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**WOMEN AND DEVELOPMENT
RECOMMENDATIONS**

Resulting from a Workshop conducted by
the American Association for the Advancement of Science
for the U.S. Department of State, as a contribution to
U.S. preparations for the United Nations Conference
on Science and Technology for Development.

March 26-27, 1979
Washington, D.C.

American Association for the Advancement of Science
1776 Massachusetts Avenue, N.W., Washington, D.C. 20036

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

1775 Massachusetts Avenue, N.W.

Washington, D.C. 20036

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Office of Opportunities
in Science

Priscilla Reining
Project Director
Office of International
Science

Karen L. Ehrlich
Administrative Assistant
Office of Opportunities
in Science

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March 26-27, 1979
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prepared by Irene Tinker

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INTRODUCTION

The Workshop on Women and Development was the first of a series of four workshops conducted by the American Association for the Advancement of Science as requested by the U.S. Department of State as part of the U.S. preparations for UNCSTD. The 2-day workshop, held March 26-27, 1979 at the Brookings Institution, Washington, DC, involved thirty-eight participants, both men and women, with a variety of expertise in the field of women and development. Participants came from federal agencies (U.S. AID, DOE, OTA, NASA), universities, public sector organizations (League of Women Voters, Overseas Development Council, National Council of Negro Women), professional associations and The World Bank.

After an initial general session, participants broke up into three working groups to address the following topics--national policy for development, education and training for development, and technology for development. Each group proposed recommendations which were then presented and discussed by the workshop as a whole. The present volume includes a summary of the Workshop and the Recommendations. The complete 189-page Report is available upon request, and as long as supplies last, from the American Association for the Advancement of Science.

ACKNOWLEDGEMENTS

The coordinators of this workshop wish to express their gratitude to the many individuals who contributed to the success of this project. Our greatest debt is to the conference participants and authors of background papers whose expertise and commitment is responsible for the richness of this document.

We wish to especially thank Irene Tinker, Director of the Equity Policy Center, for her consultation during the workshop and throughout the project, and for her gracious acceptance of the enormous task of writing the final report.

We extend our appreciation to the people who worked diligently throughout the project and during the workshop: Karen Ehrlich, who coordinated the workshop arrangements and the production of the report; and Jeanette Wedel, Carol Rogers and Paula Quick Hall who served as rapporteurs for the workshop.

Janet Welsh Brown
Office of Opportunities in Science

Priscilla Reining
Office of International Science

AAAS WORKSHOP ON WOMEN AND DEVELOPMENT
EXECUTIVE SUMMARY

The dominant theme throughout the workshop and in the background papers was the centrality of "women and development" issues to all development planning. As even remote villages move into the monetary economy, there is need to improve traditional economic activities of women in the food chain and in the making of household goods through the introduction of new technologies. It is equally important to recognize the economic as well as social and psychological contributions which women make in feeding and caring for their families. As new technologies are introduced to reduce the drudgery of collecting fuel and water, it is imperative to understand the implications of moving the cost for water and fuel from human time to money. This shift requires even greater attention to income-producing activities for women, whether of small scale or through modern industry.

The modernization of the economy is requiring women to buy food and fuel and even water in order to meet traditional responsibilities and obligations, but few jobs in the modern sector are available to women where they can earn the money needed. Given the clearly defined sex roles and responsibilities in most traditional cultures, money earned by the male head of household will not necessarily be used to meet the responsibilities of females. Poor women con-

tinue to feed their families by their own efforts, whether a man is present in the family or not. The workshop therefore focussed its recommendations first on technology to assist women in providing basic needs for her family: energy, food, water; and secondly on technologies to provide new income.

The discussion of these interlocking activities of women was marked throughout by the realization that national and international development and trade policies reach into every home. Price supports, import subsidies, cash crops for export, currency control, all affect the way in which international trade impinges on local agriculture and manufacturing. National planners tend to overlook the economic activity of women when setting national policies precisely because of the insufficiencies and inaccuracies of statistics and other data on the informal sector, where the bulk of women work. Thus a government monopoly on peanut processing designed to raise the export price of the commodity also destroyed the local processing and sale of peanuts by women while at the same time depriving the poor of needed oil in their diets. Planning agencies in all countries need to collect better information about the actual economic roles of women and children, and to consider the costs of adding these workers to the list of unemployed, whenever they weigh the merits of a particular development strategy.

Similarly, development projects for women, whether nationally or internationally funded, should be considered in light of national development goals. Too often women's projects are considered peripheral to mainstream development or are perceived of as welfare programs rather than as economic activities. A recent laudable effort by an African government to improve the quality and quantity of millet being produced by a woman's cooperative was jeopardized by

the granting of import and tax credits to enable Heineken's to manufacture and sell its beer at competitive prices. It is imperative that development planners understand the implications to women and their children, as well as to men, of import policies which undercut local manufacturing.

It was recognized that income-generating projects for women cannot be developed independent of programs to link up women with the banking and financing institutions of their countries and localities and thus with the local and national economy. Women represent an important market for banking services which has largely been ignored. It was underscored that development planners should clearly understand that credit is a means to an end; it should not be taken as the starting point for income-generating projects, but rather as a supplement to an enterprise which has a sound base of operations and marketing strategy.

Recommendations:

The United Nations Conference on Science and Technology is the last major international conference in the Second Development Decade series. As such it is the culmination of international effort to focus all UN activities toward development. Because the subject of the workshop was "women and development", many of our recommendations are as equally appropriate to other fora as to UNCSTD. We call upon the Department of State to carry to all appropriate international conferences the message that throughout the development process the contributions of women to the national economy must be sustained and encouraged.

Our recommendations specifically for the UNCSTD give priority to two vital areas where technology can contribute immediate solutions. The first recommendation responds

specifically to the call by the Secretary-General of the Conference for worldwide projects. In terms of the Preliminary Draft Programme of Action, these recommendations are directed toward national action to improve the planning and use of science and technology (Target area A); B (ii) also underscores the importance of ensuring that technological transfer benefits the workers as well as the owners of new industry (Target Area B).

We urge that the US delegation go to the UNCSTD prepared to support international efforts:

- A. to develop a worldwide pilot project to assess present and changing uses and supplies of household energy. (Recommendations 1, 2, 3, 9, 10);
- B. to increase income-producing activities for women:
 - (i) - in the traditional and informal sectors through projects designed to improve technologies
 - (ii)- in the modern sector through efforts to reduce the exploitative tendencies of industrialization, (Recommendations 4, 5, 6, 7, 11).

Underlying this theme of viewing women's needs as an integral part of all development is the recognition of women as a development resource. Women have always contributed greatly to the economic activity of every country. As development proceeds, it is essential that women be given access to formal and informal education at all levels, through all forms of media, so that they will have the scientific and technical skills to participate fully in more modern economic activity. Further, women must be included in policy and decision-making bodies at all levels from the national planning or research institute to village meetings.

Our recommendations focus in two priority areas: scientific and technical education for women professionals, and skill training for poor, illiterate women. Within the Draft Programme of Action these recommendations fall within Target area A because they enhance endogenous capabilities of half the population while increasing the capability and effectiveness of policy-making by adding the dimension of women to national planning. We ask the US delegation:

- C. to initiate or support resolutions to increase the number of professional women in agricultural research institutes, agricultural extension services and training centers, and community development agencies
 - (i) - to ensure utilization of professional women
 - (ii)- and to enhance communication with the women these services are meant to serve, (Recommendations 15, 17, 18);
- D. to support and target money for vastly increased training by UN regional commissions of women to act as local trainers to ensure that technology is explained to the users and that the users are trained in its use, (Recommendations 10, 11, 14, 19);
- E. to support a series of suggestions to UNESCO, IDCA, and professional associations for increasing the visibility and effectiveness of women scientists by granting prizes, issuing conference invitations, and awarding fellowships (Recommendations 13, 16, 10, 21).

We further ask the US delegation:

- F. to support improved data collection on women's development activities and on women scientists and engineers around the world today, (Recommendations 8, 12).

We have asked that reports on these activities and on the development of standards for water supply and employment guidelines be presented to the International Women's Mid-Decade Conference to be held in Copenhagen in July 1980. (Recommendations 4, 6)

Because we value women as major human resources, we ask the US Department of State:

- G. to include at least four women on the UNCSTD delegation in order to ensure representation by women from each of the concerned groups: the scientific community, the non-governmental organization, scholars versed in women and development issues, and professionals in the Department of State;
- H. to appoint immediately a woman at ambassadorial level to coordinate US activities for the International Women's Mid-Decade Conference, and delegate to her on-going oversight of the recommendations made by this workshop.

REPORT OF RECOMMENDATIONS

Made By The

AAAS WORKSHOP ON WOMEN AND DEVELOPMENT

Thirty-five scientists, men as well as women, met in Washington, D.C. March 26 and 27, 1979 to discuss issues of vital importance to women that should become part of the deliberations of the UN Conference on Science and Technology for Development scheduled for Vienna in August 1979. During the opening session Mildred Robbins Leet discussed the activities of the NGO Task Force on Roles of Women for UNCTSD, which she chairs, and reiterated the need for concerted effort if issues concerning women are to come before the UNCSTD.⁽¹⁾ Her remarks made clear the major tactical problem when promoting development projects designed to reach women: should such projects involve only women and women's groups, or should projects be integrated from inception? If women run their own projects, their issues will be paramount, but they may also be regarded as irrelevant to national priorities. If women's issues are combined with those of men, then men and their concerns are likely to dominate. As the recommendations show, the group felt that development projects must be planned within a national context but that special efforts must be made to see that development efforts reach and involve women. Such efforts include working with women's groups and networks both at the village level and at the professional level.

The dominant theme throughout the workshop was the critical need to consider the issue of "women and development" as an integral part of all recommendations and projects flowing from the UN Conference Science and Technology for Development.

Women are, after all, half of the human resource capital available, more than half in many rural areas. Yet in the area of Science and Technology for Development, women have often been treated by development planners as a marginal group, to be placated with peripheral activities unrelated to overall national plans. Alternatively, they have been viewed as part of a family unit that would automatically benefit from opportunities for the male head of household. Such assumptions not only ignored the fact that one out of three households is headed by a woman, but also failed to take into account the fact that in all poor families--and increasingly in middle-class families--every adult must contribute to the family's survival. Thus all development projects, particularly those encompassing income-producing activities, should carefully analyze the differential impact the project might have on women as well as men, and include in both the planning and the implementation stages whatever special provisions may be necessary to ensure an equitable distribution of benefits.

The papers prepared for this workshop clearly illustrate this broad involvement of women in all aspects of scientific and technological concerns. Multinationals are setting up factories in areas where cheap female labor is available and are encouraged to do so by the national governments concerned. (2)

National governments encourage modern food-processing and manufacturing factories which reduce opportunities in

the informal sector thus denying income to women.(3) Women farmers seldom benefit from internationally funded extension programs, and are increasingly deprived of access to land upon which to grow their traditional subsistence and market crops as cash crops become paramount.(4) The Green Revolution, early supported by host governments, has tended to increase unemployment, particularly among women.(5)

The introduction of a pilot solar power unit is designed to bring electricity to a remote village in the Sahel for grinding millet and pumping water, but where will women get money to pay for the grinding?(6) It may depend on who controls the technology.(7) Access of women to credit so that they can, individually or as a group, afford new technology is a world-wide problem.(8) But women of different classes are affected differently by modernization.(9) Poor women need access to information; the radio in Iran played a key role in social transformation of women.(10) Women's organizations are pivotal in the introduction of and training in new technologies, especially for the poor.(11) Finally, these micro studies need to be analyzed and policies developed, if women are ever to become equal partners in the development process. (12)

RECOMMENDATIONS

The twenty-one recommendations made by the AAAS Workshop on Women and Development have been grouped below into two categories:

- I. Recommendations Concerning Integrated Planning, and
- II. Recommendations concerning the inclusion of Women in the Making of Technology Policy

With each section the recommendations are listed according to the body which is designated to implement the recommendation: international or multi-lateral agencies; national governments of developing countries; the U.S. government; professional associations.

I. Recommendations Concerning Integrated Planning

Recognizing the all-encompassing nature of women's involvement in development, the workshop participants agreed upon a series of recommendations aimed at fostering the inclusion of women's concerns in integrated development planning rather than encouraging exclusive emphasis on separate women's projects. Such planning must include an analysis of the impact on women of all development policies in order to formulate ways of avoiding harm and maximizing benefits. It is important to emphasize the role of women in families, whether or not a man is present, and to see the family unit as a key element in designing and evaluating policies. A specific focus on women needs to be included in the planning process, taking into account the similarities and differences among women in different economic classes, between urban and rural women, and between agricultural and industrial sectors. The ultimate aim of all these recommendations is to develop policy that makes research on women's concerns and activities integral to all program sectors.

A. Recommendations to International Bodies

We support the suggestions of the Secretary General of UNCSTD that a number of pilot projects demonstrating the effective use of science and technology for development be designated at the Conference to be cooperatively developed and implemented by agencies of the UN system.

1. *Women should have equal access to and participate in all these projects at every stage, including identification, formulation, appraisal, planning, design, implementation, and evaluation. In every case the impact of these projects on women and family life should be considered.*

To illustrate the kinds of questions that should be considered in order to make the concerns of and impacts on women operative, we have prepared a checklist of the types of questions that should be asked when considering the introduction of technologies intended to benefit poor women.

(Annex A) We have also identified five major project areas that address problems of high priority for the welfare of women and families. Two of these lend themselves to UNCSTD pilot projects, two support activities relating to other UN Conferences, and one addresses the need for income-producing projects for women across the entire span of assistance activities.

Household Energy

2. *We recommend that one of the international pilot projects sponsored by UNCSTD focus on present and changing uses and supplies of household energy.*

Each of the regions of the developing world should undertake at least one pilot project, encompassing both urban and rural areas, to improve available household energy by introducing new technologies for meeting the energy needs of households. Both improved traditional and modern methods of providing energy should be offered for choice by the cooperating households. The role of science and technology in improving the efficiency of energy use should be emphasized. It is recognized that the continuing heavy use of certain traditional technologies and sources (e.g., firewood) involves increasing social and economic costs. Technologies

should therefore focus not only on improving existing technologies and supplies, but also on devising new, especially renewable, energy sources and processes. Existing technologies to be considered include a variety of stoves (mud, pressure, oil-wick, kerosene), of energy sources (biomass, biogas, electricity, firewood), and of processes (e.g., hot water pans, grain driers, etc.) A sample project is included in Annex B.

3. *The UN Conference on Renewable Energy Resources scheduled for 1981 should call upon member nations to provide information on present and projected household energy use and supply, both urban and rural.*

It has been customary to account for national energy needs only in terms of the commercial energy resources--oil, coal, natural gas, hydroelectricity and nuclear fuels. This conventional energy-accounting procedure, however, fails to account for most of rural energy uses in the developing countries. Fuelwood (firewood, charcoal and crop residues) accounts for two-thirds of all energy (other than human and animal energy) used in Africa and for one-fifth in Latin America. In India, Pakistan, and Bangladesh, where noncommercial fuels account for about 90 percent of total domestic consumption, nearly half is supplied by dung.⁽¹³⁾

Because the majority of the population in most developing countries lives in the rural areas, which in general are not served by an electrical power distribution system, they do not realize any of the direct energy benefits of the commercial power generating system. Instead the vast majority of the rural population--and the urban poor as well, who cannot afford electricity either--rely on these non-commercial energy resources. Improved information sources on present usage and changing supplies must become part of world planning on energy.

Modern Industry

4. *We recommend that one pilot project examine the socio-economic implications of the drive for technological transfer and rapid industrialization worldwide. The relationship between modern industry employers of women in developing countries and the impact of that employment upon the status of women should be more carefully assessed.*

The employment of women in labor-intensive export industries in some developing countries is a highly contentious area of concern. Trade unions in the developed countries fear the export of jobs; women and men concerned with fair labor standards worry about depressed wages and rapid labor turn-over.⁽¹⁴⁾ Therefore, a project should be initiated in a selected number of countries for which interested United Nations agencies, such as UNIDO, UNCTAD, and ILO, would be called upon to participate as would industrial companies, indigenous voluntary groups, and the Women's Voluntary Fund. A first output would be a set of work guidelines specifically concerning women. Progress on these guidelines should be reported to the International Women's Mid-Decade Conference in 1980.

Giving attention to women's concerns within major UN agencies should lead to the integration of these issues in the international codes of conduct being formulated with reference to multinational corporations. In addition, the appropriate UN agency could evolve a set of criteria for foreign private investment in developing countries which would constitute a development impact statement analogous to the environmental impact statements now required for certain kinds of projects. In this way, the focus on women's problems could have a much broader development effect.

Agriculture

5. *We recommend that programs both at FAO and at the established international agricultural research institutes link research on women in agriculture to broad theoretical concerns with technological development. Extension assistance should be directed towards improving the productivity of subsistence crops, small animal raising, and garden farming.*

Because these activities are primarily the responsibility of women, assistance should also be directed towards women. Post-harvest food handling should be considered as important to increased productivity as research in new strains. Specific projects introducing new technologies for farm and food-related activities of women should be jointly developed by the agricultural and technological agencies at regional levels.

New technologies for the agricultural activities carried out primarily by women, e.g., transplanting, breeding, processing and preserving, should receive greater emphasis. It is preferable that the technology not displace female labor, but instead, make their labor more efficient and productive. Many current income producing activities of women could be made more profitable with improved technology and consequently increased production. If the technology replaces human energy, then the control of that technology should be granted to those replaced. Too often technology has released women from drudgery but at the cost of reduced income, lowered status, and increased dependency. (15)

Water Supply

The rights of women farmers should be considered when providing water for irrigation. Particularly when providing irrigation to areas inhabited by pastoral societies, women's economic activities should be recognized and supported, or

alternative productive activities should be provided. Women's rights to land for agricultural use, which will be on the agenda at the World Conference on Agrarian Reform and Rural Development later this year (1979), is an important consideration in any project encouraging increased investment in agriculture.

6. *We support the resolutions of the UN Conference on HABITAT and the Water Conference which set a goal of clean water for everyone by 1990. In this connection, we recommend that an international working group be set up to establish minimum standards for water supply by amount of water and by cost in time or money. We further recommend that this group report its findings to the International Women's Mid-Decade Conference in 1980.*

Sanitary water supplies have been long considered a major goal of development, yet women and children still spend many hours fetching water for household use. Simple technologies such as tin roofs or plastic pipe can give women the gift of time--two to four hours more every day--to improve the quality of life of themselves and their families. Selling clean water can provide income and pay for installation. Safer wells and improved storage of water, can increase the supply, but improperly designed or poorly placed wells can endanger the water supply and degrade the land. Further, the provision of water must be coupled with water and waste management. A hierarchy of water systems should be developed which respond to the needs and resources of the community. Women should be trained in all aspects of water and water management in order to provide additional income producing activities to unskilled women and greater overall health benefits to the community.(16)

Income Producing Activities

7. *We urge that multi-lateral assistance agencies as well as USAID designate at least ten percent of their budget to projects designed to provide productive employment for women, both urban and rural. Such projects should balance technological development with training for the users.*

Women's economic activities are vital to the survival of poor families whether there is a man present or not. The lack of new income-generating employment combined with the diminution of traditional employment for women in agricultural handicraft and trading sectors is causing female unemployment of alarming proportions.(17)

Because of the lack and diminution of income generating employment for the least educated, it is necessary to explore options and alternatives. For example, the use and production of foreign technology entails the introduction of capital-intensive modern technology heavily subsidized by local government and populations when an intermediate indigenous technology might at least equally increase production, preserve foreign exchange and provide income-generating employment for those with little access to modern sector employment.(18)

Therefore, we suggest a program which will :

- (a) identify goods and services responding to local needs which have traditionally been produced by women using indigenous technology, and
- (b) identify technologies which will improve productivity and retain employment for these least educated women.

We recommend wider use of time allocation studies to identify women's tasks that can be made more efficient through new technologies. These technologies should satisfy local needs for products and services and be susceptible to

indigenous financial, managerial and technical direction. Priority should be given to products and services which meet basic needs as defined by the users. It is likely that the product so identified will accommodate the processing of locally available raw materials and the manufacturing of items for daily use, e.g., foods, especially weaning foods, partially prepared foods, preserved foods, easier-to-cook foods; household items, such as soap, medicinals, utensils, matches, fuel for cooking, furniture, implements for home and field, devices to store food and water; cloth and clothing, and means of transporting materials and people.

We emphasize the need to establish projects among the most disadvantaged in both rural and urban areas. Ongoing monitoring and evaluation, both by users and by indigenous groups, including redesign and dissemination, should be a feature of such projects.

While recognizing traditional occupational differentiation by sex, such projects should also open up new activities for women. For example, new activities such as fish ponds, business enterprises, or water management could be introduced to women as easily as to men; indeed they fall within the traditional service activities of women. The tendency has been to introduce new technologies only to men and then to interpret cultural traditions in such a way as to bar women from that activity.

Data Banks

A major problem in the designing of integrated development plans is the lack of statistics on women's economic activities, including the fetching of water and fuel, which beg for technological or scientific solutions. As the projects recommended above develop information and as research

institutes disaggregate the poor by sex, it is important that such information become part of the information contained in the international network of computerized data banks. There is a great resource of information on science and technology for development now available in data banks. It exists in many countries, but the greater part is in the United States where over \$8 billion has been invested in the generation of such data. New developments in computer tele-communications and in search technology can now make data bank information readily available as an important resource for development.

8. *We recommend that UNESCO sponsor a working group to review categories for information retrieval to ensure that women's special concerns are both separately coded and adequately cross-referenced, and that the group report its progress to the International Women's Mid-Decade Conference in 1980. In this manner, data will be available for integrated planning as well as for women's projects. We further urge developed countries to support this effort by utilizing the categories in their own data banks and by giving financial support to assist developing countries in establishing and maintaining compatible systems.*

B. Recommendations to National Governments

Each of the five major project areas noted above, household energy, modern industry, agricultural, water supply, and income-producing activities, also calls for priority action at the national level. These projects should be designed to demonstrate the contribution to local and national development that can be achieved when the great energies and talents of women as well as men are fully involved.

Household Energy

9. *Household energy needs should be made an integral part of each nation's energy policy. It is recognized that over 90 per cent of the rural energy supply and nearly 50% of the total*

energy consumed comes largely from non-commercial sources in the developing countries. Further, such energy is inefficiently used. (19)

Improved data need to be generated to measure both use and efficiency of non muscular energy used for the processing, preservation, and preparation of food, for heating water, or for lighting. However, the increasing scarcity of noncommercial fuels, their rising prices, and the widespread land degradation occurring as more and more trees are cut, require immediate attention to improved or alternative energy sources for poor households. Participation

Emphasis was given throughout the seminar to the importance of consulting the user when introducing any technology. Too often new technologies have harmed those they were intended to benefit. The way that technologies are introduced—by whom, when, how; the social as well as economic costs, and the control were seen as equally critical to its utility as the technology itself. Particular attention should be paid to technologies which reduce the muscular energy required of women to ensure that release from drudgery does not place an even greater economic burden on them.

10. *A national monitoring system needs to be developed to ensure that at every level new technologies introduced into developing countries take into account the needs of the users. Provision of and funding for such a monitoring system should be included in all internationally funded technology projects. Users should be part of any evaluation.*

The socio-economic impacts of new technologies should be evaluated to see who in fact benefits. When the intended users of technology are primarily women, or when the human energy being replaced has been provided primarily by women, the appropriate monitoring mechanism may be the National Women's Bureau or a local women's research center.

The workshop further emphasized that while national planning must integrate women's and men's concerns, the delivery systems may have to be separate in order to reach women directly.

An important resource in the identification, development and delivery of new technologies are existing networks and organizations that involve women. While individual women face restrictions in access to channels of information, technology, and opportunity in some societies, local women's and community groups are at various implementing stages suitable vehicles for disseminating technological information and supporting risk along locally defined lines.⁽²⁰⁾ Once aware of technological options, women users themselves decide their needs and priorities and spread information through existing communication networks. Simultaneously, peer support is available for the risk and experimentation sometimes associated with technological change.

11. *Women's groups and informal or community groups which include women as well as men should be involved in the selection, evaluation, and promotion of new technologies.*

II. Recommendations Concerning the Inclusion of Women in the Making of Technology Policy

The complex and demanding needs of all countries, and of the world, require the wise utilization of all national resources, and especially of all human resources. Women should have the opportunity both to select from the full range of professional and occupational roles and to be trained to fill those roles. When women are better equipped to participate in their society's economic development, national productivity and equity of economic distribution will be enhanced.

Education and training in science and technology are particularly crucial, yet throughout the world the percentage of

women in these fields is low. One reason may be the frequent exclusion of women from research and administrative jobs in the scientific and technical area because of cultural constraints or occupational segregation.

The workshop recommendations therefore stress not only education but access as well so that women may participate fully in the making of technology policy.

The critical need to involve women fully in the planning, selection, and use of science and technology to address problems of social and economic development, requires that development agencies undertake specific commitments in two priority areas: advanced training in both natural and social sciences and in technology; training of local women who are the end users of technology.

A. Recommendations to International Bodies

Despite discrimination throughout the educational process and despite societal pressures away from technical subjects, women scientists and engineers exist in nearly every country throughout the world. Prejudice and institutional conservatism frequently prevents these women from attaining jobs for which they were trained. We argue further that these women will be better qualified than men to provide the bridge to poor women.

Recognizing and Utilizing Women Professionals

12. *Data collected by the United Nations for the International Women's Mid-Decade Conference in 1980 should include information on the numbers of women in all scientific and technological occupations.*

This information should include descriptions of the variety of occupations open to women and a discussion of the factors which inhibit or encourage women professionals in the various fields.

13. *Annual prizes should be established for women scientists from Asia, Africa, and Latin America who have made important new contributions to social and economic needs.*

Such prizes should be offered by the United Nations through UNESCO or ECAST they should be coordinated with similar prizes recommended by participants in the Singapore International Symposium in Science and Technology for Development sponsored by the International Council of Scientific Unions in January 1979.

14. *The regional commissions should concentrate on programs which provide training for project managers and educators in methods of involving the users of technology in decisions about its selection, use, and control.*

The workshop participants stressed the importance of ensuring that local women and men be given sufficient information about technological alternatives so that they can make meaningful choices. Demonstration models trucked to local fairs or weekly markets provide hands-on experience; tape cassette provide easy reference for illiterates; local dance and drama forms can be adapted to convey information about alternative technologies. All such media techniques should be widely and frequently used.

Most governmental bureaucrats tend to give orders rather than ask local citizens to define their needs. Cadres of personnel trained in community organization will be needed to facilitate opportunities for users to participate in decision-making. UN regional commissions could provide

technological information as well as design training manuals for national project managers. Special emphasis should be given to training in the use of new communications technology.

15. *The international agricultural research institutes should add women professionals to their staffs to facilitate both research and extension services to women farmers and in agricultural-related activities.*

While these institutes do not make national policy, their research findings influence international agricultural policy. Currently their staffs are predominantly male. (21) We are convinced that the perspectives of women are necessary to ensure that women's roles in agriculture are recognized and that technological innovations are extended to women as well as men. We wish to stress the simultaneous need for improved service to women farmers along with additional research in crops more likely to be within the woman's domain.

16. *UNESCO should sponsor periodic small international conferences, bringing together both academic and nonacademic professionals engaged in work on women and development.*

There is no professional association at the present time representing the interests of scientists concerned with the impact of development on women, yet there is a need for women from different countries in different disciplines to compare research priorities and findings. Such contact should be more frequent than the occasional world conference, and more scientific than the program meetings visualized under the plan for the International Women's Institute.

Only through international exchange and visibility will sufficient attention be paid to developing the scientific capacity to understand the complex problems of women's

integration in development. Pioneering work has been done by individual scholars, usually isolated in universities and research institutes. Important information has been collected in many action projects and through the efforts of some national and international agencies. But an integrated approach to women and development issues requires that serious investments be made in (1) building the scientific capacity of individuals and (2) increasing the participation of such trained individuals in those institutions that conduct policy-relevant research in the field of women and development.

Emphasizing the need for integrated development planning, in addition to professional growth, scholars studying women and development should be included in all relevant conferences sponsored by UNESCO.

B. Recommendations to National Governments

The improvement of existing agricultural extension and community development services are imperative in order to mitigate the impact of deteriorating rural conditions in much of the world. Services to rural women, largely ignored in their farmer and entrepreneurial capacities, need substantial redirection. (22)

Utilizing Women Professionals

17. *Agricultural extension services should reflect the sex composition of the actual agricultural work force. Teams should include both male and female members in order to provide better communication with both male and female agricultural workers without disrupting cultural and social practices.*

In order to ensure a pool of qualified female extension agents, governments may need to reserve places in training

centers or universities so that women can receive education not only for home economics and food processing, but also for other types of agricultural sciences, e.g., crop propagation and improvements, fertilizing and pesticides, breeding, etc. (23) It is essential that women extension workers receive equal pay and the same prerequisites available to their male colleagues.

The international pilot projects involving the impact of technology on women which this AAAS Workshop has proposed relate either to women's responsibilities in the household, providing fuel and water, or to income-producing activities from handicrafts to industry. Women are best able to communicate with other women, both in eliciting and transmitting information. Professional women can also make a significant contribution to these projects as planners, creators, implementors, and evaluators. Without their participation, such projects will not succeed.

18. *Women should be included in rural and urban community development agencies which seek to introduce new technologies for household use or for income-producing activities, so that such technologies will be appropriate to women as well as men.*

Training Local Women

In the development process, women have been denied education and training which would lead to income earning opportunities. Although this process is changing for the present generation, in many less developed countries at least 90% of adult women still lack access to education and marketable skill training. Adult education classes in the past have tended to focus almost exclusively on literacy training.

19. *On site or informal training geared to upgrading existing skills or providing new marketable skills should be made available widely to women who have been denied access in the past.*

The types of training we are proposing should include:

- i) small scale entrepreneurial activities;
- ii) food processing techniques and production of crops for commercial purposes;
- iii) maintenance and repair of agricultural machines;
- iv) practical technical training with which they can earn a living and which should not necessarily depend on literacy;
- v) training to organize credit unions and cooperatives

Such training generally reinforces group cooperation and contributes to a more positive self-image. As their horizons enlarge, women tend to increase their use of community resources already available to them thus improving the level of health, nutrition, and education of their families and their communities.

C. Recommendations to the United States Government

As the centerpiece of the U.S. Proposals for UNCSTD, the Institute for Scientific Technological Cooperation should become a model for the inclusion of women into the development process.

20. *We recommend (i) that women have a minimum of two fellowships designed for specific women's concerns in each of the five issue areas;*
- ii) that there be created a staff position at the Deputy Assistant level devoted to promoting the participation of women in research and demonstration projects throughout the agency and in each regional office;*

iii) that at least one million dollars annually for the first three years be used specifically for exchange and travel activities involving women scientists and technologists.

D. Recommendations to the AAAS and other professional associations

For development to succeed, the resources of women must be integrated into research project design. To provide information to make their inclusion meaningful, greater attention needs to be given to development oriented research concerning women in a social, political, and economic context. Women's special needs should be discussed and explored within the framework of general development theory.

21. We call upon scientific associations and development agencies to include scholars familiar with women and development issues in all their meetings and deliberations. We further urge these associations and agencies to assure the continuing development of scientific capacity adequate to analyze the complex problems of women's integration in the development process through both basic and applied research.

Existing methods of data collection and analysis pose special difficulties in the scientific study of women's participation in economic processes. The creation of an adequate infra-structure for basic and applied research on women and development issues is necessary to overcome existing institutional and attitudinal barriers to an integrated approach to research and planning in these areas. Particular attention must be paid to overcoming these barriers through the creation of an adequate body of information, methods of data collection and analysis, and means of communicating findings to an international and interdisciplinary group of researchers and policy-makers. Scholars isolated in universities and research institutes must receive greater support

for their work and should be integrated more fully into existing institutions concerned with these issues.

CONCLUSION

Modernization is essentially the process of substituting scientific findings and technological systems for traditional methods of providing human needs. Because the dominant development theories have ignored or downplayed women's contributions to the sustenance of family and community, women's roles have been increasingly limited and women's status frequently eroded. Specific focus on ensuring that new technologies reach women and address their needs will go a long way to redressing the balance.

The participants in the AAAS Workshop on Women and Development commend the Department of State for recognizing the importance of including women in the development process by sponsoring this workshop. We urge the Secretary of State to instruct the U.S. delegation to the United Nations Conference on Science and Technology for Development to support wholeheartedly the recommendations submitted in this report.

* * * * *

Notes and References

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2. Linda Y.C. Lim, "Women Workers In Multinational Corporations In Developing Countries," AAAS Workshop on Women and Development, March 1979.
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13. See Joy Dunkerley et al, Energy and the Poor in the Third World, a Resources for the Future Research Paper, 1979; and Environmental and Natural Resource Management in Developing Countries, a Report to Congress by USAID, February, 1979.
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16. For additional background see Maryanne Dulansey Water Resource Development The Experience of U.S. Non-Profit Organizations, American Council of Voluntary Agencies for Foreign Service, Inc., March 1977; and Mary Elmendorf and P. Buckles, "Socio-Cultural Aspects of Water Supply and Excreta Disposal" The World Bank, September 1978.
17. See M. Elmendorf, "The Dilemma of Peasant Women," in Women and World Development by Irene Tinker and Michele Bo Bransen. (Washington: Overseas Development Council, 1976).
18. See example of modern rice-hulling plants in Ivory Coast, "Petty Trade and Other Employment Options for the Uneducated Urban West African Women," Barbara C. Lewis.
19. See UNIDO report 1978, "Draft Report of the Technical/ Official Level Meeting to the Ministerial Level Meeting." International Forum on Appropriate Industrial Technology, India, November 1978.
20. Rural elite can take risks and serve as local change agents if there are built-in procedures for diffusion.

Notes and References (Cont'd)

21. The staff of these international institutes tend to be male. Female professional staff have not been recruited for the scarce social scientist positions which might steer Centre policy and research in a direction more responsive to the problems of female farmers. The two female staffers at CIMMYT, for example, are in experimental research and laboratory work rather than in outreach positions. The economists at CIMMYT, IITA, IRRI and ICRISAT are all male. All Directors--General and Program Heads are male. Since these men primarily come from Western countries, they tend to operate from a model in which all farmers are male.
22. Experience with the National Maize Project in Tanzania shows that women have significantly less contact with the extension service than men. In one region only 20 percent of the women participating in the project (which in fact facilitated extension contact) had been visited by an extension agent. In contrast, 58 percent of the men had been visited. Low contact rates are due to socio-cultural constraints on male/female interaction and to the prevailing belief that women are probably not capable of learning technical information. The predominantly male staffing pattern of the extension service reflects the primarily male composition of the student body in agricultural facilities. In 1975 only 25 percent of the graduates of Agricultural Training Institutes (the source of extension agents) were women and 25 percent of these were studying nutrition. Less than 1 percent of Tanzanians sent outside for agricultural training between 1966 and 1970 were women. For a survey of women and extension in other countries, see Jacqueline A. Ashby, 1979, "New Models for Agricultural Research and Extension: The Need to Integrate Women." Paper prepared for FAO Conference on Rural Development and Agrarian Reform. WID/USAID, Washington, D.C.
23. In 1976 Mexico set up a new type of secondary school, Escuela Agro-Pecuaria, with scholarships for rural youth, both male and female.

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APPENDIX A

Muneera Murdoch

Priscilla Reining

Grace Hemmings-Gapihan

I. METHODOLOGY FOR EVALUATING IMPACT TECHNOLOGY ON PASTORAL SOCIETIES

Impact of Irrigated Agricultural Development Projects on Pastoral Societies

1. Pastoralists

- a. animals
- b. grass and water
- c. people

2. Division of Labor between men and women

Women's work is complementary to that of men although the nature of that work might differ from one society to another (i.e., Fulan: women in charge of milking; Subriya: women are not.) Almost invariably women own animals although they might not participate directly in herding.

Development Intervention

1. shift from pastoralism to agriculture
2. from subsistence to cash crops
3. new project oriented toward males
4. males adopt new types of work
5. new work evaluated in cash terms
6. women deprived of traditional mode of production - only left with mundane type of work - power over production is lost
7. women not involved directly in new mode of production - assumption that benefits reaching men will by definition reach women as well
8. man becomes the only generation of cash income
9. women becoming economically dependent on men
10. economic dependence generating social dependence
11. loss of self-esteem among women

Solution

1. What are the roles of women or of men in a pastoral society?
2. How will the new project affect these roles?
3. How could women be involved in the new activities?

II. METHODOLOGY FOR EVALUATING IMPACT OF TECHNOLOGY IN RURAL COMMUNITIES

1. What is the named community?
2. What other groups must be considered below the level of the village level?
3. What is the nature of the household?
4. How are households formed and dissolved?
5. What happens when that person dies or marries?
6. What is the model for the technology?
7. Who buys? Individual or group?
8. Will everyone be able to buy?
9. Who owns the new devices?
10. Who controls its usage?

III. METHODOLOGY FOR EVALUATING PROJECTS IN THE MODERN INDUSTRIAL SECTOR

Such projects may be located in rural areas, e.g. under regional dispersal of industry programs. Many labor-intensive manufacturing industries employ rural women in rural areas directly or as piece workers.

Important Questions which should be asked (and answered)

1. What are the national policy objectives of the particular project/technology to be introduced, e.g. growth, employment, income

distribution? Are women included at the macro level, e.g. as planners, as "targets" of the project?

2. Is the project going to be viable in a long-run economic sense, given anticipated market and technological conditions and changes?
3. What is the product produced, and why is it desirable to produce it? Does it fulfill community needs as articulated by the community, including women?
4. Are women going to be beneficiaries or losers from the project in an economic or social sense (either intended or unintended); how, directly or indirectly?
5. If women are adversely affected by the project, what can be done about it? Can the project or technology be modified or adapted to benefit women? Perhaps a simpler technology involving more labor-intensive processes requiring less formal education and skills (which women do not have), can be substituted; or, project approval may require a component of on-the-job training for women. Can the same technological and market opportunities benefit women more if they are organized differently, e.g. in indigenous enterprises, local co-operatives, joint-ventures, multinational corporations? Are women better off under different institutional arrangements of technology use and control?
6. If women are employed, why? Is it a sex-segregated industry? If so, is the employment of women partly the result of their inferior labor-market status and discrimination because they are cheaper, easier to lay off, more easily exploitable, etc.? Will the removal of discrimination by legislation or negotiation reduce the employment of women? Is this bad if it equalizes women's labor market position, by removing sex segregation in both male- and female-intensive industries?

7. Does social and cultural disruption arise from the wage employment of women? Is it positive for women (e.g. the breakdown of feudal traditions and roles which oppress women) or negative for women, and for their national societies (e.g. an improvement in the position of women may be seen to be a negative cultural disruption by males whose traditionally dominant position is undermined by it.)
8. What is the role of women within the industrial enterprise? Are they represented at all levels of the labor force, e.g. production operators, technicians, engineers, managers? Since most women are production workers, what input/control do they have in the production process -- in management, marketing, technology choice and innovation, hours and conditions of work, etc.?

Water: Distribution and Control

1. Thorough knowledge of water resources: seasonal variations, sites, geography, climate variations.

What are resource constraints?

Are they always the same?

What are the periods of greatest stress?

Is any increase possible?

Are water resources managed so that scarce resources are adequately distributed?

How is water transported or used?

Can time to get water be reduced?

What effects will this have on consumption of water?

Choice of water sites?

Distribution of water resources?

What effects will this have on degree of consumption of water for various activities?

Can the community sustain the effects of increased consumption?

2. Health problems connected with water:

To what degree have these plagued the population?

At what ages?

Has the population adapted biologically, by building up immunities to available water?

3. Dependency and development:

To what degree can the society change its water use patterns in such a way as not to become increasingly dependent on Outside Structures?

Will ease of obtention of water generate unemployment for herders? For women?

Are technologies ends in themselves or means of further development?

Will they use as much as possible of village resources with their people and raw materials?

To what degree are there useful constraints by nature?

Availability of clean water by whose definition?

APPENDIX B

Norman Brown

Irene Tinker

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Energy for use in household and for rural agriculture and homecrafts goes largely uncounted in national energy statistics. This is due to the custom of measuring only "modern" or "commercial" energy oil, coal, natural gas, hydroelectricity, and nuclear fuels. Yet such an energy-accounting procedure ignores what in many cases amounts to more than one-half the total energy used in many developing countries, exclusive of animal and human power.

Rural areas, where a majority of population in the developing countries still live, are seldom served by electrical power grids. Diesel motors power pumps for irrigation, provide energy for small industries, and run small lighting systems for wealthy enclaves. But most rural people as well as the urban poor cannot afford commercial energy in any form even where kerosene is subsidized.

Some two billion people continue to rely on non-commercial energy resources to cook, smoke food, heat water and space, or provide light and safety. These resources are primarily firewood, twigs and brush, agriculture residues, and animal dung. Resources for the Future has just completed a study on "Household Energy for Use and Supply by the Urban and Rural Poor in Developing Countries" which underscores the lack of data on these non-commercial fuels. They conclude on the basis of available data that the lowest energy consumption is among rural areas of South Asia; due to heavy deforestation, animal dung provides as much as fifty percent of the total rural energy consumed. As the amount of dung burned increases, food production will fall unless artificial - and energy intensive - fertilizers are substituted. (1) (Joy Dunkerley, et al, A Report to the World Bank, October 1978, Chapter III.)

It would seem that many countries are following India's path toward deforestation. Experts estimate that Senegal will be bare of trees in 30 years, Ethiopia in 20, Burundi in seven. (2) (D. French.) 90% of wood consumed annually in developing countries is used as fuel. (3) (World Bank 1978, Forestry Sector Policy Paper.) Reasons for this alarming increase in the use of forest reserves are largely related to the population increase both directly in increased cutting and indirectly as more land is cleared for agricultural crops to feed the growing populations. Improved health measures have opened up river valleys in Africa and the Terai in Nepal to settlers, also reducing forests and exacerbating erosion.

As available resources drop, the time consumed in gathering fuel increases. In India it has been stated that one person in a family of five must spend full-time gathering dung, firewood, and refuse. (3) (Mahajni.) Even higher estimates apply to Tanzania. (5) (USAID.) Such time requirements encourage larger family size, for children help the family more than they cost.

When one examines the use to which this energy is put, it appears that some 40 to 50% of the total energy consumed in rural areas is used in cooking alone. (6) In the case of India, for example, this leads to the conclusion that approximately one-fourth of the country's total energy budget is used in rural areas just for cooking, while rural Bangladesh uses about 40% of that country's total national energy budget just to cook food. (7)

The urban poor must also eat, yet their energy consumption is estimated as lower than that of the rural poor. (8) As much as one third of the family's budget may go for fuel in the Sahelian countries. One study states that "to obtain the same amount of usable energy which can be purchased in the US for about \$1.30, a charcoal burning family in Addis Ababa may have to spend about \$8.00." (9)

Two things are clear from these scattered reports:

1. there is a crisis in household energy
2. little data are available on actual usages and current adaptations of consumption

It is also obvious that household energy is a problem for women who do most of the cooking around the world and are generally responsible for gathering fuel. Any project dealing with household energy must incorporate women's views and needs at every phase of study and implementation.

International pilot projects

Each of the major regions of the world should undertake at least one pilot project encompassing both urban and rural areas to improve available household energy by introducing new technologies for meeting the energy needs of households. Both improved traditional as well as modern methods of providing energy should be offered for choice by cooperating households.

Each project should consist of four to six sites where international teams will:

- ***survey the existing patterns of supply and use of household energy, utilizing local women as participants and data-collectors;
- ***demonstrate and discuss technological improvements which with local community and women's organizations, might be tested. Only presently available technologies would be described. Each site should test only one technology. All stages of the discussion, selection, and introduction of the new technology should be carefully monitored and recorded.
- ***preliminary reports of the projects should be made available to the UN Conference on New and Renewable Resources of Energy in 1981.

Technologies to be considered

1. Village woodlots: improved or alternative species, better community control, larger size, better management
2. More efficient use of traditional fuels: improved cookstoves, processing of brush and residue for higher temperatures
3. Development and/or adaptation of more efficient methods of charcoal production
4. Alternatives for hot water: introduction and/or improvement of solar ponds or tanks
5. Alternatives for methane converters, small hydro systems
6. Energy for food processing: solar dryers, water or mechanical grinders, solar water pumps

Formulation of Approach

1. Role of individuals or groups within the community
2. Role of outside experts
3. Relation of project to existing social patterns
4. Relation of project to competing or complementary development project

Initial Appraisal

1. What are the anticipated benefits of
 - reducing the time consumed in fuel gathering
 - increasing the supply of firewood
 - local control of woodlots
 - reducing food preparation time
 - reducing exposure to combustion products (e.g., smoke from burning dung)
2. What are the anticipated consequences of
 - accustomizing women to the convenience of charcoal or biogas as compared to wood
 - the impact on income production from traditional fuel gathering activities
 - establishment of woodlots in relation to traditional patterns of tree ownership by women or by men
 - materials requirements for new stoves or biogas plants
 - providing women with more time

Project Design

1. Specific elements identified that will be included in project
2. Identification of local institutions that will have local responsibility
3. Identification of best-country organization that will have national responsibility
4. Specific studies to gather needed data
5. Anticipated costs
6. Projected time schedule
7. Environmental assessment, if needed

Execution

1. Logistic and managerial aspects of field operations
2. Modification resulting from environmental assessment
3. Participation in studies
4. Participation in construction activities
5. Use of devices, approaches, new institutions resulting from project

Evaluation

1. Benefits
2. Employment opportunities
3. Income level distribution
4. Health
5. Environmental changes
6. Costs
7. Potential for replication
8. Changes recommended

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APPENDIX C

PARTICIPANTS

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PARTICIPANTS

AAAS Workshop on Women and Development
March 26 - 27, 1979
The Brookings Institution
Washington, D.C.

Mr. Robert Berg
Associate Assistant
Administrator
AID
Washington, D.C. 20523

Mr. Simon Bourgin
Senior Advisor to the US
Coordinator for UNCSTD
S/CST Room 1006
New State Department Building
Washington, D.C. 20520

Dr. Norman L. Brown
Special Advisor on Energy,
AA/ASIA
and
Chief, Division of Scientific,
Technical and Environmental
Problems
AID
Washington, D.C. 20523

Ms. Mary Burke
Staff Associate
Center of Concern
3700 13th Street NE
Washington, D.C. 20017

Ms. Melinda Cain
Research Social Scientist
Denver Research Institute
University of Denver
Denver, Colorado 80210

Ms. Kim Conroy
Consultant
The World Bank
1818 H Street NW
Washington, D.C. 20433

Ms. Roslyn Dauber
Research Analyst
Office of Technology
Assessment
U.S. Congress
Washington, D.C. 20510

Ms. Maryanne Dulansey
Consultants in Development
2130 P Street NW, Suite 803
Washington, D.C. 20037

Dr. Mary Elmendorf
Consultant
International Bank
for Reconstruction
and Development
1818 H Street NW
Washington, D.C. 20433

Dr. Louise Fortmann
Visiting Assistant Professor
Department of Rural
Sociology
Cornell University
Warren Hall
Ithaca, New York 14850

Ms. Paula Goddard
Deputy Coordinator
Office of Women in
Development
AID
New State Department Building
Washington, D.C. 20523

Mr. Denis Goulet
Senior Fellow
Overseas Development Council
1717 Massachusetts Avenue NW
Washington, D.C. 20036

Ms. Grace Hemmings-Gapihan
Department of Anthropology
Yale University
New Haven, Connecticut 06520

Peter Henriot, S.J.
Director
Center of Concern
3700 13th Street NE
Washington, D.C. 20017

Mr. John Hurley
Deputy Director
Board on Science
and Technology for
International Development
National Academy of Sciences
2101 Constitution Avenue NW
Washington, D.C. 20418

Ms. Leah Janus
Overseas Education Fund
of the League
of Women Voters
1435 West Wesley Road NW
Atlanta, Georgia 30327

Dr. Charles Kidd
Research Professor
of Public Affairs
George Washington University
2130 H Street NW
Washington, D.C. 20052

Mr. Glen Leet
President
International Society
for Community Development
54 Riverside Drive
New York, New York 10024

Ms. Mildred Robbins Leet
Chairperson
NGO Task Force on Roles
of Women for UNCSTD
54 Riverside Drive
New York, New York 10024

Dr. Barbara Lewis
Associate Professor
Department of Political
Science
Livingston College,
Rutgers University
New Brunswick, New Jersey
08903

Dr. Linda Lim
Assistant Professor
of Economics
Swarthmore College
Swarthmore, Pennsylvania
19081

Dr. Michael Maccoby
Director
Harvard Project on Work,
Technology and Character
1710 Connecticut Avenue NW
Washington, D.C. 20009

Dr. Martin McLaughlin
Senior Fellow
Overseas Development Council
1717 Massachusetts Avenue NW
Washington, D.C. 20036

Ms. Muneera Murdoch
Research Assistant
Institute for Development
Anthropology
P.O. Box 45
Westview Station
Binghamton, New York 13905

Ms. Kathleen Newland
Senior Researcher
Worldwatch Institute
1776 Massachusetts Avenue NW
Washington, D.C. 20036

Dr. Hanna Papanek
Associate Professor
of Sociology
Boston University
Boston, Massachusetts 02215

Dr. Irene Petty
Consultant
National Council
of Negro Women, Inc.,
1346 Connecticut Avenue NW
Suite 832
Washington, D.C. 20036

Mr. Jairam Ramesh
Consultant
International Institute for
Environment and Development
1302 18th Street NW
Washington, D.C. 20036

Dr. J. Thomas Ratchford
Associate Executive Officer
AAAS
1776 Massachusetts Avenue NW
Washington, D.C. 20036

Dr. Louis Rosenblum
Chief, Solar and
Electrochemical Division
NASA/Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135

Mr. Peter Schauffler
BioEnergy Council
1625 Eye Street NW
Suite 825-A
Washington, D.C. 20006

Ms. Gloria Scott
Advisor on Women
in Development
Office of the President
The World Bank
1818 H Street NW
Washington, D.C. 20433

Dr. Nwanganga Shields
Economist
International Bank
for Reconstruction
and Development
Room K-4402
1818 K Street NW
Washington, D.C. 20433

Dr. Mangalam Srinivasan
Consultant on Science
and Technology for UNCSTD
3905 Jennifer Street NW
Washington, D.C. 20015

Dr. Kathy Staudt
IPA - Office of Women
and Development
AID
New State Department Building
Washington, D.C. 20523

Dr. Irene Tinker
Director
Equity Policy Center
1302 18th Street NW #203
Washington, D.C. 20036

Ms. Michaela Walsh
Project Leader
Office of Technology
Assessment
U.S. Congress
Washington, D.C. 20510

Ms. Mary Wolff
Associate Director
Aspen Institute
for Humanistic Studies
1919 14th Street #811
Boulder, Colorado 80302

Special Guests

Ambassador Jean Wilkowski
U.S. Coordinator for UNCSTD
Department of State

Mr. Jack Sullivan
Assistant Administrator
for Asia
Agency for International
Development

AAAS Workshop Staff

Dr. Janet Welsh Brown
Program Head
Office of Opportunities
in Science

Dr. Priscilla Reining
Project Director
Office of International
Science

Ms. Karen Ehrlich
Administrative Assistant
Office of Opportunities
in Science

Ms. Paula Quick Hall
Program Associate
Office of Opportunities
in Science

Ms. Jeannette Wedel
Development Officer

Ms. Carol Rogers
Head
Membership Recruitment
and Public Information

Other AAAS Staff

Ms. Maria Celina Heeter
Project Assistant
Office of International
Science

Ms. Denise Weiner
Program Associate
Office of International
Science