World Poverty: A Challenge for the 21st Century.* Cm 32. London: Stationery Office.

reoccupation of Salem since late 1998 allows over 300 houses and buildings, including the main police station, to come back into use, and Bramble airport's runway may be reusable again within 2-3 years, after the construction of protective barriers against lahars. DFID therefore faces complex and costly investment decisions in conditions of exceptional uncertainty. The GoM wants to proceed as quickly and as extensively as possible with reconstruction investments that will facilitate economic recovery. Also, the passage of time will reduce the number of those 'temporarily' resettled off-island who choose to return. DFID has the difficult role of setting assistance levels and, jointly with others, for example the EDF, of making investments in external transport and balancing uncertain needs and volcanic risks. Moreover, there is a difficulty in resolving the issue of the time period over which it is developmentally most beneficial to spread limited investment resources for reconstruction.

9.15 Up to March 1998, DFID had spent £59m. in emergency-related aid, of which around £53m. was additional expenditure, allowing for previous aid projections. DFID has committed an additional £75m. up to 2001. Therefore, projected HMG expenditure will be at least £160m. over six years, taking into account a conservative estimate of additional expenditure by the FCO and other government departments off-island and in the UK on relocating Montserratians. In per capita terms that is equivalent to £2,600 a year based on a pre-eruption population of 10,000. This amounts to over 80% of the 1994 GDP per capita, and considerably more for the much smaller population still resident. If these sums are considerable, it should also be remembered that the likely total capital loss, including real estate, has been up to £1 billion, and that most of that loss has been only partially recoverable or uninsured.

B. HMG'S PERFORMANCE: CRITERIA FOR EMERGENCY ASSESSMENT

9.16 The seven criteria put to the evaluation have provided a useful checklist for assessment of the specifics of HMG's response. These criteria have been used in reviewing sectoral activities in Chapters 4-7 and management of the response in Chapter 8. They were derived from previous evaluations of DFID responses to emergencies, in particular the major humanitarian crisis in Rwanda in 1994. These responses have usually involved funding and possibly technical co-operation for emergency activities, especially relief operations organised by the governments of affected countries, NGOs and international agencies. The Montserrat emergency is unusual as a natural disaster. It was protracted, and caused a near total collapse of the private sector economy. It is exceptional too because, as an OT, virtually its only source of assistance is HMG which has been directly involved in managing the emergency. Therefore in considering HMG's response, attention is drawn to ways in which the criteria may need further refinement – a lesson from the Montserrat experience.

Use of scientific information

9.17 Monitoring the course of the eruption and assessment of safety and health hazards has posed a considerable challenge both for scientists and the authorities. Special attention has been given therefore to considering the appropriateness of HMG's response in the use of scientific advice. The OST

Guidelines set out three key principles concerning the identification of issues, building science into policy and presenting policy which are to be applied 'to uses where there is significant scientific uncertainty, a range of scientific opinion and potentially significant implications for sensitive areas of public policy' (OST, 1998: p1 – see footnote 3).

9.18 For the identification of issues, the OST Guidelines state that 'Individual departments and agencies should ensure that their procedures can anticipate as early as possible those issues for which scientific advice or research will be needed, particularly those which are potentially sensitive' (ibid: p7). The procedures in place prior to the eruption were not adequate to ensure that the increasing volcanic risk would be anticipated or effectively monitored. However, possible risks to health were quickly identified in late 1995. By and large, appropriate steps were taken to monitor potential health hazards, but they were only properly formalised from September 1997.

9.19 Building science into policy involves accessing the best available scientific advice, ensuring that departments draw upon a sufficiently wide range of best expert sources both within and outside government (Ibid: p11). Prior to the eruption the Head of SRU advised only the Chief Minister with HMG indirectly involved. This was an inappropriate procedure. Once the potentially extreme risk was recognised, HMG progressively secured the best scientific advice from within and outside government, and supported development of the MVO to provide adequate monitoring and as a centre for complementary research. However, the Governor as responsible official did not initially receive adequate guidance on how best to achieve this. Furthermore, senior officials in FCO and ODA/DFID were not directly supported by relevant scientific advice but were largely reliant on information forwarded from Montserrat. Arrangements were ad hoc and short-term until the BGS(I) was given a 2-year contract only in September 1997. From about that time HMG has also brought together a sufficiently wide range of expert advice from within and outside government, including the CMO and CSA. FCO and DFID have also organised this process through the formal, six-monthly elicitation meetings to quantify the safety and health risks to the resident population and reconstruction activity. The procedures now provide a clearer and consistent basis for policy making.

9.20 Broadly, scientists have been permitted to publish and encouraged in their research and in making MVO information available on the internet. Public information on the eruption and its implications was limited and unsatisfactory at the outset. From October 1995 onwards there was a progressive improvement, with direct involvement by scientists in public information and they made great efforts to explain to an increasingly informed public what was happening and its implications.

9.21 The use of advice has had to take account of the strong preference of many to remain on the island, accepted by HMG, and the practicalities of making this possible. Following on the September 1997 visit of the CMO, the December 1997 formal risk assessment was critically important and a watershed in public information. HMG's response to official scientific recommendations was to make public the scientists' full findings, to make all residents aware of the volcanic hazard and health risks, and to provide

advice on minimising health risks, on a day-to-day basis. This has continued to be HMG's approach, although public information may not be sufficient to ensure full public compliance with official advice. In these circumstances, continued vigilance is required to ensure that all are fully aware of safety and health hazards and the ways in which risks can be minimised, and that financial decisions by, for example, the insurance industry are made on a properly informed basis. The wider issue of public information and consultation on other aspects of HMG's emergency response is discussed below.

Appropriateness of emergency actions

9.22 Throughout the evaluation the issue of timeliness and delays loomed large. Broadly, where something was done by EMAD (now CHAD), in an urgent mode, it was done quickly. The important exception was the emergency jetty which was the subject of extended informal pre-appraisal and negotiation as if it were a development project. However, it would appear that, wherever possible, early delegation of spending authority within a wider project to the contractor, as in this case, would have been preferable to micro-management by an on-island co-ordinator or in London. BGS(I) and Brown & Root were given their contracts only in August-September 1997. The lack of experience and loss of management capacity by GoM departments, and the absence of NGOs, apart from the Red Cross and Christian Aid to a limited degree, made it difficult to avoid so much direct involvement.

9.23 In contrast, where development aid was used, the process from identification to approval was in many cases (especially up to June 1997) long-drawn-out. This is reflected in the low level of expenditure on construction up to that time. These complex, multi-faceted procedures are required by DFID because aid intended to contribute to long-term development is usually managed by a recipient government or agency, and transparent, fully elaborated proposals are therefore required for accountability. Since the agreement of the September 1997 crisis programme, these procedures have contributed to further delay where they were required for a quite small supplementary investment. This is partly because of the withdrawal of delegated authority from the AMO in October 1997.

9.24 Budgetary aid was on the whole provided in a flexible way. The uncertain situation made it difficult to set limits and the quarterly reassessments were effective in ensuring additional funding, albeit sometimes with delays in disbursement that added interest charges to budgetary costs. However, the enhanced monitoring requirements in 1998/99 do impose a further burden on an already overstretched administrative capacity. Whilst each such requirement may be specifically justifiable, the aggregate consequences of a government expenditure programme which is far more complex than before the eruption, and with more external reporting requirements and contact time, make it difficult for the GoM to get beyond short-term routine tasks.

9.25 An overall assessment of the suitability of specific emergency actions, including equipment purchases, infrastructure investments, consultancies and so forth, is difficult because the emergency has obliged HMG, together with GoM, to intervene in almost every aspect of on-island socio-economic

activity. The comments of GoM are worth noting: some things went well and some difficulties were encountered – a curate's egg! Attention has focused not on aspects of re-equipping the north of the island that were successful – water, generator and roads – but on specific forms of assistance, equipment purchases and investments which became less appropriate because they were delayed; circumstances changed and more permanent solutions became appropriate. Important cases are prefabricated housing and the temporary GHQ. Some lessons can be drawn which are of wide relevance. Where civil engineering works are required, many of the disagreements concern appropriate standards for replacement facilities and buildings. The evaluation accepted that pre-eruption standards for housing, health status (but not necessarily health care), and education provision on-island give a reference point to be taken into account in reconstruction. The difficulty in an emergency is that there can sometimes be a sharp trade-off between urgency, specification and costs.

Cost-effectiveness

9.26 The evaluation adopted two related criteria in examining cost-effectiveness. First, was the chosen solution the least-cost consistent with the desired result? Secondly, was there evidence of market testing where this was practicable?

9.27 Throughout the emergency, it was clear that officials were concerned with escalating costs in both financial and human resource terms. However, cost-consciousness in an emergency is not necessarily cost-effective. A common criticism of HMG's response was that caution in avoiding expenditure that might, in retrospect, prove inappropriate, was a factor in the step-by-step reactive response between September 1995 and June 1997.

9.28 The review of DFID-funded activities in various sectors suggested that cost minimisation was a major consideration in the procurement of services and also supplies. Indeed, concern for cost-saving may in some instances have been over-zealous. The initial selection of the source for tents in 1995 is a case in point. Subsequently, procurement choices for materials for prefabricated construction in the first phase of the Immediate Housing Project at Davy Hill and for GHQ, may have involved some sacrifice in durability to save costs. There is also a linked issue of consultation, because GoM reluctantly accepted some cost-minimising choices and subsequently looked for opportunities to modify solutions, usually increasing costs.

9.29 The importance of adequate market testing seems to have been a factor in DFID's increasingly preferring to organise procurement. It also involved a UK-based main contractor. The GoM's experience in major contracting and its network of contacts are limited. There are also pressures to sustain the local economy by contracting non-competitively on-island.

9.30 In terms of major investments, the provision of infrastructure through roads, storage and the emergency jetty appears to have been regarded as a necessary and, in the circumstances, cost-effective investment. The construction of a temporary GHQ appears to be least cost-effective, taking into account

the delays and cost overruns. Overall, construction and adaptation using local materials, know-how and labour appear to have been more cost-effective than solutions based on the importation and assembly of prefabricated structures.

9.31 The use of military transport to bring in stores and equipment in August 1995, first as contingency planning for full-scale evacuation or on-island relocation, was probably a justified response.

9.32 The establishment of emergency sea and air links in June 1997 was cost-effective in an emergency situation. Recontracting of the MVO helicopter services to provide both a more powerful machine and a lower-cost contract is indicative of appropriate market testing.

9.33 The smallness of Montserrat raises a further special problem of diseconomies of scale, which would apply to other British Overseas Territories in considering disaster preparedness and in any future emergency. This problem arises sharply in relation to provision for the population current and projected. It is also a consideration in relation to the involvement of official advisers and technical consultants. In many instances, the costs for a very small activity may be not substantially less than for a review or project preparation on a much larger scale. The National Evacuation Plans, which have been a necessary part of contingency planning, are a case in point. DFID development project procedures were elaborated with much bigger projects in mind.

Consultation and public information

9.34 There are two partly distinct but overlapping issues of consultation. First, there is the question of the extent to which the affected people were consulted, kept informed or allowed to participate in the process of determining emergency activities and implementation. Secondly, there is the issue of co-operation between HMG and GoM and the publicly expressed views of the latter that it has not been 'genuinely' consulted and kept informed about HMG's activities. This is also part of the problem of coherence or co-ordination.

9.35 The evaluation found public information on the course of the eruption and its implications limited and unsatisfactory at the outset, because it increased uncertainty and made it more difficult for people to plan how to respond. However, from October 1995 onwards there was considerable improvement, with direct involvement by scientists. This helped to ensure that subsequent evacuations were orderly and restrictions on access largely accepted, where compulsion was difficult. Nevertheless, there were subsequent periods of uncertainty about what services would be available or about the health situation. For example, the failure to inform parents and teachers in August-September 1997 about what was planned for the school year 1997-98 may have increased the numbers migrating and the loss of staff. At a micro level there has been scope for more participation. Because shelters were 'temporary' not enough effort was made to help those accommodated to manage their activities and to be effectively represented in contacts with the Emergency Department. The evaluation noted the general view of Montserratians that, in particular, there has been little consultation on the question of health service provision.

9.36 Throughout the emergency, efforts were made to progressively strengthen public information. For example, both the Emergency Department and the Governor's Office appointed information officers; the latter was assigned after 25 June 1997 and publishes monthly newsletters.

9.37 DFID has a major separate public profile in Montserrat as the primary funder, with its own Aid Management Office. However, it has not given special attention to public information. There is a substantial flow of visiting advisers and consultants, and a general complaint was of lack of feedback on the outcome of their visits. The GoM also complained about the infrequency and ineffectiveness of the consultation process with DFID staff and experts on-island. The direct role of DFID in managing this long-drawn-out emergency with on-island advisers, the AMO and then largely from London, does not appear to have involved an explicit attempt to ensure adequate public information.

9.38 In 1995-96 too little use was made of social development advice which would have highlighted communication problems and ways of improving public consultation. Positively, DFID officials' participation in public consultations and radio discussions, for example on the airport in late 1998, and visits by the concerned Minister indicate recognition of the need to consult and inform.

9.39 Evaluation team members were frequently told that there had been poor provision of information to those Montserratians relocated to the UK, who were said to be largely reliant on informal contacts with friends and family still on-island. A belated but appropriate response to this problem was the appointment in October 1998 of a GoM Information Officer in London.

Social impact and coverage

9.40 The measures undertaken by the GoM, supported by HMG, were effective in minimising the impacts of the emergency on the lives and health of potentially vulnerable people.

9.41 Similarly, minimum shelter, food and public services have been assured through a combination of measures, including the provision of shelters and the Food Voucher Scheme. However, the severe social disruption and the economic effects were mitigated to only a limited extent and the impacts on the community, and within it on families and individuals, of relocation and massive emigration have been large and traumatic. The economic effects of the eruption have not been closely documented. The social survey investigations were delayed but were then thorough. These do not distinguish households and individuals in terms of source of income – public, own business and private sector employment. Both qualitative case studies and indirect evidence, however, suggest that the impact has been most severe on those working outside the public sector.

9.42 The social sectors are a GoM responsibility and most of the community was extremely adversely affected. There has been little attempt so far to target social assistance explicitly. The provision of shelter on the basis of need has resulted *de facto* in a high proportion of vulnerable groups, the elderly and those

without family support, being in public accommodation. The primary form of social assistance has been transferred from direct relief to those in shelters, to a more general food voucher and then cash benefit system, without any effective targeting. The need for a social welfare review to bring this about has been recognised by DFID since late 1996, but the process was still incomplete in late-1999. The direction of change, towards improved cost-effectiveness, has been appropriate, but very slow. An earlier move to income-tested benefits as cash payments would have been preferable.

Economic impact

9.43 The volcanic crisis has had a devastating economic impact, causing a 44% decline in real GDP between 1994 and 1997. It has also had serious implications for the island's medium- and long-term development and forced fundamental changes in its economic structure. The economy will not be viable in either the short or medium term without large-scale subventions and is unlikely to attract substantial private investment for a number of years. At an individual level, Montserratians have faced loss of livelihoods and other assets, including savings which had been deposited in apparently solid local financial institutions. These losses have caused considerable psychological distress and related health problems.

9.44 HMG and the GoM have been confronted with an extremely difficult task in dealing with the economic consequences of the emergency. Little was attempted to address these economic effects directly prior to August 1997, except through budgetary support to replace collapsing public revenues. From mid-August 1997 onwards, it became apparent that the future of the island was dependent on the development of economic and social structures in the north. Since then, DFID's accelerated programme of infrastructure investment has had obvious indirect benefits for the private sector. However, there have still been very few actions specifically intended to help support and sustain the economy, and those that have been undertaken have been very slow in delivery.

9.45 The response on financial regulation, addressing the effects of the loss of insurance cover, the knock-on insolvency of the Montserrat Building Society and the position of the Bank of Montserrat, has been characterised by extreme caution and procrastination because of contingent liability.

9.46 The absence of measures to address the economic effects of the eruption on the private sector has a number of causes. There was a partial separation of emergency and economic and developmental responsibilities, at least up to late 1997. Treasury policy for the UK is that HMG is unable to provide financial assistance to any private sector activity unless failure to do so imposes systematic risk. It is unusual for DFID to play a role in broader private sector economic and financial recovery in conjunction with the total physical development of a whole island. DFID's activities are normally confined to small enterprise development. Overall, there was a fundamental failure to appraise possible actions and decisions within a broader framework, assessing their aggregate consequences for economic performance and the pace of economic recovery. HMG should perhaps have considered special context-specific institutional solutions. Indeed, a lesson from the emergency is that the strenuous attempt by HMG departments to work within existing managerial arrangements has impeded an effective response.

Connectedness

9.47 Addressing urgent emergency requirements whilst taking into account longer-term needs is widely recognised as a difficult, often unsatisfactory aspect of emergency and humanitarian relief responses. The evaluation has examined these issues in terms of sectoral economic issues. The overall conclusion is that so far this has been a less satisfactory aspect of HMG's response. It also offers some possible lessons for future emergency actions.

9.48 The chief areas of disagreement between the GoM and DFID have concerned the longer-term needs of the island and whether these should be taken into account in specific emergency actions. Apart from the provision of immediate relief and contingency planning for emergency actions - and even the latter was initially seen by the GoM as prejudicial to development - there was no clear-cut division between emergency and development programmes. Most emergency investment activities have a potentially important development value. These include the jetty, the hospital and the Immediate Housing Project. Others, such as the provision of shelters and GHQ, have mainly emergency-related use but will have a residual intrinsic value.

9.49 The particular problem in Montserrat has been that neither the full extent of the damage, nor the length of time over which the emergency would continue was predictable. This has made it difficult to assess the potential development benefits of investments ex ante and thus to take decisions on their scale and nature. Instead, there has been a tendency, as already indicated, to meet the immediate needs of the island, thus reducing commitment of resources in the short-term. HMG's problem has been to determine the dividing line between following procedures for emergency aid and development aid.

9.50 An important lesson is that it is difficult, at the level of individual actions, to meet emergency needs in a developmental way. As soon as questions of durability and residual intrinsic values enter into consideration, there is potentially a sharp trade-off between making a timely response to emergency requirements and durability or reusability. Costs also escalate.

9.51 The response to the economic and private financial consequences of the volcanic emergency has been ineffective, apart from the planning-for-recovery aspects of the SDP and the CPP, which were only agreed between October 1998 and January 1999. This failure, combined with the lack of success in making emergency actions more developmental, suggests that separate interventions to address different objectives. In addition to actions and preparations to prevent loss of life, complementary measures are needed in an economy-wide disaster to limit damage to the private sector, assist its recovery, and protect financial institutions. These requirements were not anticipated, with serious costly consequences.

Coherence (co-ordination)

9.52 Many of the delays, omissions and shortcomings in HMG's response are linked to the complexity of HMG management and the administrative system in Montserrat. This complexity, particularly in the early period of the crisis before DFID was represented on Montserrat, led to poor internal communications, which separated information from points of decision, and to a lack of clarity about where the final responsibility for action lay.

9.53 The system in Montserrat, which gives responsibility to the elected GoM, the Governor/FCO and DFID, often left none of them with clear authority for many of the decisions which had to be taken. The changes made since September 1997 have considerably simplified management arrangements within the FCO and DFID. However, there is still a triangular relationship, in which the Governor/FCO, DFID and the GoM have distinct responsibilities and differing priorities. These need to be reconciled if genuine policy coherence is to be achieved. The three-year funding commitment and the CPP process provide the opportunity to undertake this, if there is a restoration of delegated authority.

9.54 The overall co-ordination of HMG's response has involved a progressively wider and higher level of consultation and actual co-ordination as the emergency continued and intensified. However, only after the establishment of the MAG, ultimately chaired at Ministerial level and with Cabinet Office monitoring, did a crisis programme rapidly take shape, with regular performance monitoring.

9.55 The UK aspect is outside the scope of this evaluation, but two issues were drawn to the Team's attention that may be considered in a separate review. First, the reception and assistance provided to those on assisted passage had to be 'fine-tuned' reactively as problems were encountered. There are possible lessons to be learnt in any future limited programme for displaced people, many with special needs. Secondly, where several departments are involved, the determination of financial responsibilities and the implementation of investigations, such as in health, may require 'directed' co-ordination which is most effective at a higher, even ministerial level.

9.56 There is also the question of HMG's co-ordination with other governments and organisations that were actually or potentially concerned with, and contributing to, the emergency response. Initially, the Eastern Caribbean states demonstrated considerable willingness to assist, for example by accepting evacuees. They were subsequently, as the International Development Committee report finds, little involved and not kept up-to-date on developments. The CARICOM housing initiative has failed to make a timely contribution to solving the immediate housing problem.

9.57 Early in the emergency DFID sought to obtain an EU/ECHO contribution to the temporary hospital which after some delay was refused, apparently because the situation in 1996 did not then constitute an emergency. Later ECHO offered official assistance to emergency housing after the fatalities of 25 June 1997. In 1996 the Chief Minister had sought, but been unable to obtain, non-British funding

sufficient to finance an emergency housing programme. The US Office of Foreign Disaster Assistance offered technical assistance from the US Geological Survey in July 1995, if this was funded by HMG. These cases illustrate the extent to which the emergency came to be widely viewed at a financial level as a British colonial responsibility.

9.58 Positively, the evaluation found that there had been consultation and co-operation with neighbouring Antigua over off-island evacuation planning and the temporary reception of relocated people, especially those en route to the UK in 1997. EU partners, France and the Netherlands, assisted with emergency search and rescue and evacuation of the injured in June 1997. There has been close consultation with the authorities in the French Overseas Department of Guadeloupe on possible mass evacuation and scientific monitoring. More widely, public scientific institutions such as the USGS and individual scientists have taken a professional interest, providing advice in what, from modest beginnings, became one of the most closely monitored volcanic eruptions.

9.59 The seven evaluation criteria make a useful checklist of issues for assessment, provided the list is treated with flexibility in a specific context. It focuses attention particularly on the humanitarian lifesaving, protective functions of an emergency response, which was also HMG's priority up to August-September 1997. The wider economic and financial effects of the catastrophe which then impinged sharply on individuals are given too little attention. Urgency is what distinguishes emergency actions and provides their rationale, and so timeliness should be clearly distinguished from other issues of appropriateness or suitability, i.e. the specifics of a response. In exploring the involvement of affected people, particular attention should be given to public information about the course and consequences of a natural disaster as well as public responses. Where a natural hazard has caused or precipitated the emergency, separate attention ought to be given to the role of scientific advice in preparedness and mitigation of disaster impacts. Institutional arrangements for managing an emergency should also be considered, as in Chapter 8.

C. NATURAL DISASTER EMERGENCY MANAGEMENT: SOME LESSONS FROM HMG'S RESPONSE

9.60 The evaluation has examined in some detail the specifics of HMG's response, finding both successes and failures. Scientific opinion and disaster management experience indicate that the Montserrat volcanic emergency has been exceptional in being both so long-drawn-out and so full of uncertainty about how the eruption would progress. This uncertainty allowed different strategies to be promoted by key stakeholders. These reflected a different balance of immediate and longer-term responsibilities and interests. The response for which HMG and the GoM were responsible is widely accepted as having been unsatisfactory in many aspects up to mid-1997. Since then, although there was agreement in September 1997 on a crisis programme and planning for reconstruction, substantial problems have been encountered in implementation, with a considerable slippage from the initial

timetable for completion in building construction and support for private sector housing, whilst important policy initiatives including more targeted social assistance and financial sector strengthening were not achieved. A cost-effective solution, involving an acceptable level of risk for a fixed-wing airlink, is waiting on the volcano. The aggregate impact of HMG's response since September 1997 is unimpressive in relation to the specific tasks set and the scale of response being provided.

9.61 It was not, however, the purpose of the evaluation to make detailed recommendations on future policy and implementation in Montserrat. Rather, its objective, in the spirit of the International Development Committee's original recommendation, was to draw out lessons on scientific monitoring and natural disaster response for the OTs and more generally. The recommendations of the evaluation therefore concentrate on institutional and management arrangements that could contribute to more effective responses to major natural disasters by HMG in two situations: the first where HMG has constitutional responsibilities in an OT; the second in a country or region where HMG considers the specific circumstances require it to take a major or lead role in managing an emergency response.

A team or task force approach to crisis management

9.62 HMG departments attempted to manage the Montserrat emergency within normal institutional arrangements both in London and the Caribbean. This was associated with a reactive, catching-up strategy and ad-hoc adjustments to management, as these became unavoidable. The alternative is to attempt from the outset a more ambitious strategy of 'capping' the problem. This may require a task force approach, involving a temporary crisis management team.

9.63 The DFID model of emergency response implies assessment, commitment of resources to actions by others, directly or indirectly, and monitoring and reassessment or bringing the activity to an end. This approach requires limited managerial involvement. The Montserrat emergency was different in that HMG was itself directly involved in the management of the emergency from the beginning and on an indefinite basis. Eventually, two parallel enhanced FCO and DFID management teams were built up on-island. But, where the UK is likely to have a direct involvement or take a lead role, and also where more than one department is involved, then bringing together in a specific task force a sufficient capacity to oversee all aspects of the response is managerially cost-effective and can provide coherence. This might be achieved by drawing together capacity from within different government departments or by directly recruiting a temporary capacity from outside government. The task force would have a leader of sufficient seniority and relevant experience to initiate action and with considerable delegation of authority, including financial authority, reporting to the highest level. The option of an inter-departmental task force should be considered from the onset of a crisis where DFID, FCO and MOD are likely to be involved, and personnel and material are required as well as financial resources.

9.64 An Emergency Room is sometimes set up within departments with crisis management responsibility, for example, the MoD or the Home Office, as well as the FCO. Its small secretariat provides a focal point for information exchange, consultation and documentation in a rapidly evolving crisis. There were at least two crisis points during the Montserrat emergency, when this might have been useful - in July–September 1995- drawing in the FCO, ODA and the MoD, and in mid-1997, also involving a number of other Whitehall departments and agencies with financial regulatory responsibility. The temporary establishment of an emergency room or centre and crisis secretariat should be explicitly considered in procedures for disaster management in the OTs by FCO or by DFID.

9.65 DFID is understood to be strengthening its humanitarian assistance capacity in contracting an agency to supply a range of management, logistical, social, and institutional skills. Such an agency could have provided valuable services from the outset of the Montserrat emergency in contingency planning, procurement and co-ordination.

9.66 The high degree of specificity in each natural disaster makes it desirable to ensure that senior decision makers are supported by high quality scientific advice in London and in situ.

9.67 Both the FCO and DFID experienced difficulties in staff placement for urgent assignments in Montserrat through normal procedures. It may be appropriate to review procedures for more effective, timely internal placements of staff in an emergency, and to consider whether adequate incentives are in place to attract and retain appropriate personnel.

Fast-tracking emergency involvements

9.68 The evaluation supports the near-unanimous view of Montserratians and most of those involved from the UK that there is a need for fast-tracking emergency infrastructure and accommodation, addressing immediate and short-term (up to 3-4 years) requirements. These should be considered separately from longer-term development needs and, temporarily, given priority.

9.69 There are different ways in which this might be accomplished. A multi-disciplinary team, or task force in-country, could quickly navigate standard procedures if given sufficient delegated authority. More generally, development project guidelines could be reviewed to establish a fast-track sub-set of procedures for a limited range of exceptional circumstances. But the institutional culture and relationship with partners must also support, rather than deter, urgent more risky actions.

9.70 Disaster preparedness, including contingency plans that identify what may be required, will also facilitate fast-tracking in an emergency. This is a priority for the more disaster-prone OTs, including Montserrat.

Promoting partnerships in the Overseas Territories

9.71 The elected members of the LegCo and senior GoM officials would have benefited from familiarisation with HMG practice and procedures. The partnership relationship envisaged between the FCO, DFID and the OTs would be facilitated by such training and, in particular, co-operation in emergency management could be made more effective in this way.

9.72 There is an urgent need to clarify appropriate standards to which the 'reasonable claims' of the OTs on British aid are to relate, especially in an emergency. Otherwise there is an unavoidable bargaining situation that can become adversarial. The on-island or within-territory level of provision for health care and education, involving relatively large capital and recurrent costs, are obvious areas for clarification. The proposed restoration to OT British subjects of full rights of residence in the UK (FCO, 1999) will in future remove one source of problems like those encountered during the Montserrat emergency.

Institutional arrangements for post-disaster reconstruction

9.73 Reconstruction is especially challenging when, as in Montserrat, it is largely based on the physical development of a previously underdeveloped area. Development of the north of the island is currently the responsibility of GoM ministers and officials as well as DFID. The former have limited and already overstretched capacity. The latter would not normally be involved in managing the task. There have also been disagreements on priorities and approaches. The task of reconstruction is considerable and will require, as the SDP indicates, private sector capital and entrepreneurial expertise if it is to succeed.

9.74 A major aspect of the reconstruction is physical planning and its implementation, including land acquisition and use. These tasks are akin to those which in post-war Britain were entrusted to the New Town Development Corporations. Such a corporation might provide a relevant model for the development of northern Montserrat. It would have a board on which all key stakeholders were represented and would provide a way of drawing in some with large-scale business and financial experience from the UK and the international business community. It would require a chief executive. The corporation would be able to draw on planning expertise and those with knowledge of business possibilities. It would enable the GoM to concentrate on the normal responsibilities of government and DFID to withdraw to its usual aid management role.

9.75 An alternative, more easily implementable institutional arrangement for the physical development of the north of the island and reconstruction would be to contract a consortium of architects and consulting firms to cover all requirements. But this would require surplus monitoring.

D. MONITORING THE VOLCANO: RISK ASSESSMENT AND VOLCANO-SEISMIC CRISIS MANAGEMENT

9.76 The evaluation would be incomplete without reflecting on what the lessons are for the scientific aspect of hazard monitoring and crisis management.

The future of Soufrière Hills Volcano

9.77 The resurgence of magma and growth of a new lava dome (end October - early November 1999) underscore the urgent need for a line-of-sight observatory with a wide range of functions. Even when new magma is no longer emplaced in or outside the volcano, close monitoring will be needed for at least a further ten years, after which monitoring will need to be continued for the foreseeable future. The dome will remain dangerously hot for decades, and even when collapses during cooling have reduced the threats of pyroclastic flows, steam (phreatic) explosions of groundwater will remain a significant risk. Before vegetation stabilises most slopes, there will be considerable erosion by rainfall, with significant hazards from lahars. As the pace of erosion diminishes, engineered conduits and barriers will need to be built before regular domestic and recreational access can be fully restored and selected areas rehabilitated. The pattern of volcano-seismic crises in the past, with a 'failed eruption' every 30 years (approximately) on three occasions before this actual eruption, suggests elevated risks of another eruption around the year 2025.

The future of the Montserrat Volcano Observatory

9.78 The future MVO will need a proper observation facility, monitoring equipment, scientists and technicians to fulfil its functions. Essential on-going research will need co-ordination at the Observatory as well as scientific personnel to engage in research activities, conceivably alongside monitoring duties. In addition, the Observatory will have a key role as an information centre, from which a campaign of volcanic hazard awareness can be undertaken. Furthermore, it will have to take its place in the regional network of observatories and in any future projects concerned with hazard preparedness and mitigation.

9.79 The MVO is to be put on a statutory, permanent basis. In practice, this will require the assurance of sufficient full-time staff, funded through the GoM with UK budgetary resources administered by DFID and the MVO Management Board. The Board's role will also be to ensure professional integration into a network for the Caribbean, as well as for the UK and the wider international community of volcanologists and seismologists.

Volcano-seismic monitoring and research and the Caribbean region

9.80 The Montserrat experience has relevance for risk assessment and volcano-seismic crisis management elsewhere. The lessons of Montserrat are profound for the rest of the Caribbean region. Eleven of the Caribbean islands are active volcanoes and sooner or later all will face problems similar to those of Montserrat. At least two eruptions in the next century are likely to involve volcanoes that have not erupted in this century. The Caribbean region will therefore need a strong regional scientific seismicity and volcanic activity surveillance organisation. The Seismic Research Unit of the University of the West Indies in Trinidad is the obvious location and it will need to be strengthened as part of a wider global network for volcanological and seismic research and monitoring.

9.81 Visual observation from helicopters is unreliable. There was a hazardous two-month gap in observations from late September 1995 and shorter gaps in June 1997. It is also relatively risky. In future it would be appropriate to evolve state-of-the-art high-resolution satellite imagery to monitor an erupting volcano on a daily basis. The practicality and costs of this addition to monitoring need to be considered by remote-sensing specialists and volcanologists in consultation. The potential importance of such developments underlines the need to ensure that the regional network will involve the expertise and financial support of all the countries with interests in the region including the UK, its EU partners France and the Netherlands, and the United States.

Disaster preparedness in the Overseas Territories

9.82 All the volcanic islands in the Caribbean region and several British OTs elsewhere require periodic up-to-date hazards assessment with associated scientific study. The aftermath of the Montserrat crisis seems an ideal time to raise levels of awareness and preparedness at these sites. The study of disaster preparedness in the Caribbean OTs, recommended by the International Development Committee and being undertaken by ELMT, offers an opportunity to do this.

9.83 Our narrative began with the failure to take account of recent scientific research on volcanic risks in Montserrat that was published in a major scientific journal and even presented in a widely available school textbook. Commissioned under the umbrella of a regional programme, the Pan-Caribbean Disaster Prevention and Preparedness Project and with the impetus coming from the GoM which wanted an assessment, the Wadge and Isaacs report of 1987 and its subsequent publication seems to have somehow escaped the attention of all those most closely involved. Such a serious omission must clearly not be allowed to occur again. A mechanism such as an advisory panel and a point of responsibility are required for ensuring that concerned officials in the FCO and DFID are kept informed of directly relevant scientific developments regarding natural hazards.

APPENDIX A

TERMS OF REFERENCE

Introduction

Since volcanic activity started on Montserrat in 1995, some £62 million of emergency aid, development assistance and budgetary aid has been committed by DFID. This has included the establishment of emergency air and sea links; the building of a new jetty, power and water supplies in the north of the island; housing for those displaced from the central and southern parts of the island; improvements to education and health facilities in the north; and the maintenance of essential services. In addition, assistance has been provided for people relocating from Montserrat to Britain and elsewhere in the Caribbean. Given this considerable level of support, and the important potential read across to other emergency situations, a study is to be commissioned to determine lessons to be learnt from the emergency response to the Montserrat crisis. The study will be undertaken by independent experts.

Purpose

The purpose of the study is to review HMG's preparations, organisation and delivery of emergency aid in response to the Montserrat crisis and identify findings and lessons learnt particularly with general application to aid responses to prolonged natural disasters. The study will take account of the Evaluation Synthesis of Emergency Aid, which was undertaken, for DFID in 1997.

Specific Objectives

In consultation with the GOM, DFID and the FCO, the evaluation team will review the emergency response to the Montserrat crisis against six key criteria:

i. Appropriateness: the appropriateness and timeliness of the responses provided, including the balance between emergency aid, development assistance and budgetary aid.
ii. Cost-effectiveness: effectiveness of the interventions in terms of the cost of particular activities or of the unit costs of the assistance. Assessment of value for money; benefits in relation to costs.
iii. Impact: conclusions on the social and economic impact on Montserrat and its people, e.g. number of lives saved by the interventions, extent of alleviation of suffering, the provision of relief and benefits, which sectors of the population were positively (or negatively) affected by the emergency response and how this related to intended targeting.
iv. Coverage: extent to which the effectiveness of interventions involved considered targeting of the affected population.

v. Coherence: overall policy coherence and co-ordination between the key actors (DFID, FCO, GoM, OGDs) in planning and delivery of interventions. Effectiveness of co-ordination mechanisms and consultation processes.
vi. Process: the degree of involvement of the affected population in planning and implementing overall responses and individual interventions.
vii. Connectedness: consideration of relief-development linkages or the continuum, as appropriate. Connections between emergency and other forms of aid.

Outputs

The evaluation team will produce an inception report following an initial visit by the Team Leader. A draft of the report of the evaluation will be produced by the beginning of February, for circulation within DFID, to the Government of Montserrat, and to relevant Whitehall departments. A final version of the report will be subsequently produced, reflecting, as far as is appropriate, comments on the draft received by the evaluation team. Guidance on the format of the report will be provided by Evaluation Department. Publication of the final report in DFID house style will be arranged by Evaluation Department.

Timing and Duration

Work should begin in September 1998. It is envisaged that the final report will be available by April 1999.

APPENDIX B

KEY EVENTS OF THE MONTSERRAT VOLCANIC EMERGENCY AND A VOLCANOLOGICAL NOTE ON THE SOUFRIÈRE HILLS VOLCANO ERUPTION 1995-1999

18 Jul 95 *Volcanic activity begins (around 1800 hrs GMT) with steam venting, followed by explosions and ashfalls on Plymouth area.* Emergency Operations Centre (EOC) activated at 2230.

25 Jul 95 FCO and ODA agree that overall responsibility for handling and coordinating HMG response will remain with West Indies and Atlantic Department.

28 July 95 British military team recommends the preparation of contingency plans for an evacuation centre in the north for 2500 people. Team also produces plan for full evacuation.

21 Aug 95 *First large phreatic eruption on Chance's Peak.* 5000 people evacuated from Plymouth and south.

7 Sep 95 Plymouth re-occupied.

25 Sep 95 *First signs of dome growth*

30 Nov 95/ 1 Dec 95 *Confirmation of dome growth with incandescent lava seen for first time and first small pyroclastic flow.*

2 Dec 95 Plymouth evacuated for a second time, with 6000 people relocated to the North.

22 Dec 95 *First magmatic eruption.*

2 Jan 96 Plymouth reoccupied.

21 Mar 96 GoM confirm acceptance of budgetary aid conditions.

3 Apr 96 Third and final evacuation of Plymouth. Acting Governor declares state of public emergency.

23 Apr 96 Voluntary Evacuation Scheme: Montserratians admitted to UK for 2 years.

11 Jun 96 *Dome growth switches to West side* putting at risk any commercial activity in Plymouth.
22 Aug 96 FCO and ODA announce further £25m Emergency Investment Package.

17 Sep 96 *First magmatic explosive event occurs without warning;* houses destroyed at Long Ground.
BGS(I) organises rotation of chief scientists from SRU and UK institutions.

11-13 Nov 96 Elections held. Bertrand Osborne sworn in as Chief Minister of first coalition government.

12 Dec 96 *Collapse of Galways Wall;* scientific prognosis is that the volcano now presents a threat to neighbouring islands, especially Guadeloupe, because of the possibility of a tsunami.

Apr 97 ODA's Aid Management Office operational on-island.

1 May 97 UK General Election; DFID created as separate Government department.

15 May 97 *Large pyroclastic flow marks beginning of heightened activity.*

17-18 Jun 97 Baroness Symons (PUSS, FCO) visits island and hands over Emergency Jetty to GoM.
25 Jun 97 *Pyroclastic flows east towards airport; destroy villages of Harris, Trants, Farms.* Flow west reaches Belham River. Nineteen people killed in danger area. Airport closed.

4 Jul 97 *Main activity switches to explosive and semi-explosive ash eruptions.*
Revised volcanic risk map puts more than half the island in the Exclusion Zone.

15 Aug 97 Governor orders evacuation of Salem, Old Towne and Frith; 1598 people in shelters.
19 Aug 97 Joint FCO/DFID announcement of Assisted Passage Scheme for evacuees to UK.

21 Aug 97 DFID announces Assisted Regional Voluntary Relocation Scheme.
Chief Minister, Mr. Bertrand Osborne resigns.

22 Aug 97 Mr. David Brandt sworn in as Chief Minister.

23 Aug 97 Montserrat Building Society suspends operations.

26 Aug 97 Montserrat Action Group formed for Whitehall co-ordination.

12 –18 Sep 97 Chief Minister leads a team to London; meets British Prime Minister; joint FCO/DFID Statement on Action Plan including housing, Soft Mortgage Scheme, return fares for evacuees from UK to Montserrat, SDP and airstrip feasibility study.

17 Sep 97	New Governor, Mr. Anthony Abbott, is sworn in.
20-25 Sep 97	Sir Kenneth Calman (Chief Medical Officer) and team visit island.
Nov 97	DFID, Montserrat Unit formally established.
10 Nov 97	Baroness Simons, PUSS, FCO, chairs MAG for first time.
27 Nov 97	International Development Committee's first report on Montserrat published.
2 –18 Dec 97	Scientists produce scientific and risk assessments, validated by UK Chief Scientific Adviser.
26 Dec 97	*Largest explosive event involving about 50 million cubic metres of material.*
10 Mar 98	*Significant reduction in volcanic activity; magma eruption ceases.*
21 May 98	Home Office announces offer of settlement to Montserratian evacuees.
11 Jun 98	Secretary of State for International Development announces pledge of £75 million over next three years. Draft Sustainable Development Plan published
13 Jul 98	Overseas Territories Department established within FCO.
14-16 Jul 98	Scientists confirm reduced volcanic activity and lower risk.
1 Oct 98	Reoccupation of Salem, Old Towne and Frith begins
end-Nov 98	MAG terminated by FCO.
11 Jan 99	Inquest verdict on deaths of 25 June 1997; HMG and GoM criticised
13 Jan 99	HMG and GoM agree 3 year Country Policy Plan for period 1998/9-2000/1.
12 Mar 99	Scientific assessment indicates risk to populated areas has fallen to levels of other Caribbean islands with dormant volcanoes.
1 May 99	Assisted Return Passage Scheme begins.
27 Nov 99	*New lava dome observed, confirming that magma activity had resumed.*

A volcanological note on the Soufrière Hills Volcano eruption 1995-1999:

The key events listed above and more fully in Annex 10 include the most important physical events in the eruption from a human perspective. In this note these events are summarised and explained for the benefit of non-scientific readers.

Montserrat is one of the Caribbean volcanic islands comprising the east-facing Lesser Antilles volcanic arc that extends from Grenada in the south to Saba in the north (Figure 1). Unlike the familiar eruptions of Hawaii, characterised by vigorous 'fire-fountaining' and rapid flow of 'runny' (low viscosity) basalt lavas, the Lesser Antilles volcanoes typically erupt relatively small volumes of highly viscous *andesite lava,* in the form of slowly growing *lava-domes* or spines, and/or explode violently to produce tall columns of *ash* that can extend into the stratosphere and are a hazard to aircraft. Particularly dangerous at these volcanoes are *'pyroclastic flows',* which are hot mixtures of rock and magma fragments with air that flow down slopes, commonly at velocities exceeding 30 metres per second (nearly 70 mph) and locally twice that. Their temperatures commonly exceed several hundreds of ^{o}C and they burn, sweep away or bury obstacles in their path. Pyroclastic flows are lethal; they killed some 29,000 persons in 1902 at St Pierre on Martinique and they accounted on Montserrat for the tragic deaths of 25 June 1997.

The Soufrière Hills in 1995-1998 came from a reservoir (technically a magma chamber) at a temperature of around 850^{o}C, located roughly 6 kilometres below the volcano. *Phreatic explosions,* produced by the sudden release of heated groundwater that expands explosively as steam and blasts out old volcanic rock, characterized the opening phase of the eruption as magma approached the surface. Most of the eruption subsequently involved a relatively slow ascent of magma and extrusion of andesite lava to form a lava dome, with numerous collapses that produced devastating pyroclastic flows. On three occasions (17-18 September 1996 and two protracted intervals in August and September-October 1997) *magma explosions* erupted from deep in the conduit. During the explosive episodes, *andesite bombs,* tens of centimetres to metres in diameter rained down in areas extending up to 2 kilometres from the volcano summit, devastating affected property. Both explosive eruption columns and pyroclastic flows produced blanket-like deposits of fine gritty to flour-like *ash,* the immediate effects of which were more of a nuisance than directly hazardous, apart from the dangerous effects of reduced visibility during fallout and possible roof collapse owing to loading. However, the *fallout ash* from pyroclastic flows from dome collapse at Soufrière Hills Volcano contains the mineral *cristobalite* which is known to cause symptoms similar to silicosis developed in miners. Many hundreds of dome-collapse pyroclastic flows have occurred with associated fallout over inhabited parts of Montserrat (and there will be many more), and the long-term health implications of inhalation of cristobalite are imprecisely known.

Physically, the most catastrophic event of the eruption occurred on 26 December 1997 involved pyroclastic flows and violent, laterally directed blasts. Southern villages were destroyed, a substantial amount of debris entered the sea and a small *tsunami,* or tidal, wave was formed.

In all stages of the eruption major rainfall has caused lahars (sometimes referred to as mud-flows), which can be highly erosive on steep slopes and tend to build deposits along river beds and adjacent areas, especially where slopes diminish near the coast. Numerous lahars are progressively burying Plymouth.

The ascent of new magma and dome growth apparently ceased by 10 March 1998. Then, 20 months, later in November 1999 the appearance of a new dome and rising magma were confirmed. This was quickly recognised in the scientific assessment of December as making prediction of the future course of the eruption more uncertain. Even if little new magma is extruded, the dome of Soufrière Hills Volcano will take decades to cool. Thus significant potential hazard from hot pyroclastic flows will remain for a decade or more, depending on the course of the dome's degradation. Throughout the cooling processes the dome will tend to crumble and form avalanches until it has few steep slopes. Also for decades to come, ground water will circulate around and into the hot rocks at depth and may be violently released at the surface in phreatic explosions. Magmatic gases will continue to be released vigorously, if not explosively. The cooling will be associated with continued ground deformation and seismicity above background levels.

Appendix B: Key events of the Monserrat volcanic emergency

APPENDIX C

LIST OF PEOPLE CONTACTED [10]

Governor's Office

Anthony J. Abbot, Governor
Robert Webb, Head of Governor's Office
Richard Aspin, and Press and Public Affairs Officer

Legislative Council Members

Howard Fergus, Speaker of the House (and Acting Governor)
David S. Brandt, Chief Minister, Finance, Trade and Economic Development
P. Austin Bramble, Minister of Agriculture, Land, Housing and the Environment
Adelina E. Tuitt, Minister of Health, Education and Community Services
Rupert Weekes, Minister of Communication and Works
Charles Ekins, Attorney General
C.T. John, Financial Secretary
Reuben Meade (Former Chief Minister)
Bertrand Osborne (Former Chief Minister)
D.V.R. Edwards, Deputy Speaker

Government Departments

Emergency Dept.
Franklyn Michael, PS (now retired)
Horatio Tuitt, Assistant Secretary, Operations

Ministry of Finance
Oral Martin, Economic Adviser
Cynthia Farrell
Cecil Brown
Kingsley Howe
Florence Leigh
Geraldine Cabey, Accountant General

Development Unit
Angela Greenaway, Director

[10] Persons with whom members of the team had formal meetings or structured telephone discussions

Appendix C: List of people contacted

Ministry of Agriculture, Trade and Environment
Sarita Francis, Director of Housing
Gerard Grey, Acting Director, Agriculture
Melissa O'Garro, Fisheries Officer
Easton Farrell, Agriculture Officer
Jim W Bass, Special Adviser
Cecil W Lake, Housing Inspector/Field Supervisor
Sylvia White, Administrative Officer, Land Development Authority

Jim W. Bass, Special Adviser
Cecil W. Lake, Housing Inspector/Field Supervisor
Sylvia White, Administrative Officer, Land Development Authority

Ministry of Communication and Works
Eugene Skerrit, PS
Michael Duberry, Acting Manager, Montserrat Water Authority
Franklyn Greenaway, Physical Planning Unit

Ministry of Health and Education
John Skerrit, PS (now on sabbatical leave in UK)
Ronnie Cooper, Director of Health Services and Chief Medical Officer (now in private practice)
Sister Donahughe, Psychiatric Nurse
Vernon Buffonge, Former PS
Trevor Howe, Environmental Health Officer
Oeslyn Jemmotte, Director of Education
Alris Taylor, Acting Director of Education (now PS, Health and Education)
Kathleen Greenaway, Principal, Montserrat Secondary School
Eudora Fergus, Deputy Principal, Montserrat Secondary School
Eliza O'Garro, Principal, Brades Primary School

Community Services Dept.
Darnley Estwick, Principal Community Development Officer (now retired)
B. Collins, Community Development Officer
Joseph Curwen, Community Development Officer

Food Voucher Office
Alma Meade
Annetta Blake

Customs
Roosevelt A. Jemotte, Port Manager, Montserrat Port Authority
Stanford Ryan, Airport Manager (now retired)
Raymond Cabey, Senior Airport Officer

Statistics
Teresina Bodkin, Chief Statistician

Human Resources/Administration
Claudia Roach, PS

Royal Montserrat Constabulary
Chris Burgess, Commissioner of Police
Charles Greeney, Superintendant
Stephen Foster, Inspector

Montserrat Volcano Observatory

William P. Aspinall, Chief Scientist
Paul Cole, Scientist
Tim Druitt, Scientist
Susan Loughlin, Deputy Chief Scientist
Angus Miller, Scientist
Gill Norton, Deputy Chief Scientist
Richard Robertson, Chief Scientist
Keith Rowley, former Chief Scientist
Stephen J. Sparks, Chief Scientist
Simon Young, Chief Scientist and subsequently Director

HMG

Department for International Development
George Foulkes, Parliamentary Under Secretary of State
Frank Black, Formerly Head, AMO
Patricia Bridge, DFID Antigua
Graeme Carrington, Formerly Health Field Manager
Charles Clift, Formerly Economic Adviser, BDDC
Janet Gardener, Social Development Adviser
David Gillett, Engineering Adviser
Paul Hailston, Desk Officer, Montserrat; Overseas Territories Unit
Tony Hill, NR Adviser, AMO

Appendix C: List of people contacted

Doug Houston, Head, AMO
Alan Jenkinson, Engineer, AMO
Mukesh Kapila, Head, Complex and Humanitarian Affairs Department
William Kingsmill, Formerly Economic Adviser, BDDC
Jim McCredie, Engineering Adviser on Hospital
Tim Martineau, Health and Population Adviser
John Milnes, DFID's Adviser in PWD Montserrat
David Nabarro, Former Head, Health and Population Division
Peter O'Neill, Engineering Adviser
MelvynTebbutt, DFID Construction Manager on Hospital
Richard Teuten, formerly Head, Overseas Territories Unit
Mike Wood, Head, Overseas Territories Unit
Ellen Wratten, Social Development Adviser, BDDC

Foreign and Commonwealth Office
Phil Ellis, Desk Officer, Overseas Territories Department
David Hollamby, Deputy Head, Overseas Territories Department
Alan Huckle, Formerly Head, DTRS
Frank Savage, Former Governor (present Governor, BVI)

Ministry of Defence
Nicholas Gurr, Formerly Assistant Director, Overseas Secretariat (Western Hemisphere Division)
Ian Hime (Rtd.), Former Defence Attache, Bridgetown
Kevin Pollard, Desk Officer, Overseas Secretariat (Western Hemisphere Division)
Lawrence Smallman, Desk Officer, Directorate of Overseas Military Activity
Mark Spicer, Formerly Desk Officer, Directorate of Overseas Military Activity

Treasury
Marcello Casale, International Financial Services

Financial Services Authority
Jean Moorhouse

Dept. of Social Security
David Tottey

Dept. of the Environment, Transport and the Regions
Russell Netto

Home Office
Alan Lawrence, Emergency Planning Division
Mark Porter, Emergency Planning Division
Sally Titterington, Race Equality Unit

Dept. for Education and Employment
Beverly Grant
Kevin McLean

Dept. of Health
Robert Maynard, Senior Medical Officer

Office of Science and Technology
Robert Clay, PS to Chief Scientific Adviser

National Audit Office
Cliff Kemball

Others

Montserrat and the Caribbean
Beatrice Allen, Librarian, Montserrat Public Library
John Allen, NEMWIL Insurance Company
Neville Bradshaw, Director, Montserrat Building Society
Kenneth Cassell, Managing Director, Montserrat Stationary Centre
Roselyn Cassell-Sealy, Executive Director, National Development Foundation
Elveta Chalmers, Administrative Office, Montserrat Tourist Board
Manu Chandirmirani, Owner/Manager, Rams Supermarket
Mary Cooper, Old People's Welfare Association
Gregory DeGannes, Manager, Bank of Montserrat
Betty Dix, Tradewinds Real Estate
Michael Dodd, Brown & Root's Project Manager in Montserrat
Eddy Edgecombe, Chairman, Montserrat Tourist Board
Susan Edgecombe, Tradewinds Real Estate
Mike Emanuel, Tropix Traders
Bruce Farara, President, Montserrat Chamber of Commerce and Industry
Fr. Larry Finnegan
James Hixon, Managing Director, Montserrat Building Society
Blondina Howes, former Director of Community Services and DFID (Antigua)
David Lea
Barry McGonigal, Horizon

Appendix C: List of people contacted

Lystra Osborne, Montserrat Red Cross
Fr. Victor Peters, Montserrat Christian Council of Churches
Vincent Placid, Secretary/Treasurer, Montserrat Building Society
Bennette Roach, Editor, Montserrat Reporter
Don Romeo, journalist
Danny Rowland, Horizon
Jacquie Ryan, Agents for United Insurance
John Shepherd, Seismic Research Unit, Trinidad
Camilla Watts, Director, Montserrat Red Cross
Candia Williams

UK and elsewhere
John Adlam, Emergency Logistics Management Team
Clarice Barnes, Birmingham University
Peter Baxter, University of Cambridge Medical School
John Bennett, formerly BGS
Lucy Bonnerjea, LSE
Peter Burton, Emergency Logistics Management Team
Amanda Clarke, Penn. State University, USA
Daniel Daley, MOPPA
Peter N. Dunkley, BGS
Jane Furlong, MOPPA
Frank Hooper, former Commissioner of Police, RMPF
Lazelle Howes, The Montserrat Community Support Trust
Jasmine Huggins, Christian Aid
Roland Lubett, Armidale, Australia
Alan Matthews, Emergency Logistics Management Team
Edwin Ono'Regie, The Montserrat Project
Antony J. Reedman, Director, BGS(I)
Geoff Robson, formerly Director, Seismic Research Unit, Trinidad
Paul Sargeant, formerly Adviser, PWD and AMO Montserrat
Amanda Sives, Nottingham Trent University
Jonathon Skinner, Keele University
David G.P. Taylor, Former Governor of Montserrat
Barry Voight, Penn. State University, USA

APPENDIX D

THE EVALUATION TEAM: BIOGRAPHICAL NOTE

Dr Christine Barrow is a Senior Lecturer in Sociology at the University of the West Indies, Barbados, and Head, Department of Government, Sociology and Social Work. Her main research focus is on Social Development issues with a Caribbean and Third World focus, specialising in Family, Gender, Poverty Alleviation, Rural Development/Land Tenure/Agrarian Reform. She has completed several consultancies throughout the region.

Ms Charlotte Benson is a Senior Research Associate at the Overseas Development Institute, London. Since 1993, she has been undertaking research and also related consultancies for the World Bank and Asian Development Bank on the economic impacts of natural disasters including recent studies on Fiji, Philippines, Vietnam and Zimbabwe.

Dr Edward Clay is a Senior Research Associate at the Overseas Development Institute, London. He was formerly Director of the Relief and Development Institute, London, and a Fellow of the Institute of Development Studies at the University of Sussex. Recent activities include acting as Team Leader for both the Evaluation of ODA's Response to the Southern African Drought and for the Joint Evalaution of EU Programme Food Aid on behalf of the EU Working Group of Heads of Evaluation and a member of the international advisory panel for the Bangladesh Flood Action Plan.

Mr Jim Dempster is a Civil Engineer who started his career in the Sudan Irrigation Department then spent 32 years with Sir M. MacDonald & Partners, followed by assignments as an independent consultant for multi-national bi-lateral aid agencies. He specialised in land and water resource development and formulating policies and plans for combating flood disasters mainly in south and south-east Asia, but latterly in the Caribbean. He has been awarded a CMG and OBE for services to Civil engineering.

Dr Peter Kokelaar is Reader in Volcanology at the University of Liverpool. His research interests include physical volcanology and sedimentology. He has worked extensively on the island volcanoes of Surtsey (Iceland), Stromboli (Italy) and White Island (NZ). He has been a Visiting Professor at California Institute of Technology, a US Geological Survey Distinguished Visiting Scientist at Cascades Volcanic Observatory and the recipient of an award for outstanding research publication from the Lyell Fund of the Geological Society in 1997.

Dr Nita Pillai is a Food Policy Officer at Consumers International, formerly Research Officer with the Overseas Development Institute. She is a microbiologist and nutritionist and has worked on public policy issues relating to food aid and food security.

Appendix D: Evaluation team: Biological note

Dr John Seaman, is a medical doctor with extensive experience in the health aspects of international disaster relief and health service provision. He was a co-founder and first Editor of the journal, *Disasters.* He was formerly Head of Policy Development and is currently leading the group working on food security at the Save the Children Fund (UK). He was awarded an OBE in 1996 for his contribution to humanitarian relief.

The Department for International Development (DFID) is the British government department responsible for promoting development and the reduction of poverty. The government elected in May 1997 increased its commitment to development by strengthening the department and increasing its budget.

The policy of the government was set out in the White Paper on International Development, published in November 1997. The central focus of the policy is a commitment to the internationally agreed target to halve the proportion of people living in extreme poverty by 2015, together with the associated targets including basic health care provision and universal access to primary education by the same date.

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