GENERAL DISTRIBUTION

OCDE/GD(95)42

OECD WORKSHOP ON DEVELOPMENT ASSISTANCE AND TECHNOLOGY CO-OPERATION FOR CLEANER INDUSTRIAL PRODUCTION IN DEVELOPING COUNTRIES

28-30 SEPTEMBER 1994
HANOVER, GERMANY

SUMMARY RECORD

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Paris 1995

020575

COMPLETE DOCUMENT AVAILABLE ON OLIS IN ITS ORIGINAL FORMAT

This Summary Record is made availabe under the responsibility of the Secretary-General of the OECD.

Copyright OECD, 1995

Applications for permission to reproduce or translate all or part of this material should be made to:
Head of Publications Service, OECD
2, rue André-Pascal, 75775 PARIS CEDEX 16, France

Foreword

As part of its follow-up activities to the United Nations Conference on Environment and Development (UNCED) in 1992 and as part of its multi-Directorate Programme on Technology and Environment which focuses specifically on policies and measures to promote cleaner technologies in industry and other sectors, the OECD organised a Workshop on Development Assistance and Technology Co-operation for Cleaner Industrial Production in Developing Countries. This workshop was held in Hanover, Germany, on 28-30 September 1994, and was jointly organised by the Working Party on Development Assistance and Environment of the Development Assistance Committee (1) and the Pollution Prevention and Control Group of the Environment Policy Committee (2).

The major themes of the workshop were:

-- developing country policies and donor strategies in support of cleaner production;

-- capacity development for managing technological change for cleaner industrial processes and products; and

-- short- to medium-term concrete actions that promote cleaner production in developing countries, including: a) promoting access to information; b) enhancing the role of the private sector; and c) improving financing for cleaner technology through mobilising domestic resources as well as bilateral and multilateral development assistance.

This document presents a summary record of the workshop, notably the presentations given in the opening plenary and the ensuing discussions on the workshop themes. It has been prepared in collaboration with the workshop's Rapporteurs, Ms. Judy Daniel-Paul and Mr. Edgar Kröller.

---

1. The Development Assistance Committee (DAC) is the principal body through which the OECD deals with issues related to aid for developing countries. Its mandate is to promote an expansion of the volume of resources to developing countries and to improve the effectiveness of aid provided by DAC Member countries. These are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, the United States and the Commission of the European Communities, together with the International Monetary Fund, the United Nations Development Programme and The World Bank as permanent observers.

2. The Environment Policy Committee (EPOC) provides a forum for OECD Member countries to work together on assessment and development of policies, strategies and measures for environmental protection. In particular, the Committee is seeking to promote effective integration of environmental and economic policies and related technological innovation and diffusion. It is currently supporting and expanding "outreach" by OECD to non-Member countries.

Table of Contents

OECD WORKSHOP ON DEVELOPMENT ASSISTANCE AND TECHNOLOGY CO-OPERATION FOR CLEANER INDUSTRIAL PRODUCTION IN DEVELOPING COUNTRIES

28-30 September 1994
Hanover, Germany

SUMMARY RECORD

I. Introduction

1. This workshop was jointly organised by the Working Party on Development Assistance and Environment of the Development Assistance Committee (DAC) and the Pollution Prevention and Control Group of the Environment Policy Committee. It was held from 28-30 September 1994 in Hanover, Germany, at the invitation of the Minister of the Environment of the State of Lower Saxony.

2. The workshop's major aim was to review and discuss, in an action-oriented way, how donors can help to promote cleaner industrial production in developing countries. Discussions focused in particular on concrete actions in favour of cleaner production, including appropriate policy frameworks, capacity development, better access to information, private sector involvement and financing for cleaner technology promotion.

3. Participants included approximately 90 development and environment experts from government, the private sector, non-governmental organisations (NGOs), multilateral agencies from OECD Member countries and 23 low-to-middle income developing countries. Workshop participants submitted 37 short papers describing the significance that cleaner production approaches are being given to industrialising countries' development policies as well as to donors' assistance strategies and programmes.

4. The workshop opened with welcoming addresses by:

-- Mr. Bernard Wood, Director of the OECD Development Co-operation Directorate, Chair of Plenary Session;

-- Ms. Monika Griefahn, Minister of the Environment, State of Lower Saxony; and

-- Mr. Herbert Schmalstieg, Lord Mayor of Hanover.

5. This was followed by keynote addresses on "Development Assistance and Technology Co-operation for Cleaner Industrial Production in Developing Countries" by:

-- Mr. Joseph C. Wheeler, Former Chairman of the OECD Development Assistance Committee; and

-- Mr. Kalyan P. Nyati, Senior Advisor, Indian Confederation of Industry.

6. There were also background presentations by:

-- Ms. Jacqueline Aloisi de Larderel, Director of the United Nations Environment Programme/Industry and Environment Programme Activity Centre (UNEP IE/PAC), on "Strategies and Policies for Cleaner Production"; and

-- Mr. Ralph Luken, Senior Advisor at the United Nations Industrial Development Organisation (UNIDO), on "Cleaner Industrial Production in Developing Countries: Market Opportunities for Developed Countries and Potential Cost Savings for Developing Countries".

7. The meeting then formed three Working Groups to elaborate the substantive part of the agenda. The moderators of the Groups were, respectively, Ms. Edith Kürzinger (Germany), Mr. Mohamed Bouguerra (Tunisia) and Mr. Ronny Ferm (Sweden).

8. The final plenary session of the workshop, chaired by Ms. Rebecca Hanmer of the OECD Environment Directorate, considered, and commented on, the Report by the Rapporteurs, Ms. Judy Daniel-Paul and Mr. Edgar Kröller. (In its present form, the Report provides a summary of the debate and, in part, also draws on the Issues Paper which guided the discussions and many of whose conclusions were -- explicitly or implicitly -- accepted by the workshop.)

II. Opening Plenary

9. The introductory presentations highlighted a number of environmental challenges and opportunities in today's rapidly changing world. One of the crucial elements of the transformation process is the demographic explosion: the world population is expected to increase from around 5 billion in 1990 to roughly 10 billion in 2050. The size of families is shrinking and people are living longer and healthier lives. Aspirations and values are becoming increasingly globally shared perceptions. The pressure on natural resources and the environment continues to grow. Agenda 21, the Programme of Action which was adopted at the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, is an example of the growing recognition in the international community of the global interlinkages between developmental and environmental issues.

10. Notwithstanding broad general global convergence trends, there is still a considerable lag between the "North" and the "South". In their eagerness to reduce this gap, some developing countries' representatives have come to the conclusion that "development must precede the niceties of environmental concerns". Essentially, this view assumes that developing countries faced with poverty problems should ignore, at least temporarily, the linkages between development, environmental degradation and poverty. Others argue that, should the developing countries copy the model of economic development of the industrialised countries, which are still responsible for the largest share of environmental stress, an ecological collapse might be unavoidable.

11. Many experts note with satisfaction that the general attitude towards environmental concerns is becoming increasingly realistic. There is a progressive strengthening of measures to protect the environment. In most industrialised and developing countries the focus has been, by and large, on pollution

control and remediation. As the limits of that approach in terms of sustainable development are becoming increasingly apparent, more attention is being devoted to pollution prevention. In practice, however, the introduction of preventive measures and technologies has proved difficult to implement. For developing countries, the introduction of such precautionary approaches raises special problems and challenges.

12. Increasing the industrial base and promoting economic growth are vital for developing countries to improve their living conditions and to create jobs for a growing work force. In many developing countries, industrial production is expected to expand rapidly over the next few decades. Inevitably, this will confront them with a growing number of difficult environmental problems that may severely compromise their potential for sustainable development. A pressing issue for these countries is therefore to move beyond pollution control within the broad goal of integrating economic development and environmental protection and thus achieve sustainable development.

13. A key component in the development process is the use of appropriate technology. Increasingly, investments in hardware and know-how must focus on pollution prevention rather than on pollution control. Pollution prevention approaches, which can range from no- to low-cost "good-housekeeping" measures to more costly investments in process modification, reduce the consumption of raw materials and energy and the production of waste. Pollution prevention investments can significantly improve process efficiency and productivity. However, both in developing and developed countries, practice is lagging behind the conceptual progress made. The workshop was intended to help reduce this gap by identifying action-oriented, concrete steps to accelerate the diffusion and application of cleaner industrial processes.

14. Technological change is a complex political, economic and social process. Many developing countries lack sufficient financial, managerial and institutional resources to create the technological adaptations required. Hence, they miss opportunities for economic progress and risk falling behind in their ability to compete in world markets and to meet priority needs at home. These are powerful reasons why strengthening national capacities of developing countries to manage technological change must be considered a central issue for achieving sustainable development.

15. There is a whole range of existing and emerging cleaner technologies. To benefit from these, developing countries must develop the capacity to identify and assess needs and opportunities, to select between technology options, to find those that are suited to a country’s individual situation and then to adapt and further develop these technologies in each particular national setting. Developing countries must strive to ensure that technological change promotes environmentally sound production and manufacturing processes.

16. With a well functioning market now recognised as essential, growing importance is also being attached to promoting private initiatives and the role of the private sector in technology co-operation. Private initiatives, however, will fall short of what is required to achieve sustainable development unless governments create the enabling conditions necessary to encourage the diffusion of cleaner technology.

17. Developing countries rely on well-targeted development assistance and technology co-operation to take fuller advantage of the economic and environmental benefits that cleaner technology provides. Bilateral and multilateral development assistance agencies can help developing countries to create the enabling conditions in managing technological change for cleaner production. External aid can be an important vehicle to provide access to the wealth of OECD and other countries’ experience -- both positive and negative -- with cleaner technologies. Main areas for effective action include policy and regulatory

reforms, as well as developing the capacity to use and adapt imported technologies and eventually to generate environmentally sound technologies in the developing country itself.

18. Capacity development must be seen as a locally-rooted, open-ended process of change which ultimately depends on the society as a whole and its cultural fabric to accept change and adaptation. Any strategy for capacity development should therefore take into account each country's human, scientific, technological, organisational, institutional and resource capabilities. Donors can assist importantly in this process, but the main impetus must come from the recipient country itself.

19. Given the fact that the OECD has special expertise in specific sectors, it was proposed in the workshop that the OECD Development Assistance Committee work with other OECD Committees to promote development co-operation in specific, environmentally-important industrial sectors, particularly energy, steel and chemicals. Where appropriate, donor governments should involve the private sector in the aid process and encourage business to co-operate with the public and private sectors in developing countries.

20. Stepped-up co-operation for cleaner production should become an on-going feature in the policy dialogue with developing countries, in aid co-ordination and in the regular Aid Reviews of the donor community. It is of paramount importance that solutions be sought jointly and are regarded by developing countries as appropriately integrating economic development and environmental protection.

III. Working Group Discussions

A. Policies and strategies to promote cleaner production

21. Following the opening plenary, workshop participants were divided into three parallel working groups. These groups met for four half-day sessions to discuss and draw conclusions on the questions outlined under each theme of the Issues Paper. The following provides a consolidated summary of the discussions in the working groups.

1. Developing country policies

22. Developing country governments have a crucial role to play in creating the enabling conditions in which cleaner technology diffusion can take place. These conditions include political, social, micro- and macroeconomic factors which are conducive to technological change. A clear political commitment endorsed on a high political level to adopt and sustain policies in favour of cleaner production is a prerequisite to the establishment of such an enabling environment.

23. There was consensus at the workshop that governments should adopt a broad approach in devising strategies and policies in support of cleaner production processes. A key requirement for developing country governments is to create a policy framework favourable to the transfer and local generation of technology by the private sector. To that end, most participants advocated a combination of regulatory mechanisms and economic instruments. The promotion of technology innovation, voluntary agreements with

industry, increased public information dissemination, education and training, and awareness-raising were all identified as important elements of a national pollution prevention strategy. Other favourable measures include the protection of intellectual property rights, the support for joint ventures with foreign partners and the elimination of barriers for international trade in environmental technologies.

24. Legislation needs to be supported by effective enforcement procedures. However, strategies that promote voluntary compliance should also be encouraged with less reliance on command and control mechanisms. It is essential, therefore, to shape co-operation between government and the private sector in such a way that it encourages industry participation. Firms should be convinced that cleaner production is part of a profitable industrial development action rather than as government intervention based on environmental grounds.

25. While there are obviously common features in the general approach to promote cleaner production, national policies need to be adapted to each country's particular situation. It is imperative to translate policy guidance into simple language in order to help make the directives widely acceptable to users.

26. Many developing countries face considerable barriers in policy formulation. This is due to a lack of specialised staff, institutional support, technical capability, limited access to information, and a lack of co-ordination among the different government agencies concerned. Consequently, a key policy priority is to promote capacity development within policy and technical units of governments, private sector institutions and intermediaries such as consultancies.

27. It was generally recognised that the private sector should be involved at an early stage in policy development. To this end, the government should establish efficient channels of communication and co-operation. Private sector groups to be approached for dialogue and co-operation could include sector business associations, non-sectoral environmental management business associations, general business associations and consulting firms. Within government, ministries and departments, measures should be taken to ensure better communication amongst the agencies responsible for environmental matters and to provide focal points to which business can refer easily and effectively.

28. As to the priority policy areas for government action, it was suggested that a gradual approach, beginning with small, concrete steps followed by demonstration projects and the creation of networks ("start small, think big"), would be most likely to yield results. This gradual approach should be combined with setting realistic, i.e. achievable and enforceable, goals and deadlines. One outcome of such an approach could be the development of a structured plan for each developing country. The plan could also provide guidance for aid-management by the recipient country.

29. Suggested criteria to evaluate priority policies included the following:

- -- policies with the highest chance to create success stories, which have a high potentially multiplying effect and which can be cost-effectively duplicated and transferred elsewhere;

- -- policies which identify and correct obstacles and bottlenecks to ensure the greatest environmental performance improvement in the most cost-effective way.

30. Government provisions for a number of targeted support measures have proven particularly useful. Such measures include specialised training courses, workshops and seminars, and the establishment of

National Centres for Cleaner Production (also called "Environmental Technology Centres"). Governments can also offer free, or partially subsidised, waste minimisation advice for a limited period.

31. Apart from promoting cleaner production processes, governments should also encourage industry to invest in producing "clean" or environmentally preferable products, in order to take advantage of opportunities arising from the "greening" of consumer preferences in their export markets.

32. While certain incentives are applicable to firms in developing countries regardless of ownership and size, there is often a need to use different approaches for state-owned companies, large private companies and small- and medium-sized enterprises. Special support measures may be needed for micro-enterprises, defined as firms with one to ten employees, as these are particularly hard to reach on account of their vast number, geographical dispersion and, often, informal status.

33. It was generally felt that, ideally, no differentiation should be made between state- and privately-owned companies because the type of ownership should not influence management decisions within the company or the way regulatory agencies treat a company. In reality, however, state-owned companies are often treated more leniently and have less managerial independence. Moreover, state-owned companies, such as power plants and oil refineries, are often responsible for a large share of pollution. It is imperative, therefore, that these enterprises play a leading role in demonstrating the viability of pollution prevention and cleaner technologies. Unless state-owned enterprises take a firm lead, the private sector receives incorrect signals.

2. Donor strategies

34. Almost all donors have incorporated activities into their programmes that are specifically aimed at improving the environment and encouraging sustainable development. However, as regards pollution prevention and the transfer of cleaner technologies, the donor community has made a slow start in adapting its development and environmental policies to the Agenda 21 recommendations of UNCED in 1992. Some of the reasons identified for this slow response at the workshop include the lack of a clear definition of "cleaner production", a lack of specialised staff in aid agencies, and a certain bias for end-of-pipe technologies produced in the donor countries, even if the long-term profitability of pollution prevention technologies is higher. Still, there is evidence of new political commitments to live up to the agreements reached at Rio. However, specific policy formulation and dialogue will take time to become operational in the aid process.

35. Three main goals for donors in relation to technology co-operation to assist developing countries in building their national capacities to manage technological change for cleaner production, to stimulate the transfer of cleaner technology by the private sector, and to promote the use of cleaner technologies in development assistance projects.

36. Several donors have experimented with a number of different initiatives to promote sound environmental management and cleaner technologies in developing countries. Yet, there is not enough experience to evaluate the different approaches and to draw firm conclusions. Donors are trying, however, to avoid promoting policies and development strategies which would result in a repetition of the mistakes made by industrialised countries at the beginning of their own involvement in environmental protection, for example, investing exclusively in end-of-pipe technologies and large-scale pollution treatment facilities.

Such investments are not only highly capital-intensive and ill-suited for many developing countries, but they also diminish developing countries' opportunities to "leap-frog" the "dirty stages" of industrialisation.

37. A major short-coming of external aid was seen in its government-to-government nature. This opens the door for excessive bureaucracy, inefficiency, mismanagement and waste. Many participants strongly argued that, to date, the private sector has not been sufficiently involved in technology co-operation by aid agencies and recipient countries. To mobilise business, aid agencies should focus greater resources on areas that are likely to stimulate private sector investment and business-to-business relationships. Beyond supporting economic policy adjustments designed to induce private investment, specific measures may include the promotion of joint ventures, advisory services, market research, training, and trade promotion through fairs and product advice.

38. As in other fields of development co-operation, cleaner production strategies can be greatly improved through better co-ordination among all the actors. This is also meant to avoid duplication of effort and to make the various donor approaches mutually supportive. In particular, donors need to avoid contradictory approaches, where one donor promotes cleaner production while another donor encourages an end-of-pipe approach. There is also a need to create more coherence among the relevant ministries within donor countries, notably among the Ministries of Environment, Trade, Industry and Finance.

B. Capacity development

39. The capacity for managing technological change and, more specifically, cleaner production technologies depends on a variety of factors. These include the country's institutional structure, its system of education, the credibility and power of agencies that establish and enforce environmental standards, the existence of environmental technology information centres, testing facilities, private sector associations, trade unions and public interest groups. Economic incentives can also play a powerful role in promoting capacity development for environment, notably the gradual internalisation of environmental costs into the cost of production, such as for water and energy.

40. Restructuring traditional educational programmes can also be an important part of building a core of skilled and committed actors. In this regard, some participants recommended the review of educational systems to specifically include training for cleaner production technologies and programmes. Explicit provisions to this end should also be made in university curricula. Moreover, a re-training of engineers, entrepreneurs and industrialists to acquaint them with the tools of pollution prevention would also speed the adoption of cleaner technologies.

41. In order to build capacity for the implementation of cleaner technologies, some participants raised the idea of designing "national business plans" for adopting cleaner technology techniques. Such plans should enlist the contributions of all parties concerned. National Environment Action Plans would also be a useful framework to promote cleaner technology policies and to define the respective roles of different actors, both domestic and external. Business associations, chambers of commerce and other similar organisations should be encouraged to contribute to the formulation of cleaner technology and production strategies.

42. A number of participants considered a national needs assessment as an important basis for focusing capacity development and technology requirements. While it was recognised that a "plan of

action" is needed to guide capacity development, the concept of "needs assessment" itself appeared poorly defined, and it remains to be seen how such an assessment could be conducted and how the results would remain relevant over time. Still other participants argued that, in contrast to a government-co-ordinated effort, the transformation to sustainability based on cleaner technologies is in many ways a "bottom-up" approach where capacity is developed at the plant level in a sector, spread across that sector and eventually reaches all sectors.

43. Opinion was also divided as to whether the emphasis for capacity development should be on the public or private sector. The majority of participants argued that progress will only be made through the private sector. Capacity development resources should therefore be concentrated on consulting firms and the plant and shop-floor levels. However, it was also clear that public sector capacity to promote environmentally sound development is equally important if developing country governments are to play a catalytic role.

44. There was broad consensus that capacity development has its best chance if it is driven by demand. The most propitious entry point is the private sector, at the micro-, industry-, plant- and shop-floor level. This is where practical problems arise and must be solved. Increasing use, therefore, should be made of existing consultancy firms in developing countries.

45. Several developing country representatives criticised the record of external assistance in supporting operating developments. They claimed that aid has often replaced local initiatives, leaving little behind in terms of indigenous capacity when the project is terminated. To avoid this shortcoming, aid should directly address the economic agents, providing the "missing link" in the capacity development process. Some of the proposals in that context included the provision of training for entrepreneurs for the commercial utilisation of cleaner technologies and support for business surveys, also at the plant level, to determine cleaner production requirements and bottlenecks.

46. The discussions in this session showed that developing technical capacity takes time and rests fundamentally on domestic efforts. A long-term outlook is needed by both donors and recipients. This will require from donors a re-orientation of existing technical assistance programmes; from short-term, tangible result-oriented projects more toward co-operative research and development, professional outreach with private and technical institutions in developing countries, and on-site technical expertise through extension services as an integral part of developing countries' technology and environment policies.

47. Notwithstanding the importance of external assistance, over-reliance on aid should be avoided. The focus must be on developing indigenous capacity. Recipient country governments should therefore "grab and match" donor contributions. By paying for part of the costs, these governments will have a vested interest in them. Bilateral and multilateral donors should also actively promote South-South co-operation and technology transfer, i.e. co-operation among developing countries themselves.

C. Effective actions

48. Under this item, workshop discussions focused on short- to medium-term effective actions that could facilitate cleaner production. Of course, suggestions for effective actions were also made during the previous sessions and appear in the above summary of the discussions.

49. Possible actions were discussed for three major areas:

-- improving access to information;
-- enhancing private sector action; and
-- improving financing for cleaner technology promotion.

1. Improving access to information

50. Access to information was seen as one of the most critical elements in the process of cleaner production diffusion. Timely and accurate information is often the key to finding solutions with the aim of reducing waste, minimising risks to the environment and human health and ensuring an efficient use of natural resources, energy and water. Information is particularly needed for a forward-looking, "anticipate and prevent" approach, as distinguished from the "react and cure" approach of pollution control technology.

51. Views were divided on the question of whether the lack of access to information on the relative costs and benefits of cleaner production technologies is a principal obstacle to acquiring and implementing environmentally sound technologies. Some of the main difficulties in implementing cleaner technologies were seen as a combination of the following perceptions at the plant management level: a) managers often fear that a shift to cleaner technologies may impair product quality; b) they are also concerned that cleaner technologies may take time to implement and may not eliminate the need for end-of-pipe devices for compliance with government regulations; c) cleaner technologies are thought to cost much more than "dirty" technology plus end-of-pipe technology; and d) plant managers frequently think that current operations are efficient enough.

52. Consequently, the information to be transferred should provide a balanced view of the different technology options. The most effective way to do this is through face-to-face direct interactions between all interested parties: private sector associations, government at all levels, plant operators, company officials, consultants, etc. Aid agencies can contribute by providing customised technical assistance, such as training on environmental management and accounting systems and assistance in shifting to pollution prevention operations.

53. The appropriate timing and specificity of information on technological options is important. It should indicate which technology is required, how much it costs, possible alternatives and experiences other users have had. Specialised consultants can often play a valuable advisory role in providing information needed to identify appropriate technology. Public disclosure of information about sources, types, amounts, and consequences of pollution can significantly enhance the demand for improved environmental protection.

54. The private sector in developed countries can also play a significant role in information transfer aimed at fostering economic development based on cleaner technologies. Multinational firms with global networks of suppliers and affiliates need to become primary agents for diffusing unbiased information on pollution prevention technology.

55. Since large enterprises usually have their own information sources, the initial focus should be on facilitating information flows to small- and medium-sized firms. Information transfer measures should also include the support of international standards institutions and laboratories which monitor, test and certify quality. It is important to help such institutions to gather relevant information and achieve accreditation.

In the same vein, NGOs should be supported; they can help small- and medium-sized firms in particular to acquire information necessary to export environmentally preferable products.

56. A number of suggested actions to facilitate the transfer of information included the assessment and adjustment of existing information systems, the establishment of an international network of clearing houses, the creation of centralised, national referral services, and the setting up of technology transfer agencies specifically aimed at linking technology producers, traders and users. Where clearing houses are set up, it is usually best to establish them not under government auspices but with a private sector umbrella organisation, close to the end-user. They should embrace all environmentally relevant information, i.e. not only on cleaner technologies but also on other related areas such as appropriate pollution control approaches, "green" products, etc.

57. A major problem with respect to information dissemination is how to reach the end-user, including enterprises at different levels and the public at large. Another problem is to ensure a two-way information flow, i.e. from international and national network sources to local users, with feedback and lateral information exchange.

58. Bilateral and multilateral development assistance agencies can contribute to reducing the information and transaction costs involved in the search for cleaner technology options. Donors can help to strengthen information systems, databases and clearing houses. To improve the access of developing countries to timely and relevant information, special efforts are needed to better co-ordinate existing information systems and to make them user-friendly. Assistance can also be provided to help developing countries adapt generic information to the local context and to assess different technology options in the context of their policy and regulatory environment, the communication infrastructure, sector-specific needs and language.

59. Donor agencies themselves do not often have all the information needed to promote the transfer of information to developing countries. Sometimes agencies charged with promoting technology co-operation do not have a comprehensive overview of which pollution prevention technologies are available and who is developing and implementing them in their own country. In particular, they lack information on small- and medium-sized companies which are offering environmental technologies but do not have sufficient export capacities.

60. Moreover, lists of publicly developed and owned cleaner technologies are generally unavailable. Hence, some possibilities for cleaner technology transfer may not be properly identified. In order to fill these gaps, a number of developed countries are sponsoring "cleaner technology identification events" and offer financial incentives to encourage the transfer of environmentally sound technologies. Sector-specific reports describing the potential for international technology co-operation could also be prepared.

2. Enhancing private sector activities

61. Throughout the workshop, the private sector was identified as the major source of technological innovation and the main channel through which cleaner technology is transferred. Owners and operators of cleaner production technologies have therefore a significant role to play in helping developing countries to acquire appropriate technologies, including "good housekeeping" and "good practices".

62. Private sector suppliers of cleaner technology are often sceptical about the proper protection of their intellectual property rights in developing countries. Greater diffusion of innovative technology will depend on guaranteeing technology owners an adequate return on their investment. However, care must be taken to ensure that this neither undermines developing countries' capabilities for sound environmental management nor leads to a reduction in the supply of pollution prevention technologies that are suitable for developing country conditions.

63. Some participants suggested that company codes of conduct, already used by some firms and associations to guide environment-related behaviour, could also progressively contain explicit, measurable commitments to technology co-operation with developing countries. Specialised investment companies could speed up the development and application of environmental technology in the industrialising countries' private sector by making available management expertise and capital for cleaner technology investments. Such environmental technology investment corporations, though capitalised primarily from private sources, could be catalysed through initial public and multilateral funding.

64. Large multinational enterprises are improving their environmental performance by setting their own company-wide standards and through voluntary adherence to environmental codes. In a growing number of cases, this effort includes the introduction of cleaner production technologies. Further action in this direction, such as environmental auditing and environmental impact assessments, would enhance the transparency of the environmental activities of private firms and could set positive precedents.

65. Special attention needs to be devoted to improved co-operation among small- and medium-sized enterprises in developing and developed countries. In developing countries, these enterprises are often a main source of pollution. In OECD countries, SMEs account for a sizeable amount of environmental technology innovation and production. However, they are often not well equipped to enter developing country markets. Actions to increase co-operation in cleaner technology could include, for instance, technology partnership arrangements or various forms of contracting and sub-contracting.

66. Development assistance and technology co-operation can catalyse private sector initiatives and business-to-business relationships that involve cleaner technologies. To date, however, business has not been sufficiently involved by OECD Member country aid agencies and recipient governments. Trade associations, scientific societies, NGOs, consulting firms and individual companies were all identified as key agents for change. To mobilise these agents, both governments and aid agencies should take action that promotes licensing arrangements or joint ventures between developing and industrialised country companies or support industry- or firm-specific needs assessments and feasibility studies. Further measures could include the provision of technical assistance for small- and medium-sized enterprises dealing with cleaner technologies and assistance for private companies in developing countries to develop business and investment plans.

67. A strong plea was made that environmentally harmful production processes, which are strictly controlled in developed countries should not be transferred to developing countries. Likewise, many participants were concerned that primarily end-of-pipe technologies, which are becoming obsolete or which no longer meet environmental standards in OECD countries, are now being transferred to developing countries. This would severely impair developing countries' potential for "leap-frogging". While it is the responsibility of developing countries to determine the type of industrial development they desire and to put in place adequate controls on the impact of inappropriate technology, donors were asked to pay close attention to this issue in designing their export promotion programmes.

68. Other proposals for action included the creation of "cleaner production zones" and the development of "guidelines" and "good practices" for financing options, donor activities, training programmes and other relevant aspects of sound environmental management.

3. Improving financing for cleaner technology promotion

69. While there might be serious financial bottlenecks in individual situations, the general view of participants was that lack of funds is not the main constraint to investing in cleaner production. The focus of actions should be on improving access to available funds and using existing resources more effectively.

70. Developing country governments are key actors in creating the conditions to mobilise domestic financial resources and to improve access to commercial finance for cleaner technology. Policies to encourage private sector investment, such as reducing trade barriers, strengthening competition, opening up markets for foreign investment, reducing corporate taxes, and structural adjustment measures, are likely to improve access to capital for new technologies. Furthermore, adequate pricing of natural resources is likely to have a substantial impact on private sector investment and on the potential markets for cleaner products.

71. Developing countries could mobilise significant funds through such measures as improving resource rent capture from logging, mining, fishing, and oil production; improving cost recovery from public investments through full-cost pricing and user charges; taxing appreciation of property values resulting from public investments; leveraging private funds through incentives to increase venture capital and long-term investment in environmentally sustainable technologies; imposing differential taxes on products according to their relative environmental impact, both to affect consumption patterns and to encourage private sector research and development; and by promoting industry-funded environmental funds.

72. Donors can assist developing countries in raising awareness about financial resources available for environmentally sound production; this comprises both bilateral and multilateral resources as well as finance from national banks. Action to improve access to commercial credit, to increase the banking sector's capacity to better evaluate environmental projects in their lending activities, and to help recipient country governments design market incentives, such as user fees, environmental taxes, tax benefits for research, etc., are likely to promote cleaner technology.

73. Donor-assisted financing mechanisms are most effective when they serve to mobilise, multiply or replenish existing and additional financial resources and/or induce policy changes. Such mechanisms could include the financing of the full or incremental costs of cleaner production technologies as part of a project, the improvement of co-ordination of contributions among various donors, the establishment of matching funds or national environmental funds ("green investment funds") for environmental technology, the purchase of patent rights, the provision of grants to soften the terms of loans for the purchase of goods and services, the provision of seed money for research, demonstration or commercialisation, and measures to reduce cash-flow constraints such as bridging loans and revolving funds.

74. Donor agencies face certain constraints in earmarking funds for cleaner production. For example, many donors are giving higher priority to financial loans and grants rather than to technical assistance for environmental management which could directly benefit end-users who are trying to implement cleaner

production approaches. This helps underline an important point: development assistance to promote cleaner production must be crafted in the wider context of general assistance programmes. There is still much room for creative thinking as to how to introduce cleaner production into programmes and projects essentially designed to meet other objectives.

75. Financing technology co-operation and the transfer of technology raises some important issues for aid agencies: care must be taken to ensure that Official Development Assistance (ODA) does not substitute for finance that the market could provide on commercial terms under reasonable assumptions concerning pricing and competition. Where commercial finance is not forthcoming, concessional finance should be justified on "development quality" grounds, taking account of factors, such as positive externalities, demonstration effects and whether alternative solutions that might be financed on market terms are less acceptable or unacceptable.

76. Some participants felt that the provision of additional funds should be made conditional on the conduct of a "waste-minimisation assessment" of the projects to be financed. Donors could include such a condition when they provide funds either directly to the project or for financial intermediaries which lend on the resources to the end-users. Other participants warned not to add further "conditionality" to the aid process. They particularly thought such conditionality could lead to the imposition of environmental standards in developing countries which may not be appropriate in their individual local context.

77. A number of multilateral financial institutions, including the World Bank and regional development banks, are establishing mechanisms which are specifically aimed at reducing adverse environmental impacts of their projects. For example, most international financial institutions (as well as bilateral donors) are using environmental guidelines and environmental assessments in their operations. They can play an important role in promoting cleaner production in developing countries. However, few donors have integrated a cleaner technology component into their projects, and application procedures for existing funds are sometimes non-transparent and lengthy. This often prevents small- and medium-sized enterprises from applying for such funds. Efforts should therefore be made to make aid resources more easily available for smaller enterprises by helping these firms to prepare project proposals, feasibility studies and investment plans.

78. Some of the proposals aimed at facilitating access to multilateral financial resources for cleaner technology transfers included the creation of special funds for cleaner technologies, tradable emission rights, transferable development rights, debt-for-environmentally-sound-technologies swaps, the establishment of venture capital funds, and the creation of specialised banks to serve as brokers for acquiring patent rights and making them available to developing countries on favourable terms.

IV. Next Steps

79. In the interest of contributing to the international debate in the area of the transfer, diffusion and use of cleaner technologies, some of the main results of the workshop have been communicated to other international organisations. In this context, an overview of workshop findings was presented at UNEP's High Level Advisory Seminar in Warsaw (12-14 October 1994). A summary report was transmitted as a major input to the work of the UN Commission on Sustainable Development (CSD). Workshop findings

also provided significant contributions to the CSD Workshop on the Promotion of Access to, and Dissemination of Information on, Environmentally Sound Technologies in Korea (30 November to 2 December 1994), and the UNIDO Roundtable on Technology Transfer and Capacity Building for Sustainable Development in Vienna (8-10 February 1995). A summary report was transmitted as a major input to the work of the UN CSD and the elaborations of the CSD's work programme as discussed at its third session in April 1995.

80. As a first follow-up to the Hanover Workshop, this summary record is intended to provide an overview of workshop discussions and major findings. The OECD Secretariat will produce a fuller document including a synthesis of the written contributions submitted by workshop participants. This report, to be published this Spring/Summer as part of the OECD Document Series, will provide an opportunity to explore in more depth the major themes raised at the workshop as well as to make this information more widely available and accessible within and outside OECD countries.

Annex 1

LIST OF DOCUMENTS

Document	Paper submitted by:	Title
No. 1	ETHIOPIA, Mr. D. Mebratu	Ethiopia Country Report
No. 2	ZIMBABWE, Mr. N. P. Nziramasanga	Zimbabwe Country Report
No. 3	JORDAN, Mr. N. Y. Al Akeel	Jordan Country Report
No. 4	UNITED KINGDOM, Overseas Development Adminstration (ODA)	ODA Policy Paper
No. 5	NICARAGUA, Mr. E. M. Lacayo	Nicaragua Country Report
No. 6	TUNISIA, Prof. M. L. Bouguerra	Tunisia Country Report
No. 7	INDONESIA, Mr. I. Elias	Indonesia Country Report
No. 8	CANADA, Canadian International Development Agency (CIDA)	Promotion of Cleaner Technology within the Canadian Development Assistance Programme
No. 9	TUNISIA, Mr. R. Nafti	Clean Technology: Obstacles and Prospects: Case Study of Tunisia
No. 10	UNEP/IE	Strategies and Policies for Cleaner Production
No. 11	THAILAND, Ms. A. Noodharmcho	The Opportunities for and Barriers to Promoting Cleaner Industrial Production in Thailand
No. 12	PHILIPPINES, Mr. R. V. Serrano	Philippines Country Report
No. 13	EGYPT, Mr. M. A. Tohamy	Case Study on the Application of the Cleaner Production Concept in RAKTA Pulp and Paper Mill
No. 14	PAPUA NEW GUINEA, Ms. M. Koma	Promotion of Cleaner Production in Papua New Guinea
No. 15	UNIDO	Industry and Agenda 21: The Role of UNIDO
No. 16	INDIA, Mr. G. V. Subrahmanyam	Cleaner Technologies of Industrial Production in India
No. 17	ZAMBIA, Mr. Patson Zulu	Opportunities for and Barriers to Promoting Cleaner Industrial Production in Zambia

Document	Paper submitted by:	Title
No. 18	NETHERLANDS, Foreign Ministry	Netherlands Development Policy on the Transfer of Environmentally Sound Technology
No. 19	ETHIOPIA, Mr. Y. Abraham	Ethiopia Country Report
No. 20	UNIDO	Cleaner Industrial Production in Developing Countries: Market Opportunities for Developed Countries and Potential Cost Savings for Developing Countries
No. 21	CHINA, Mr. Xia Kunbao	Opportunities for and Barriers to Promoting Cleaner Production in China and Suggestions for Technology Co-operation
No. 22	THAILAND, Ms. Q. Limvorapitak	Thailand Country Report
No. 23	INDONESIA, Mr. I. Elias	Indonesia Country Paper on National Cleaner Production Centre
No. 24	MALAYSIA, Ms. C. A. Ibrahim	Barriers to and Opportunties for Promoting Cleaner Industrial Production in Malaysia
No. 25	AUSTRALIA, Environmental Protection Agency (EPA)	Australia, Development Assistance and Cleaner Production
No. 26	World Resources Institute (WRI)	Missing Links: Technology and Environmental Improvement in the Developing World
No. 27	PAKISTAN, Mr. S.-U. Siddiqui	Barrriers to and Opportunities for the Promotion of Cleaner Industrial Production in Pakistan
No. 28	BOLIVIA, Mr. V. Chuquimia	Bolivia Country Report
No. 29	TUNISIA, Mr. R. Nafti	Project Overview: Environmental Pollution Prevention Project (EP3) in Tunisia
No. 30	GERMANY, Deutche Investitions- und Entwicklungsgesellschaft mbH	Thailand Environmental Technology Study
No. 31	GERMANY, Deutche Investitions- und Entwicklungsgesellschaft mbH	India Environnmental Technology Study
No. 32	UNIDO	UNIDO Activities in the Field of Cleaner Production

Document	Paper submitted by:	Title
No. 33	UNITAR	Pilot Studies on the Establishment of Polluant Release and Transfer Registers in Developing/Industrialising Countries
No. 34	MOROCCO, Mr. A. Jaïdi	Morocco Country Report (French version only)
No. 35	UNITED STATES, Agency for International Development (USAID)	EP3's Experience in Establishing Sustainable Country Pollution Prevention Programs: The First Year
No. 36	UN Division for Sustainable Development, Department for Policy Co-ordination and Sustainable Development	Inter-Agency Consultation on Transfer of Environmentally Sound Technology, Co-operation and Capacity-Building (Chapter 34 of Agenda 21)
No. 37	NORWAY, Norwegian Society of Chartered Engineers	The Norwegian Industrial Transfer of Know-How Programmes on Waste Minimization/Cleaner Production to Central and Eastern European Countries
	UN Economic and Social Council [E/CN.17/1994/L.10]	Education, Science, Transfer of Environmentally Sound Technologies, Co-operation and Capacity-Building
	Mr. K. P. Nyati, India	Keynote Presentation: Cleaner Industrial Production in Developing Countries - Prospects, Barriers and Strategies
	Mr. J. C. Wheeler	Keynote Presentation: Development Assistance and Technical Co-operation in Cleaner Industrial Production in Developing Countries

Annex 2

LIST OF PARTICIPANTS

Member Countries

Australia

Mr. B. O'NEILL
EPA, Environment Protection Agency, Australia
Tourism House
40, Blackall St
Barton ACT 2600
Tel: (61-6) 2 74 12 94
Fax: (61-6) 2 74 16 40

Canada

Mr. W. RICHARDSON
Technology Transfer Office
Technology Development Directorate
Environment Canada
Place Cartier
425 blvd. St. Joseph
Hull, Quebec, K1A 0H3
Tel: (1-819) 953 93 64
Fax: (1-819) 953 90 29

Ms. L. COLLETTE
Canadian Partnership Branch
Canadian International Development Agency (CIDA)
200 Promenade du Portage
Hull, Quebec K1A 0G4
Tel: (1 819) 997 11 67
Fax: (1 819) 994 97 07

Denmark

Mr. S. KRISTOFFERSEN
Danish Environment Protection Agency
29, Strandgade
DK-1401 Copenhagen K
Tel: (45-32) 66 01 00
Fax: (45-32) 66 04 79

EC

Mr. J. CAUWENBERGH
European Commission
Office: SC 14 3/47
Rue de la Loi, 200
B-1040 Brussels
Tel: (32-2) 29 68 022
Fax: (32-2) 29 91 063

Finland

Mr. J. UOSUKAINEN
Finnish International Development Agency (FINNIDA)
Katajanokanlaituri 3
SF-00160 Helsinki
Tel: (358-0) 1341 6451
Fax: (358-0) 1341 6428

Germany

Ms. E. KÜRZINGER
Environment Division 224
Ministry for Economic
Co-operation and Development (BMZ)
Friedrich-Ebert-Allee 114-116
D-53114 Bonn
Tel: (49-228) 535-340
Fax: (49-228) 535-204 or -202

Mr. J. GAMPERL
Kreditanstalt für Wiederaufbau (KfW)
Palmengartenstraße 5-9
D-60325 Frankfurt/Main
Tel: (49-69) 7431-2273
Fax: (49-69) 7431-2944 or -3363

Mr. J. METZNER
Deutsche Gesellschaft
für Technische Zusammenarbeit (GTZ)
Postfach 51 80
D-65760 Eschborn
Tel: (49-6196) 79-1235
Fax: (49-6196) 79-7151

Ms. K. SEIFERT
Division GII4, Co-operation with developing
countries and with UN bodies
Ministry for Environment, Nature Protection
and Nuclear Safety
Bernkasteler Straße 8
D-53175 Bonn
Tel: (49-228) 305-2342
Fax: (49-228) 305-3337

Germany (cont.)	**Mr. G. PIPER** DEG - Deutsche Investitions und Entwicklungsgesellschaft Belvederestraße 40 D-50933 Köln Tel. (49-211) 4986-113 Fax. (49-211) 4986-290
Italy	**Ms. A. ALESSANDRONI** Central Technical Unit Directorate General for Development Co-operation Ministry of Foreign Affairs Piazzale della Farnesina 1 I-00194 Rome Tel: (39-6) 36 91 41 32 Fax: (39-6) 32 08 069
Mexico	**Mr. J. L. URIONA HIDALGO** National Institute of Ecology Constituyentes No. 947, Ed.A P.B. Col. Belén de las Flores Del. Alvaro Obregon 01110 México, D.F. Tel: (52-5) 271 2147 / 271 0920 Fax: (52-5) 271 1270
	Ms. A.C. MEZA REINOSA National Institute of Ecology Rio Elba No. 20, 4 piso Col. Cuauhtémoc, Del. Cuauhtémoc 06500, México, D.F. Tel: (52-5) 553 29 77 / 94 81 Fax: (52-5) 286 85 59
Netherlands	**Ms. R. PORS** Environment Programme Ministry of Foreign Affairs P.O. Box 20061 NL-2500 EB The Hague Tel: (31-70) 348 66 43 Fax: (31-70) 348 43 03

Netherlands (cont.)

Mr. K. J. MONING
DGM afdeling Milieu-Technologie
Ministerie van Volkshuisvestling
Ruimtelije Ordering en Milieubeheer / IPC 660
Postbus 30945
NL-2500 GX The Hague
Tel: (31-70) 339 48 61
Fax: (31-70) 339 13 04

Mr. R. GLASER
Ministry of Housing, Spatial Planning
and the Environment
P.O. Box 394
4330 AJ Middelburg

Norway

Mr. U. ABRAHAMSEN
State Pollution Control Authority
P.O. Box 8100, Dep.,
0032 Oslo
Tel: (47-22) 5734 00
Fax: (47-22) 67 67 06

Mr. T. LUND
DNV Det Norske Veritas AS
DNV Development - Environment Section
Veritasveien 1
N-1322 Hovik
Tel: (47-67) 57 72 50
Fax: (47-67) 57 74 74

Mr. O. NEDENES
Norwegian Society of Chartered Engineers
P.O. Box, 2312, Solli
N-0201 Oslo
Tel: (47-22) 94 75 00 / Direct: 43 77 05
Fax: (47-22) 94 75 01

Sweden

Ms. A. JENNERVIK
SWEDECORP
P.O. Box 3144
S-103 62 Stockholm
Tel: (46-8) 677 66 77
Fax: (46-8) 24 92 90

Mr. R. FERM
Swedish Environmental Protection Agency
S-171 85 Solna
Tel: (46-8) 799 15 20
Fax: (46-8) 799 15 24

Switzerland

Mr. H.-P. EGLER
Service du Développement
Office fédéral des affaires économiques extérieures
Départment fédéral de l'économie publique
CH-3003 Bern
Tel: (41-31) 322 22 46
Fax: (41-31) 382 33 74

United Kingdom

Mr. C. WEST
Environment Policy Department
Overseas Development Administration (ODA)
94 Victoria Street
London SW1E 5JL
Tel: (44-71) 917 06 30
Fax: (44-71) 917 07 93

Ms. S. BLACKLAWS
The Technology Partnership Initiative
Department of Trade and Industry
151 Buckingham Palace Road
London SW1W 9SS
Tel: (44-71) 215 1037
Fax: (44-71) 215 1089

United States

Ms. G. HUDEN
Office of Environment and Natural Resources
Center for Environment
Bureau for Global Programs, Field Support
and Research
Agency for International Development
Washington, D.C. 20523-1812
Tel: (1-703) 875 40 76
Fax: (1-703) 875 46 39

Mr. J. GALLUP
Office of Environment and Natural Resources
Center for Environment
Bureau for Global Programs, Field Support
and Research
Agency for International Development
Washington, D.C. 20523-1812
Tel: (1-703) 875 45 18
Fax: (1-703) 875 46 39

* * * * * * * * * *

Invited Organisations

BIAC
Business and Industry
Advisory Council

Mr. W. BLUM
Preussag AG
Konzern Umweltschutz
Karl-Wiechert-Allee 4
30625 Hannover
Germany
Tel: (49-511) 566 14 17
Fax: (49-511) 566 19 01

INEM
International Network for
Environmental Development

Mr. T. DAVIS
Bahnohfstrasse 36
D-22880 Wedel
Germany
Tel: (49-4103) 84019
Fax: (49-4103) 13699

UN/DPCSD
UN Department for Policy
Co-ordination and Sustainable
Development

Mr. D. PILARI
Division for Sustainable Development
1, United Nations Plaza
New York, NY 10017
United States
Tel: (1-212) 963 6757
Fax: (1-212) 963 1267

UNEP/IE
UN Environment Programme/
Industry and Environment

Mme J. ALOISI DE LARDEREL
39, Quai André Citroën
75739 Paris Cedex 15
France
Tel: (33-1) 44 37 14 50
Fax: (33-1) 44 37 14 74

Mr. S. C. De HOO
39, Quai André Citroën
75739 Paris Cedex 15
France
Tel: (33-1) 44 37 14 50
Fax: (33-1) 44 37 14 74

UNIDO
UN Industrial Development
Organization

Mr. R. (Skip) LUKEN
Industrial Sectors and Environment Division
Vienna International Centre
P.O. Box 300
A-1400 Vienna
Austria
Tel: (43-1) 21 11 31 33 52
Fax: (43-1) 23 07 449

UNITAR
UN Institute for Training and Research

Mr. A. HALPAAP
Training Programmes in Chemical and Waste Management
Palais des Nations
1211 Geneva 10
Switzerland
Tel: (41-22) 798 84 00
Fax: (41 22) 733 13 83

WORLD BANK

Mr. D. HANRAHAN
Environment Department
1818 H Street N.W.
Washington, D.C. 20433
United States
Tel: (1-202) 458 56 86
Fax: (1-202) 477 09 68

WRI
World Resources Institute

Mr. D. DITZ
Program on Technology and the Environment
1709 New York Avenue, N.W.
Washington, D.C. 20006
United States
Tel: (1-202) 662 34 98
Fax: (1 202) 638 00 36

* * * * * * * * * *

Non-Member Countries

Bolivia

Mr. V. CHUQUIMIA JIMENEZ
Cámara Nacional de Industrias
Avenida Mariscal Santa Cruz 1392
Edificio Cámara Nacional de Comercio
Piso 14
La Paz
Tel: (591-2) 374 476 or 78
Fax: (591-2) 350 620

Chile

Mr. J. HECKE
Centro de Estudios en Tecnologias Apropiadas para América Latina (CETAL)
Apartado 576
Cerro Concepcion
Valparaiso
Tel: (56-32) 213 360
Fax: (56-32) 214 851

Chile (cont.)	**Mr. L. SOTO-KREBS** Instituto de Investigaciones Tecnnológicas Av. Santa Maria 6400 Vitacura - Santiago Tel: (56-2) 242 81 00 Fax: (56-2) 218 53 07
China	**Mr. K. XIA** Department of International Co-operation National Environmental Protection Agency No. 115, Xizhimennei Nanxiaojie Beijing 100035 Tel: (86-1) 832 0672 Fax: (86-1) 832 8013
Colombia	**Mr. J. OSPINA** Promoción de la Pequena Empresa Eco-Eficiente en Latinoamérica (PROPEL) Transversal 18, No.101-70 Bogota Tel: (57-1) 222 9980/9804 Fax: (57-1) 218 73 28
Egypt	**Mr. M. TOHAMY** RAKTA General Company for Paper Industry El-Tabia Alexandria Tel: (20-3) 56 01 530 or 56 01 532 Fax: (20-3) 56 01 300
Ethiopia	**Mr. Y. ABRAHAM** Ethiopian Mineral Resource Development Corporation Legadembi Gold Mine P.O. Box 2543 Addis Ababa Tel: (251-1) 61 00 74 Fax: (251-1) 61 17 76
	Mr. D. MEBRATU Chem-Tech Centre Sh. Co. P.O. Box 8701 Addis Ababa Tel: (251-1) 20 41 21 Fax: (251-1) 71 00 60

India

Mr. K. P. NYATI
Confederation of Indian Industry
India Habitat Centre
4th Floor, Zone IV
Lodi Road
New Dehli 110003
Tel: (91-11) 46 91 151/46 02 523/46 01 592/46 01 593
Fax: (91 11) 46 02 524/46 33 168

Mr. G. V. SUBRAHMANYAM
Ministry of Environment & Forests
Paryavaran Bhavan, CGO Complex
Lodi Road
New Dehli 110 003
Tel: (91-11) 43 64 594
Fax. (91-11) 43 60 678

Indonesia

Mr. I. ELIAS
Indonesian Environmental Management and Information Center
Jalan Kramat IV/no 8
Jakarta Pusat 10420
Tel: (62-21) 390 9920/390 9156/314 0797
Fax: (62-21) 310 16 56

Ms. M. HILMAN
Environmental Impact Management Agency
BAPEDAL
Arthaloka Building, 11th floor
Jln. Jenderal Sudirman No. 2
Jakarta
Tel: (62-21) 252 15 49
Fax: (62-21) 251 15 47

Jordan

Mr. N. AL AKEEL
Royal Scientific Society
P.O. Box 925819
Amman - 11110
Tel: (96-26) 844 701
Fax: (96-26) 844 806

Malaysia

Ms. C. A. IBRAHAM
Department of Environment
12th & 13th floor, Wisma Sime Darby
Jalan Raja Laut
50662 Kaula Lumpur
Tel: (60-3) 293 89 55
Fax: (60-3) 293 14 80

Morocco	**Mr. A. JAÏDI** Casablanca International Electronics Assembly Km 6, 700 Route de Rabat Ain Sebaa Casablanca Fax: (212-2) 352378/ 30 55 86
Nicaragua	**Mr. E. M. LACAYO** Ministerio del Ambiente y Recursos Naturales Marena Km. 12 1/2, Carretera Norte Apartado No. 5123 Managua Tel: (505-2) 31 504 Fax: (505-2) 632 088
Pakistan	**Mr. S.-U. SIDDIQUI** Leather Industry Development Organisation Ministry of Industries and Production 3rd floor, Khalid Plaza 38-Blue Area P.O. Box 1231 Islamabad Tel: (51) 826 246 Fax: (92) 825 130 / 81 22 46
Papua New Guinea	**Ms. M. KOMA** Environment and Conservation Department P.O. Box 6601 Boroko Tel: (675) 271 010 Fax: (675) 271 900
Peru	**Mr. S. CAPORALI** Centro Panamericano de Ingenieria Sanitaria y Ciencias del Ambiente (CEPIS) Casilla Postal 4337 Lima 100 Tel: (51-14) 37 10 77 Fax: (51-14) 37 82 89 Internet: scaporal@cepis.org.pe
Philippines	**Mr. R. V. SERRANO** Department of Environment and Natural Resources Visayas Avenue Diliman, Quezon City Tel: (632) 711 70 59 Fax: (632) 99 97 10 / 731 73 46

Tanzania

Prof. C. L. C. MIGIRO
University of Dar-es-Salaam
Institute of Production Innovation
P.O. Box 35075
Dar-es-Salaam
Tel/Fax: (255) 51 433 76

Thailand

Ms. Q. LIMVORAPITAK
Thailand Environment Institute
210 Sukhumvit 64
Bangchak Refinery Building 4
Prakanong
Bangkok 10260
Tel: (66-2) 331 00 60 ext. 254
Fax: (66-2) 332 48 73

Ms. A. NOODHARMCHO
Technology Transfer Centre
Office of the Permanent Secretary
Ministry of Science, Technology and Environment
Ram VI Road, Ratchathewi
Bangkok 10400
Tel: (66-2) 245 90 32
Fax: (66-2) 246 81 06

Mr. P. TARANATHAM
Ministry of Science, Technology and Environment
Pollution Control Department
16-17 floor, Gypsum Metropolitan Tower
539/2 Sri-Ayudhya Road
Rajdhavee
Bangkok 10400
Tel: (66-2) 248 51 82
Fax: (66-2) 642 50 25 / 248 51 82

Trinidad and Tobago

Ms. J. DANIEL-PAUL
Institute for Managing Development
19A Stanmore Ave.
Port of Spain
Tel: (1-809) 623 22 80
Fax: (1-809) 625 52 01

Tunisia

Prof. M.L. BOUGUERRA
Les Courtilles H2
149, rue Oberkampf
75011 Paris
France
Tel: (33-1) 40 21 88 62 or 44 27 51 18
Fax: (33-1) 44 27 25 68

or

University of Tunis
Faculty of Science
University Campus
1060 Tunis
Tel: (216 1) 512 600
Fax: (216 1) 855 008

Mr. R. NAFTI
75, avenue Mohamed 5
1002 Tunis-Belvedere
Tel: (216-1) 78 82 44
Fax: (216 1) 78 72 45

Viet Nam

Mr. H.V. QUANG
Ministry of Science, Technology and Environment
The Regional Centre for Standardization,
Meterology and Quality - South
49 Pasteur Street
Hochiminh City
Tel: (84-8) 29 13 80/29 42 74
Fax: (84-8) 29 30 12

Zambia

Mr. J. CHISHIBA
Environmental Council of Zambia
Water Pollution Control Unit
Sodala House
Napundwe Road
P.O. Box 35131
Lusaka
Tel: (260-1) 28 64 35
Fax: (260-1) 22 31 23

Zambia (cont.)	**Mr. P. ZULU** Environmental Council of Zambia Waste Management Unit Sodala House Napundwe Road P.O. Box 35131 Lusaka Tel: (260-1) 286 435 Fax: (260-1) 223 123
Zimbabwe	**Mr. N. NZIRAMASANGA** Southern Centre Energy and Environment 31 Frank Johnson Ave. Eastlea, Harare Tel: (263-4) 737 351 Fax: (263-4) 739 341

* * * * * * * * * *

Keynote speakers:	Mr. K. P. NYATI Mr. J. WHEELER
Rapporteurs:	Ms. J. DANIEL-PAUL Mr. E. KRÖLLER

OECD Secretariat

Development Co-operation Directorate	*Environment Directorate*
Mr. Bernard WOOD	Ms. Rebecca HANMER
Mr. Dirk VON FELBERT	Mr. Harvey YAKOWITZ
Ms. Bettina SÖDERBAUM	Ms. Elaine GEYER-ALLELY
Ms. Susana GARCIA	