

**WOMEN  
IN NATURAL RESOURCES:  
AN INTERNATIONAL  
PERSPECTIVE**

Editors,  
Molly Stock  
Jo Ellen Force  
Dixie Ehrenreich



**Sponsored by The Agency for International Development (USAID), Women in Development (WID) and the College of Forestry, Wildlife and Range Sciences, University of Idaho**

# **WOMEN IN NATURAL RESOURCES: AN INTERNATIONAL PERSPECTIVE**

Proceedings of a conference for men and women  
held at the University of Idaho, Moscow, Idaho  
March 8-9, 1982

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Jo Ellen Force  
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## FOREWORD

Throughout the world, women play a major role in the utilization of renewable natural resources. Because women are largely responsible for activities such as collecting and using fuels and water, raising and harvesting crops, and caring for domestic animals, they commonly comprise the major labor force in forestry, fisheries, land use, conservation, rangeland grazing, and other related areas. Effective communication with women is thus an essential component of any development program aimed at the natural resources. In spite of this, women still remain a relatively untapped natural resource in both developing and industrialized countries.

This conference was, to our knowledge, the first ever to focus on the vital role that professional women can play in international natural resource development. Being the first was both an exhilarating and frightening experience, but one that we, the conference organizers, the speakers, and many of the attendees were familiar with. Many of us have been pioneers--the first woman to win a particular award, to graduate from a particular program, to hold a particular job or to have a particular opportunity. This conference was an inspiring experience as we met one another, identified role models, shared experiences and knowledge, and were challenged to contribute to the world's ability to use all of its resources in a positive way. The personal uplifting that comes from being among a group of professional women is well understood by those who have been, for a long time, "the only one."

The papers presented at the conference and herein represent varied perspectives on the role of women in international natural resource development. They begin with an overview of international involvement opportunities by Mary Elmendorf, who has over 30 years of international experience. Thadis Box and Linda Howell Hardesty describe their experiences with the "tag-along" grant, a unique way for inexperienced professionals to get their "foot in the door." Carol Rice shares her experiences with the particular and perhaps unanticipated challenges confronting women professionals in Saudi Arabia.

The next section comprises the work of professionally educated women in various natural resources fields. Presented here are papers by Martha Avery (forestry), Amy Jean Gilmartin (biology), Carole Engle (fisheries), and Milena Stoszek (range). These accomplished scientists provided valuable role models for the many students and young professionals who attended the conference.

The subject of gender and natural resources is one that cannot be ignored in this early stage of women entering traditionally male fields. Jim Kennedy shares his experiences as a male forester and suggests that many of the problems women professionals face arise not only from the fact that they are women, but also because of characteristics, such as concern for people and esthetics, that society associates with the feminine gender. Paula Williams presents a theoretical perspective on this relationship, and Jennifer James provides us with wisdom, practical advice, and humor as she charts the often ambivalent relationships

between men and women and helps us find adaptive strategies for survival in a male-dominated world.

We next focus on the relationship between host country women and their natural resources. Many U.S. women, educated primarily in sociology and anthropology, have studied this relationship and a sampling of that work is presented here. Internationally known Marilyn Hoskins discusses the role of women in community development of natural resources. Carol Colfer explores the theoretical aspects of the relationship between women and forests in East Kalimantan, Indonesia, and contrasts women/forest relationships with men/forest relationships. Linda Stone reports on an applied experiment to involve professionally trained host country women in rural resource development in Nepal. Experiences with African women who are developing the skills for greater involvement in natural resources management are shared by Judith Kidd and Martha Gaudreau. Margaret Thomas and Gina Amalfitano illustrate the issues surrounding women's participation in natural resource use through an example of women's involvement in cookstove development, promotion, and use. Completing this section, Carolyn Grygiel describes the experiences and perspectives of women from the developing world who are studying in the United States.

The final paper by Kaye Via Mickelson provides all of us with some thoughtful and practical pointers on the importance of networking and mentoring to professional development.

Our gratitude is due the staff of the Washington Women in Development office for providing financial support and for facilitating the participation of our international guests. We wish to acknowledge also the staff, faculty, and students of the University of Idaho, especially those of the College of Forestry, Wildlife and Range Sciences, without whose help the conference and resulting publications would not have been possible. Thanks are due also to the Association of Women in Development at Washington State University and the staff of the University of Idaho Laboratory of Anthropology for their help with various aspects of the conference.

The WINR conference was unique, as is this proceedings. We confidently expect that uniqueness to be short-lived, that other similar conferences and proceedings will soon follow, that more women natural resource professionals will be able to share what we shared, learn what we learned. In the meantime, we hope this work will provide insight into the role women now play in international natural resource development, as well as an awareness of the potential contribution of women--all women--to the development and creative use of the world's natural resources.

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## WHERE INTERNATIONAL WORK IS AND HOW TO GET IT

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### ABSTRACT

Though there are many entry points for women to participate in international work, those who successfully pass through them are those willing to engage in long and careful preparation. Academic preparation is, of course, a given. But there are other, equally important modes of preparation. You must prepare yourself as a person. You must also seek experiential preparation, which may be gained through a variety of activities, whether paid employment or unpaid volunteer work. Such activities not only offer experience, but also provide opportunities for network building with colleagues and potential colleagues. Thus, as an aspirant to international work, you should research the many organizations and agencies, both governmental and private, involved in international work. You must also stay current with research and issues related to international work, joining professional associations, reading, attending meetings. Having found an organization you wish to join, learn about it and about how your experience and knowledge can contribute. Finally, and perhaps most difficult, you must be ready for setbacks and other disappointments. You must have patience.

It was difficult to know just what I could or should share with you at this conference on Women in Natural Resources: an International Perspective--about how to get involved. Many thoughts and ideas came to mind. First, we have to remember how rapidly our world is changing--how the seeds of change spread quickly from village to village--how dire the prospects are for our planet by the year 2000 unless we incorporate natural resources in all planning. And natural resources, to me and to most of us here, I am sure, include not only the environment but the total ecosystem--including women--the often forgotten, unused or misused resource.

As development--modernization, urbanization, desertification, etc.--continue their rapid pace, everyone is beginning to look for new and different solutions. There is a worldwide feeling of the need to improve the quality of life "for the poorest of the poor." There is a search to find new sources of water, food, fuel; to find new methods for sanitation, health information and education. These basic needs can be filled only through sharing natural resources, which are becoming scarcer as populations grow, expectations rise, and waste continues. The industrialized world is concerned about the energy shortage--the lack of fuel oil--but the real energy shortage is the lack of fuelwood--wood to meet the daily needs of families who depend on it for cooking. It now costs more in some countries to heat the pot than for the food to put in it.

But when trees are available, who collects the wood? And who uses it? Who knows what kind is best and why? Mostly the women (Hoskins 1979). I note that you have a number of people speaking on forestry, a profession historically defined as a male province. I fully realize the problems women foresters have already had and will continue to have, but they also have a significant resource their male colleagues lack: easier access to the women--the users of the fuelwood who can become involved with them in planning, designing, and implementing programs to meet present and future energy needs. Introducing the human dimensions into survey methodologies for defining issues and strategies are essential at the village, national, and world level (Elmendorf 1980).

Water and sanitation are two other basic needs which many planners and engineers--mostly male--have failed to see as interrelated to each other and to human values and taboos and which need to be reexamined. The least costly or most sophisticated facility may not be appropriate. Sociocultural aspects must be taken into consideration so that patterns of human behavior related to water and waste are understood and felt needs met. It's easier to change technology than human behavior. And changing behavior, particularly behavior related to daily home life, such as cooking, bathing, excreta disposal, is extremely difficult. Women's roles related to water-carrying, storing, and using need to be understood, but even more important is the training role, the socializing of their families, which is a key to effecting changing patterns of behavior (Elmendorf 1977, 1978, 1980, 1981; Elmendorf and Iseley 1981).

But you didn't invite me here to talk about two of my favorite topics: women, water and waste; and forestry, fuel, food and females. Instead, you asked me to give you some suggestions about getting involved in international work--about how to find the work and the support for it. As an anthropologist, I thought (my husband really suggested it) of doing an ethnography of a job hunt. Or I could do a case study--an autobiographical one. Perhaps I can combine the two approaches.

First, I must say that getting involved is not a simple task, not a one-way street. There are many ways we, as women, must approach our work. Perhaps works would be a better word, because many of us will have double jobs/double careers. As wives and/or mothers we will have responsibilities and time-consuming duties. Many of us can't--or don't want to--go straight through undergraduate to graduate school and then job interviewing, being selected, getting tenure, etc. Many don't want to have to forfeit parenting--not just motherhood--to have a career. I strongly believe that there is not just a single opportunity or way. It's not necessary to decide on a profession and let everything else go. Sure, it's important to have skills, training, and resources, but you must also have strong motivation and ingenuity. Remember that women are one of the world's greatest resources. Development agencies are just beginning to see and use women as agents of change; and by using I don't mean manipulating, but understanding the roles of women both in the developed and developing countries as they relate to overall natural resources as we plan for our future in our global community.

As women there are three things we can be doing at all times to prepare ourselves for international involvement--living, learning and loving. We must be alive fully and openly, understanding life--the daily basic needs of the human family of individuals and groups--developing networks among our peers, our community leaders. We must learn, not just academically but also experientially. Even though having skills and knowledge are important, all our lives can be learning. Our volunteer work, our community involvement, our education/training of our children, all these experiences we can build on, can relate to our broader concerns. Our experiential learning can be put into a theoretical framework personally and institutionally through self-directed reading or academic courses.

By loving I don't mean just the male/female relationships--the "horizontal" promotions--but relating to people, men and women, young and old, rich and poor, white or colored--as fellow humans. When I completed my Ph.D. in "Humanistic" Anthropology, Dorothy Lee,<sup>1</sup> who was on my committee, prepared a letter of recommendation for me, mentioning two things which she felt were most important attributes: flexibility and respect. One's respect for the people with whom one works--for their ideas, for their cultures--is basic to understanding them. And this is what I mean by loving--concern and sympathy. This is what many of the new publications such as Zeidenstein's Learning About Rural Women or Third World Women Speak Out (Huston 1978) are saying. At that time, I was trying to listen and to understand peasant women and their perceptions

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<sup>1</sup>The Greek Anthropologist who in 1959 wrote the excellent book.  
Freedom and Culture

of their roles when I did my field work in Yucatan and wrote about Maya Women and Change (Elmendorf 1972, 1973, 1975). As to flexibility, that is what I mean by there not being just one way to getting involved in international work--to finding a job and getting support for it. Look for different ways, follow your interests, your skills. Use them in different ways. Keep them ready.

Sometimes working as a volunteer with the League of Women Voters, with the American Friends Service Committee (AFSC), with the Peace Corps or Vista, or with a local community organization can be the best way to get involved. Experiences and training can be valuable if the volunteer work is done as seriously as paid work. The networks we build in such organizations are often keystones in our later professional careers. For example, my volunteer work with the American Friends Service Committee gave me my first overseas involvement--and an introduction to many international organizations, governmental and private. As I look back over the years, that particular job was one of the hardest I ever had, the hours long, the life difficult, but my colleagues and I were working as professionals. Though I returned "no richer or poorer" as far as money was concerned, my horizons had been widened and a network of new contacts established. Many later assignments, including my appointment in 1952 as Chief of the CARE Mission in Mexico, the first woman director, were related to my AFSC volunteer work. And my decision to study anthropology came when I realized while working in Europe that my training in public administration and social work at Chapel Hill had been primarily related to the U.S. models. As a southerner, my ethnocentricity had been stretched to include the North and the West of the United States and Mexico, but I needed more understanding, more theoretical frameworks through which to view my expanding world, and anthropology helped with this. Later, during 11 years of residence in Mexico, there was an opportunity to expand that learning by working closely with Mexican anthropologists who had taken applied anthropology much further than had been done in the U.S. The learning from them has been much more useful than my academic courses, but without the courses I would have been unable to communicate with them and to continue learning.

Equally important was working with women at all levels from the villages to the ministries. There were more professional women at high levels in Mexico than in the U.S.A.--more professionals in ministries and in top political offices. I had much more freedom to work with both men and women in policy and planning in Mexico than I did on my return to the States in 1960. As a foreigner I could be a catalyst (Poston 1962).

Let me try to generalize. During the years in Mexico in the '50s and earlier in Europe just after World War II and during my fieldwork in the '60s and '70s, I had become more and more aware of the power of women as agents of change, both in the villages and at national or international levels. When you have networks of women from all three levels working together, amazing things can happen. For instance, the CARE/AFSC well-drilling project in a Mexican village was made into a movie--"World Our Hands Can Build"--and a case study of it was used by John Kennedy to help get funding for the Peace Corps. That experience was one reason I was asked to be on the U.S. delegation to the United

Nations conference on WATER at Mar del Plata. That meant weeks away from a job--no earnings but all expenses paid--and a hard assignment. But from the experience, and the new network added to the old, I was asked to prepare a paper on community participation for an engineering conference and later to design a research project for the World Bank looking at the sociocultural aspects of excreta disposal. This led to an invitation to participate in an energy workshop for the National Academy of Sciences. Each assignment leads to another, and sometimes if you work as a freelance consultant you can't finish one assignment well before another starts. That is difficult for all of us. A most important thing is to do whatever we do well, with integrity and honesty, whether the work is volunteer or paid, local or international. Sometimes time, health, or other emergencies--children, husband or three deadlines at once--interrupt so that we have to leave unfinished products or working drafts. But somehow, though, not to try seems worse than not being perfect if the project/assignment is one which deeply concerns us.

But let's get down to specifics. How does one get started? What are the key organizations in the development field? Of course we all are aware of AID--the Agency for International Development of the U.S. Government. We should also think of other U.S. governmental agencies such as the Peace Corps, Corps of Engineers, etc. The NGOs (non-governmental organizations) or PVOs (private voluntary organizations) such as CARE, AFSC, OEF, church groups, union groups, etc., should not be overlooked (see Appendix I for this group and others listed below). A full, detailed list can be obtained from the State Department or AID.

Then there are also the international agencies, particularly the UNDP (United Nations Development Fund). Also check the specialized agencies, UNICEF, WHO, FAO, UNEP, and the World Bank. Often there's a United Nations group active in the community. Join it; get on mailing lists that relate to your interests. All of them are becoming more aware of women's contributions. There are also private international groups and the international organizations from other countries such as Canada's IDRC, Sweden's SIDA, etc. Many times there are special interest groups like the American Public Health Association with overseas operations. There are groups like Barbara Ward's Institute for Environment and Development. There are special projects such as Man and the Biosphere. Go to the international meetings. If you're not a delegate, get involved with the voluntary groups. Offer to prepare a paper or lead a discussion on subjects that concern you. Develop new networks. But do not limit yourself to your professional organizations. Get involved with other groups such as the Society for International Development (SID). If it doesn't have a chapter in your town, join as an out-of-state member.

Another interdisciplinary forum for learning and contributing is the American Association for the Advancement of Science (AAAS). The association's weekly journal, Science, has too much information to absorb, but articles are timely and important to getting perspective from other fields. The annual meetings of AAAS have interdisciplinary panels in many areas. Read the proceedings, write for the papers that interest you if you can't attend. Keep up-to-date on research and issues.

Other sources of information and network building are the regional groups such as the Latin American or African Studies Association, the Americanist, or the Asia Society. And, of course, there are the women's groups, the Women's Caucuses in the professional organization, NOW, and the national and international meetings and groups--some action-oriented, others, research related. Don't forget the women's organizations. An excellent annotated list of formal and informal women's groups in developing countries, prepared by the International Women's Tribune Center (IWTC), has just been published. Order it, get on the mailing list (see Appendix I for details).

For the social scientists, there are many new organizations such as WAPA (the Washington Association of Professional Anthropologists), which has grown rapidly during the last few years and has an active job-placing activity. Membership is not limited to Washington residents. The World Bank and "Sociological Group," which started meeting informally in 1975 to share strategies and solace in a world of economists, planners and administrators, now hold regularly scheduled monthly meetings with programmed papers and suggest projects where our expertise might be needed.

In job seeking, one must not forget the small consulting agencies, the so-called Beltway Bandits. Some are serious, respected, small firms. Others are really bandits. You have to be selective. Many are looking for women to become members of their teams. Some are run by women. A list of these agencies can probably be secured through the WID (Women in Development) office of U.S. AID. A manual of forms approved for IQCs (Indefinite Quantity Contracts) is also available from AID.

No matter what you are interested in, there are certain rules of the game. Finding the organization which has programs or projects which interest you is only part of the task. You must interest them. Opportunities do exist and more and more women with special skills are being sought. However, you must be able to persuade someone in the employing agency that you are able to perform the tasks, that you can do the job as part of a team, since more and more development work is interdisciplinary--both data gathering in the field and report writing. As Barbara Pillsbury noted in the excellent discussion paper, "Opportunities in Development Anthropology - The Federal Perspective," Rule Number One is: "Find out the ground rules from the personnel office but--with rare exceptions--don't expect it to hire you without your first finding a staff professional who wants your services and will take action to get them; deal with this person ("Insider") as a professional colleague with whom you focus on substance and save haggling over contract details for personnel or contract officers." Learn about the organization, get its organizational structure or at least a phone book or annual report. Revise your curriculum vitae into a resume that emphasizes your non-academic expertise and experience. As you talk with professional colleagues, ask for specific documents of mutual interest, read and comment on them. If there is no position open, find out if there are projects you might assist with--something you feel you can make a contribution to. Learn more about the area, the organization, and submit a short, concise proposal--two or three pages only. Pillsbury suggests, "Mark it 'Preliminary' and say it is for discussion purposes only." If the

insiders are interested, take their suggestions and criticisms and prepare a more formal proposal. Pillsbury and I agree that the important thing is to get your foot in the door. If the contract or assignment is small or short-termed, take it and be prepared to spend personal time to do a good job. Prove yourself and, hardest of all, have "patience (but not passively so) and perseverance (while not being pushy)" (Pillsbury 1981). And remember to have respect and flexibility.

As I said in the beginning, there is no one way to get involved in international work. There are many entry points. As women, we have a greater chance for achieving our goals--not necessarily success or power as defined by our male-oriented society--if we approach our search for involvement differently, if we use our human potential in relation to a natural resources perspective which includes our fellow women and men.

## REFERENCES

- Elmendorf, Mary. 1972. The Mayan woman and change. CIDOC, Cuernavaca, Mexico.
- \_\_\_\_\_. 1973. La mujer Maya y el cambio. SEP-setenta, Ministry of Education, Mexico.
- \_\_\_\_\_. 1975. Nine Mayan women: A village faces change. Schenkman Press, Cambridge, Massachusetts.
- \_\_\_\_\_. 1977. The many world of women: Mexico. In Smock and Giele, eds. Women and society: Roles and status, an international and comparative perspective. John Wiley, New York.
- \_\_\_\_\_. 1978. Public participation and acceptance. In Environmental impacts of international civil engineering projects and practices. American Society of Civil Engineers Publications, New York.
- \_\_\_\_\_. 1980. Human dimensions of energy needs and resources. In Proceedings: International Workshop on Energy. Survey methodologies for developing countries. National Academy of Sciences Academy Press, Washington, D.C.
- \_\_\_\_\_. 1980. Women water and waste: Beyond access. Paper presented at the Forum of the United Nations Mid-Decade Conference on Women, Copenhagen. Available from the WASH Coordination and Information Center, Arlington, Virginia.
- \_\_\_\_\_. 1980. Seven case studies of rural and urban fringe areas in Latin America, appropriate technology for water supply and sanitation. Vol. 8. to be published in 1982 by The World Bank, Washington, D.C. (originally released in mimeo in 1978 as Eight case studies of rural and urban fringe areas in Latin America).
- Elmendorf, Mary, and Ray Iseley. 1981. The role of women as participants and beneficiaries in water supply and sanitation programs. WASH Technical Report No. 11. Arlington, Virginia.
- Hoskins, Marilyn. 1979. Women and forestry. WID--Agency for International Development, Washington, D.C.
- Huston, Perdita. 1979. Third world women speak out. Overseas Development Council, Washington, D.C.
- Lee, Dorothy. 1959. Freedom and culture. Prentice Hall, New York.
- Pillsbury, Barbara. 1981. "Opportunities in Development Anthropology: The Federal Perspective." Presented at the 1981 American Anthropological Association Meeting, Los Angeles, California.

Poston, Richard. 1962. Democracy speaks many tongues. Waverly Press, New York.

Zeidenstein, Sondra, ed. 1979. Learning about rural women. A special issue. Studies in Family Planning 10(11/12). Population Council, New York.

## APPENDIX

Some examples of agencies with international programs:<sup>1</sup>

- A. IWTC International Women's Tribune Center, Inc.  
305 E. 46th St., New York, NY 10017
- B. NGOs Non-governmental organizations  
PVOs Private volunteer organizations
- AFSC American Friends Service Committee/The Quakers Headquarters,  
Philadelphia, PA (also regional and overseas offices)  
660 First Ave., NY
- CARE Overseas Education Fund of The League of Women Voters  
2101 L St., NW, Washington, D.C. 20037 (202)466-3430
- OEF Volunteer in Technical Assistance  
3706 Rhode Island Ave., Mt. Rainer, MD 20822 (301)277-7000
- VITA Church groups, Catholic, Protestant, Jewish  
Labor organizations, AFL, CIO, etc.
- C. 1) United Nations Organizations
- UNDP U.N. Development Program, New York  
WHO World Health Organization, Geneva  
UNICEF U.N. Children's Emergency Fund, New York  
FAO Food and Agriculture, Rome  
ILO International Labor Organization, Geneva  
UNESCO U.N. Education & Scientific Organization, Paris  
World Bank, Washington
- 2) INSTRAW U.N. International Research and Training Institute  
for the Advancement of Women, Dominican Republic
- 3) Specialized Commissions:
- CYMMT International Commission for the Study of Maize -  
Corn, Mexico - Potatoes, Lima - Rice, Phillipines, etc.  
Man and the Biosphere - contact Molly Kux, AID, Washington
- 4) Regional Organizations:
- OAS Organization of American States, Washington  
PAHO Pan American Health Organization, Washington  
(Check other regions - Africa, Asia)
- D. Other Binational Organizations:
- SIDA Swedish International Development Authority, S-105  
25 Stockholm, Sweden Office: Birger Jarlsgaten 61
- IDRA International Development Research Center, Ottawa, Canada
- AAAS American Assoc. for the Advancement of Science, Priscilla  
Reining, Nancy Meckenhorn, Mass. Ave., Washington, D.C.
- ODC Overseas Development Council, 1717 Mass. Ave., NW  
Washington, D.C. 20036, Valerie Kallab, Jim Howe
- SID The Society for International Development  
1834 Jefferson Pl., NW, Washington, D.C. 20036

<sup>1</sup>Check your library for up-to-date information and more details.

PREPARING WOMEN FOR INTERNATIONAL SERVICE:  
A CASE STUDY EXPERIENCE

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Utah State University  
Logan, Utah

ABSTRACT

We describe a new approach to selecting/testing/training qualified, but inexperienced, personnel for overseas assignment.

A positive first experience between the young scientist, an experienced colleague, and the host institution can improve acceptance of young U.S. professionals, while maintaining the quality of the U.S. institution's contribution. An inexperienced applicant travels with an experienced senior researcher to the field site, where he/she is introduced and acts as a colleague with specific responsibilities, including independent planning and action in country. The novice remains long enough to overcome the initial novelty and encounter both the exciting and disturbing aspects of working and living in a developing country. Informal discussion allows the senior member to advise and reinforce his partner, who also benefits from having a successful role model.

A short assignment with tangible responsibilities provides a realistic basis for evaluating a person's commitment and suitability for a longer assignment. If the decision is against further involvement, the young scientist still comes away with a clearer idea of the international aspects of his discipline which may carry over into future teaching, research, and support of international programs. The U.S. institution investment has prevented financial loss and embarrassment from fielding an unsuitable person, thus maintaining its quality and credibility.

If the match is good, the new participant has had the advantage of training under a seasoned, respected colleague, and has had his confidence enhanced by the association, while assisting his colleague and allowing him

to achieve more on a short visit.

We present a case study in which a young woman range manager travels to northeast Brazil with the dean of Utah State University's College of Natural Resources to help plan one component of a collaborative research program, teach a short course at a National Research Center, and conduct a field experiment.

## I. INTRODUCTION

Women often are the major implementors of agricultural development projects. They till the soil, plant the seeds, milk the animals, and market the products of their labor. Depending upon the culture, they may be the decision makers that adopt new technology. However, it is rare to find a professional woman as a member of a development design team. Few women are assigned on project management or implementation staffs.

This situation can only partially be explained by the reluctance of some host governments to accept female scientists. It is due to a large extent to the lack of experienced women professionals in the agricultural and natural resource areas. Host governments want experience--a few gray heads on any team will help it to gain acceptance. It has only been in the last decade that any significant number of women have entered the natural resource and agricultural fields. Most women seeking employment in international work are faced with two obstacles--their youth and their gender.

Host country institutions prefer working with experienced scientists, whether male or female. Senior people are often unable to commit themselves for long periods in the field, while inexperienced colleagues are available and have the training, motivation, and energy to make outstanding contributions. Yet they may never have the opportunity, because of the financial risk of fielding unseasoned staff, the reluctance of host institutions to work with unknown collaborators, and the young scientists' personal doubts. These factors are especially true for women, who rarely have an established role in resource management in either developing regions or their home countries.

We, at Utah State University, made the preparation of young American scientists to work overseas a major objective of our Title XII strengthening grant. We recognized that there were a limited number of senior personnel, mostly male, who were willing to take overseas assignments. Competition for these people was strong. Most were nearing retirement. It was obvious that we had to work to attract the younger faculty members and advanced graduate students if U.S. institutions were to continue to perform overseas.

We tried a number of approaches: incentives, language training, etc., that have been used by other institutions. One unique aspect of our training program is the tag-along grant, to allow a young scientist to become a part of a design or research team with no cost to the project. The tag-along title is unfortunate and not accurate, but it was used and it stuck. We expect the young scientist to be a full, participating partner in the project.

The only difference between her and other members of the team is that she is not paid for by the sponsor or the host government, and theoretically does not have to have host government approval. The program elements of the concept are as follows.

An outline is prepared and approved that promises to give a positive first experience between the young scientist, an experienced colleague, and the host institution, while maintaining the quality of the U.S. institution's contribution. An inexperienced applicant travels with experienced senior personnel to a host country, where he/she is introduced and acts as a colleague with specific responsibilities, including independent planning and action. The novice remains long enough (about one month) to overcome the initial novelty and encounter both the exciting and disturbing aspects of working and living in a developing country. Informal discussion allows the senior member to advise and reinforce his partner, who also benefits from having a successful role model.

A short assignment with tangible responsibilities provides a realistic basis for evaluating a person's commitment and suitability for a longer assignment. If the decision is against further involvement, the young scientist still comes away with a clearer idea of the international aspects of his discipline, which may carry over into future teaching, research, and support of the international programs. The U.S. institution investment has prevented the financial loss and embarrassment of fielding an unsuitable person, thus maintaining its quality and credibility.

If the match is good, the new participant has had the advantage of training under a seasoned, respected colleague; he has had his confidence and credibility enhanced by the association; and while assisting his colleague has allowed him to achieve more on a short visit.

We present today the results of USU's first experience with the tag-along concept. Because the first applicant was a woman and a graduate student, unforeseen problems surfaced in the new program.

The first obstacle was USU's own International Programs office and the Title XII committee. They were reluctant to approve a graduate student as the first trainee-participant. The concept was initially developed for young faculty members. After some discussion, the decision was made to gamble \$2,800 on a project to send Linda Howell, a PhD candidate, and Thad Box, a professor of range management, to Brazil, to design the brush management component of the Small Ruminant CRSP study in northeast Brazil. Plans were made to go in March 1981.

The second setback came when EMBRAPA personnel showed hesitation at approving Linda's travel. We had felt that one of the major advantages of our concept was that the host country did not approve the travel of the junior scientist, who would simply travel on a tourist visa and act in an unofficial capacity. However, when the agency with which you will be working for several years advises you it would be "inappropriate" for a "graduate student" to accompany the professor until the project is designed and approved, you have little choice except to comply.

The original idea, of Linda going along to participate in the initial design of the project, had to be abandoned. Thad made the trip, and while in Brazil he made arrangements for USU to present a shortcourse on sampling tropical vegetation with Linda scheduled as one of the instructors.

In May both of us joined Drs. Ben Norton and Fred Provenza in teaching the shortcourse. In addition, Linda was introduced to the research personnel at EMBRAPA, visited a number of field sites, and participated in the further design of the brush management phase of the small ruminant project.

We have chosen to present this experience in a rather non-traditional way. The next two sections of the paper are first Linda's and then Thad's personal reaction to the experience. We wrote them independently of one another and agreed beforehand that they should contain feelings as well as facts. We want to show, at least in this case, what defeats and victories, doubts and confidences can arise when a novice first experiences the disorganization, poverty, and need of a developing country. After our personal experiences we will analyze and summarize what we think are the strengths and weaknesses of the tag-along concept.

## II. LINDA'S REACTION

It is 11:30 p.m. and we are on Pan Am 441 somewhere between Miami and Rio. I have been preparing for today for the past eight months--ever since I decided to do my PhD research in Brazil. It has been a busy eight months: finishing my master's, planning my PhD program, getting married, deciding how and where to store 30 years of accumulated junk, and trying to convince my fiance and family that I am doing the right thing. Often it was too hectic to allow me time to convince myself. In odd moments I questioned: was I too busy to think, or busy to keep from thinking, or was it possible I was actually sure of what I was doing already? I've had lots of opportunity to do a more conventional PhD project, so why the hell am I going to Brazil? Having left all that is safe and familiar and literally dragged my husband away from the security of his home, friends, and family, where am I taking us? I don't even know how to find us a hotel tomorrow night. Rightfully, Dan said, "You got us into this--you figure it out," then went to sleep knowing if he wasn't comfortable tomorrow night at least he had ME to blame it on.

So why am I so relaxed, almost serene, after such a frantic departure, with so much responsibility and so little experience to help me cope with it? Serene has never been a word to describe me, nor adventurous, brave, nor crazy--all words I would use to describe somebody doing what I'm doing now. I'm cautious, conservative, conventional--and a true chicken at heart. I never even go to Boise without advance hotel reservations!

In truth, the only answer I have is that my confidence is the result of the unique and fabulous introduction I had to Brazil and to international work last spring.

This time two years ago I was more nervous and unsure of myself as a student returning for three months of classes than I am now, headed for two

years of who knows what. After working six years with the Idaho Fish and Game, and Land Departments, I was restless. My solution was a trial run back in school, just to try it out and explore new interests. That's my style, cautious, with no commitment. The range program at Utah State University emphasizes the worldwide scope of range science. Most of the faculty have and draw upon international experiences in lecturing. Often classes had as many foreign students as Americans. I was intrigued. Undergraduate Peace Corps fantasies rekindled. But, then, I planned to get married and accept a Forest Service job when my stint at USU was done. So I day-dreamed of Africa and Australia "some day" in the future as I prepared to return to a happy routine in Idaho.

But I was hooked--and in a single day. I dropped those plans, got a job at USU, and enrolled for another quarter. Soon my new plan was clear and I set out to sell a skeptical range faculty on accepting me as a PhD student on an international program. It was a tense, scary time when things didn't fall into place easily. Justifiably, there were doubts about sending an inexperienced, apparently flighty young woman abroad to do range research. And how could I challenge those concerns? I didn't know either how it would work out. I couldn't honestly assure anyone of my qualifications or commitment to a totally new venture. What if I hated it? Or couldn't function there? Or were not accepted in that capacity? Without experience I had no confidence, and without confidence I would get no experience. On a long shot, Dr. Box, my committee, and I found a solution to this classic catch, a solution that has worked so well for me that we feel it is a reasonable means of selecting and training qualified people for international service.

I applied for and received USU's first tag-along grant for preparing young professionals to work overseas. Let me describe how this worked in my case. Dr. Box and I received a Title XII strengthening grant for me to accompany him to northeast Brazil, where he would be teaching a shortcourse in vegetation sampling and planning a brush management component for the small ruminant collaborative research project headquartered there. I was to help with the short course and plan my PhD research on some aspect of brush management, while demonstrating the role of young women scientists in the U.S.

I can't help but compare my state of mind now compared to that first trip. First of all, I never believed I would really go to Brazil. After receiving the grant my first trip was abruptly cancelled. A Brazilian collaborator was upset about receiving a female graduate student. This man planned to visit USU in a few months, so our plans were tabled until he could inspect me personally. After such an ominous start, the trip was finally approved and I was on my way.

Dr. Box and I talked very little during the 36 hours we traveled. I spent most of the time cataloguing dozens of questions and doubts that clouded my mind. Having already experienced a "macho" reaction to my prospective visit, I wondered if this reaction was typical. How could I behave so as to be perceived as confident, professional, credible, yet non-threatening? As one of the first women in a man's field this is no new question for me, but in Brazil standards might be different and I had no idea how. I also

questioned my ability to adapt my training and experience to this extent. I had no knowledge of, or experience in, the tropics, no familiarity with the labyrinth of foreign bureaucracies. Could I really be effective here?

Then there were my personal doubts--would I like it? What were living conditions and how would I accept them? Would it be safe and respectable to live alone? Would I be the subject of speculation, gossip, or harassment? Where would I fit into Brazil's rigid class structure? What if it were too hot, too noisy, or too inefficient, as the stereotype portrays Latin countries? And how would I feel living within a military government noted for its "death squads?"

The first few days in Brazil were a delightful blur--full of new sights, sounds, and smells. Routine activities were a challenge to my meager Portuguese: ordering a meal, and sorting out cruzeiros to pay for it, remembering to use bottled water only; wondering how does the phone work? where is the bathroom? and always "what does that word mean?" My phrase book and dictionary were constant companions and it was thrilling as I began to understand more and more.

We stopped first in the state capital, Fortaleza. It had beautiful beaches, fine hotels, and several of our contacts spoke English. But the honeymoon ended on the five-hour drive inland to Sobral. It was a fascinating trip as the city dropped away to farmland, thatch or mud houses, and all kinds of exotic tropical plants. Trucks, bicycles, donkeys, little kids, and VW's all jammed the road in a terrifying and apparently illogical race that still astounds me. Sobral itself was a fair-sized town with attractive churches, squares, and homes jumbled in with crowded little stores and slums. The hotel wasn't bad, the shower was a vague dribble--cold water only, the ar condicionado was a noisy fan, and the shuttered windows were no barrier to the mosquitoes which flocked in to sample the tasty new gringa; and--of course--nobody spoke English.

The hotel being no place to linger, I was anxious to see my prospective study site and start identifying possible research problems. I was equally eager to meet my future colleagues and the three USU families already in Sobral. I was delighted with what I found. So many research problems presented themselves that it took the next six months to sort them all out. People at the Center were friendly and welcoming. The other USU grad students seemed to have adjusted well and were busy enjoying the many unique opportunities offered by life in Brazil. Within a few days I felt very much at home.

Preparing the shortcourse material was a challenge because we had no idea how familiar our concepts might be, but still needed to lay a firm foundation without boring anybody. I survived my first experience speaking through a translator and suspect I learned as much as the audience from the experience. Interestingly, there were no other women among the 35 participants. A casual get-together at a local bar after the first day let us get to know the out-of-town scientists better and practice Portuguese.

After the shortcourse Dr. Box went home and I was really on my own. I decided to do a study of woody plant mortality in a pasture which had been

slashed and burned and was just beginning to regenerate. This was a great eye-opener.

First, I wanted to get permission to work in the pasture, but people said Dr. Aurino was difficult so to just go ahead. I didn't want to risk offending anyone, but nobody would go with me to explain my plans. Finally, one of the Americans relented and took me to Dr. Aurino, where, to our surprise, he was pleased to be involved. Lesson Number 1: at least try going through channels first before anticipating problems, but realize that it takes time.

There were more lessons to be learned in the field. I can usually estimate pretty well how long a field project will take, but I had to consider new factors in adapting familiar techniques to a new type of vegetation. For example, how do you mark permanent transects when next year this same charred, open pasture could be a solid tangle of 10-foot high sprouts and vines? I located points on compass bearings from the remaining trees, which I planned to mark with spray paint.

Few stores have phones, so you must visit each one. I should say each and every one because even fewer are limited to particular products. Most sell odds and ends of everything. I'm sure you could buy almost anything you would need in Sobral, if you only knew where to look.

Another delay was due to my unfamiliarity with the vegetation. I had to be shown the common species and make myself a field key. There is no plant key for this area of Brazil, so all identifications are tentative until specimens are verified. To measure stumps I often had to reach into a thick, bushy clump of sprouts inhabited by numerous insects, spiders, lizards, and, possibly, poisonous snakes. Not normally squeamish, I still poked a stick around in each clump first.

Nor did I count on the effects of heat and a different work schedule on my efficiency. I would guess it was never less than 85°F and humid--and this was winter! Daylight lasts only twelve hours, and having to take a bus back and forth from town limited the flexibility of my work hours. At 11:30 the bus goes back to town for lunch--rice, beans, bread, meat, etc., followed by a nap till 2 p.m. I never did adapt to this. A big meal and nap left me too groggy to work well in the heat and even with a rest I was exhausted and dehydrated by 5:30. I have concluded that flexibility and simplicity are essential to a successful experimental design in these circumstances.

Each day in the field suggested new questions and ideas and my enthusiasm ballooned in spite of the hassles. Earlier doubts about my capability diminished and the work became an appealing challenge. Likewise, I decided that with time, effort, and sensitivity, I could become part of the team at the Center. My last collection of doubts, the personal ones, were less clearly resolved.

I was looking forward to mastering Portuguese, so I didn't see language as a problem. The other graduate students had roomy, pleasant housing and part-time maids to do the cleaning and laundry--an unimaginable luxury in the U.S. Except for traffic, the town seemed safe, and I enjoyed long walks even at night. People I met were curious and friendly. Shopping in an open

market and bargaining for everything is excellent language training, but time consuming. All in all, the daily details of life were quite manageable, but what about some social life? Most of the Americans were scheduled to go home soon, and I wanted to be part of the Brazilian community anyway. It was possible I would be coming to Brazil alone, and single women my age are unusual there. Young unmarried women usually live with their parents and several acquaintances found it strange that I was in Sobral "all alone!" The more liberated Brazilians went to the capital weekends to take in the nightclubs-- not my style even if I had time; so how would I handle this?

There were also the frightening philosophical problems. This was my first real encounter with a society suffering from the combined effects of overpopulation, limited resources, and extreme poverty. A walk through town provided an incredible catalogue of deprivations, handicaps, injuries, and diseases. Blind, disfigured, or ill beggars were common, as were roaming packs of "street children." What would become of them? It was an upsetting, frustrating question. None of my assumptions about the value of personal effort, and a person's ability to control his own life seemed to apply here. There were just too many people-- too many problems. Many men leave the northeast to look for jobs in the south. They may or may not support the families they leave behind. Tradition and a limited education provide women few options for supporting themselves and their children: subsistence farming, begging, domestic service, or prostitution. No matter how I looked at these problems, population control seemed essential before any real improvement could occur. But this isn't a popular idea in a Catholic country. Most of the rest of the world lives like this, but am I wrong to assume people want a better life? How does the Church view these problems? I have a lot to learn.

Dr. Box told me conditions are good here compared to many areas. The other Americans seemed to have adopted one of two different strategies for dealing with this. The first is to learn to tune it out, but it appalls me to think I could become so insensitive. The other approach is more difficult--to help where you can, but realize there is little you can do. My research to improve dry season forage production is a good example. What good is it to improve livestock production when the food supply can never catch up with the population? It makes me wonder about the importance of resource management in an already desperate situation. Most resource management concepts have an element of deferral to the future, but do the people of the northeast anticipate a future?

On a more personal basis, one can help with handouts, preferably food, and by offering some employment. But once you start doing this you may be swamped with supplicants. My first idea was to hire a young girl as a part-time maid. In addition to salary I could pay her tuition and give her time off to go to school, and she could help me improve my Portuguese. It was my hope that this might give her a glimpse of other options in life. But would she really have those other options, or would she only become more discontented? I was advised by others that it was wrong to interfere. On one level I had to agree, but on another I reasoned that discontent and a view of a better future are essential for any change to occur. Obviously, wanting to help is not enough. Knowing how to help is the difficult part, about which I have a lot to learn. Learning to become aware of and sensitive to people's

need and to help where I can, but accept the fact that I can't change it all will be the greatest personal challenge of the next two years.

After Dr. Box left I made it a point to spend a lot of time alone. I wanted to see how it felt and take time to start evaluating my reactions. I had become closer to the other Americans, and they began to share some of their own doubts and frustrations about life here. A discontented wife was compounding her husband's problems with his research. It took so long to get anything done, mail was unreliable, medical help poor, and money tight. There were inevitable personality conflicts and the ethical implications of our work. These moods were infectious and I spent some pretty low days. How could I live with all this, and the heat, noise, dirt, bugs, isolation, and misery? But a more ominous question was emerging. If so much of the world is like this, how could I live with myself if I did not try to understand it and to help? I felt stuck with this new, unpleasant knowledge. It's ironic that when the situation was the most depressing it was also the most compelling. I found I had already decided that I would return.

At that point I began to measure and test myself. The more something scared me, the more I had to do it. I went where I wanted and spoke to whom-ever I ran into. At hole-in-the-wall cafes, I learned to eat what was put in front of me and ignore the animal hair sticking out of it. I felt smug when I learned to collect the ar on my plate and imprison them in a gob of mayonnaise to remove them once and for all from the bread. I abandoned the usual precautions and my luck held till the very last day. While testing my own decision I was also building my confidence and planning how I would use the next few months to prepare for my return.

I was crazy for lack of things to read in Brazil. Since no English books were available in Sobral, I decided to build an English library. I have collected cartons of books and several magazine subscriptions. Friends have promised to send more. I would like to take, and maybe teach, classes at the local college. Range management is a new idea here. I would like to introduce it to students at the state agricultural school. I hope to have students work with me in the field, maybe even have some American students come down on some sort of internship. I will make my journals available and promote the Society for Range Management.

Another goal is to really know the people of Sobral, to go to their churches, help in their projects, and really become a part of the community.

My current enthusiasm and confidence are entirely due to Dr. Box's encouragement and support during this first trip. He goaded me to explore everything--not just professional interests, but the people and their lives as well. He shared his own reactions to the problems that disturb me. It is reassuring to see that a perceptive, thinking person can be realistic without being callous. His confidence tided me over when mine was wobbly and his excitement over my questions and observations helped keep my eyes and mind open. The professional example was invaluable. Dr. Box shared his impressions of people and strategies for dealing with them in a formal bureaucracy that was new to me. Our association helped establish me as a professional, as did my part in the shortcourse. Not only will this be essential to my effectiveness when I return, but it demonstrates a different role for women.

Much as we would all like to have a sort of fairy godperson at our side during scary new adventures, it just isn't possible. For a young person interested in international work, my experience may have been the next best thing. The senior partner teaches and assists the junior partner in evaluating capability and aptitude. If the experience "takes," the young researcher benefits from a positive first impression, expert guidance, and apprenticeship under an experienced and accepted colleague. He has a chance to evaluate his training, attitudes, and skills in time to prepare for the changes he will be facing.

But what if the young person decides that international work is not right for him? He and his institution will still benefit. He has provided service on the trip and, perhaps more important, saved the expense and embarrassment of sending the wrong person abroad for a long assignment, avoiding the possibility of an unprepared or unhappy employee who fails to complete an important project. In addition, the young researcher will have gained a clearer idea of his own interests and abilities and where they may be applied more effectively; perhaps he will even see ways to prepare himself for a future foreign assignment. In any event, he will have gained a better understanding of his profession by applying its concepts in a different setting. In the future he will be able to support other international projects, to teach or assist others who may be interested in international service, or to work with foreign colleagues. No trip is a failure if it widens a new professional's view of his field and its role worldwide.

In Travels with Charley, John Steinbeck states that you don't "'take a trip'--it takes you . . . ." My introductory trip to explore range management potentials in Brazil has already taken me farther than I ever expected, and it's only just beginning. A similar opportunity early in their career might help others find their fullest potential for service and growth in their profession. With this in mind I would encourage anyone who is interested in working overseas, or in training or supplying personnel for international service to consider this approach.

### III. THAD'S REACTION

It has been almost a year since I first started trying to implement the first Junior Scientist Participation or Tag-along Grant at Utah State University. I suppose that if I had known then what I know now I would never have gotten involved in this, and would have missed one of the most gratifying experiences of my life.

I was one of the originators of the tag-along idea and was thoroughly sold on its usefulness to train young professionals for overseas work. Unless they really experience a developing country, young people will never know whether or not they want to get involved. Therefore, I was pleased when Linda Howell approached me to be her major professor and help her train for overseas work.

It had long been one of my ambitions to turn out the first genuine range management woman PhD equipped to work in overseas situations. I had known Linda for some time through the Society for Range Management and through course work at Utah State University. I had no doubts about her ability.

She is bright, hard working, and has that extra intellectual curiosity that is not often found in graduate students. She had also proved her ability to work in a "man's" profession. She spent five or six years with the Idaho State Division of Lands, and was given the Rangeman of the Year award by the Idaho Section of the Society for Range Management. I knew that she could work with the crusty old ranchers of Idaho. I suspected she could work with people in developing countries.

Some of my colleagues expressed doubts as to whether she would ever finish a PhD or work in overseas assignments. She had come back to school at Utah State University to finish her qualifications for the range conservationist degree so she could get married and settle down in Idaho. Her academic background had been described by some as "flighty." She had changed majors, left an institution without receiving a degree, and had behaved in a manner that one could interpret as being indecisive and unstable. I chose to look at it as intellectual curiosity and a desire to become involved in new experiences.

At any rate, we agreed to apply for a tag-along grant and see if we could get Linda involved in the design phase of the project in Brazil. That failed and I felt Linda's disappointment, even though I knew that there was little chance of an international experience working out the first time.

I resented having to make two trips to Brazil because I really didn't have time to do so. However, I went for the design period of the project, determined to arrange an opportunity for Linda to get down there in the next few months. That opportunity came in the form of a request for a shortcourse by the Brazilian agency with which we worked. Doctura Howell became a part of the faculty that would teach that shortcourse. I proceeded with confidence that she would be able to set a good example for our first tag-along grant.

I must admit that I began to have doubts as we traveled to Brazil. I knew that she had bad knees and could not do certain strenuous physical tasks. However, when she told me that she was allergic to insect bites and arrived for the trip with syringes, antidotes, anti-venom kits, and Lord knows what, I wondered how we were going to survive a month in a tropical setting where everything bites, stings, or has thorns. I also wondered about one of her major strengths--her compassion for people. I had observed that Linda feels deeply and I was frankly concerned whether she could take the sight of poverty, injustice, greed, want, and the other human experiences that come as a shock to one who has never been outside the continental United States. Questions had been raised about her being a woman in a professional position, and I wondered how Linda would handle the macho treatment that is quite common in Latin America in a man's profession.

Linda had been studying Portuguese and her ability with the language should have been much better than mine. On our arrival, as we walked through the airport, I heard a number of suggestive and outright obscene comments about the attractive young American blonde. I watched her to see how she would handle these. They seemed to have gone right past her. Her Portuguese was indeed better than mine, but my gutter slang was superior to hers. What I had first interpreted as her being able to ignore them was simply that she was so excited and unaware of their meaning that she let them pass.

Linda was like a little girl in a toy store. Though tired from an all-night trip, she was looking in all the shops, trying to talk to people, and thoroughly enjoying herself. Our flight from Rio to Fortaleza turned out to be a party flight. Most of the people were going to some sort of Rotary convention, and as soon as the plane took off all were standing, drinking and talking. Linda tried out her Portuguese in a very friendly and accepting environment.

We were met at the airport by two Brazilian professors who had studied in the United States, and immediately our attention was shifted from the newness and fun to the seriousness of the range management problems in northeast Brazil. Linda made the shift as a seasoned range manager might have responded. Her questions, though sometimes naive, were sound scientifically. The Brazilian professors were impressed.

I remember contrasting, as I went to sleep that night, Linda's experience with my first overseas trip. I had done the worrying for both of us, gotten us through customs, found a lost bag, we were met at the airport by friendly people who spoke our language. She had been free to look, absorb, and think. On my first trip I had been thrown into a country where I did not speak the language or even read the script. No one met me. I was hassled and confused. If I could have turned around and come out the first night, I would have done it.

The following day we started inland to Sobral, four of us in a Volkswagen bug. We stopped for lunch and the car would not start. Linda was the first out of the car, diagnosed its troubles as a vapor lock, and had the carburetor torn apart and the car back on the road almost immediately. My confidence in her ability to handle mechanical and physical problems was reinforced. I still did not know about the people.

On our first trip to the Experiment Station we picked up a young male technician. Linda immediately started practicing her Portuguese with him but found that instead of his talking about grass, goats, and brush he tried to get her to date him and proposed marriage. She simply told him that he had to ask permission from her father, me, and her brother, Bob Kirmse.

I was especially concerned about Linda's ability to be accepted by the research workers and peers. It was apparent that her enthusiasm and professional competence were recognized by all those that she met. She received an especially warm reception from the superintendent of the national experiment station, EMBRAPA, and I could see that there was no problem with the top management. However, there was coldness and suspicion from several of the middle management and scientists on the staff. At first this worried me and I thought it was a reaction to her as a woman. However, as I thought more about it, it seemed that this would be the reaction to any bright young American, male or female, from those on a peer level where competition is very great. This became more apparent when we visited a state experiment station, where Linda was accepted warmly as a colleague who could assist them rather than as someone who would compete with them.

The short course was especially helpful in establishing Linda's reputation as a true professional. Ben and I had decided beforehand that we would

try to present Linda as a trusted colleague. Several times during the course we would mention that this particular phase could better be explained by Doctura Howell, the instructor in the laboratory at Utah State University. We would pass over that subject, leaving it for Linda to cover at a later date.

My assessment of Linda's intellectual curiosity was supported as we started field work in Brazil. Nothing escaped her attention: insects, birds, soils, questions about agricultural practices, questions, questions, more questions. She wanted to view the soils and the vegetation, the livestock and wild animals from every available angle. One time when she, Joao Queiroz, and I were in the field I suggested that any good graduate student worth his salt would climb the televideo tower (about 200 feet high) and observe the patterning of vegetation from the top. To my horror, Joao and Linda quickly obtained permission and went through a fence bearing a sign saying "Danger, High Voltage," and were up the tower before I could stop them. When they were halfway up the tower, I found out that the man who had given them permission did not even work for the televideo company. He was an Argentinian who was himself visiting Brazil.

Linda's curiosity was equally enthusiastic for the people and the institutions. We attended church, went to museums, spent a lot of time in the marketplace, and walked almost every street of the small town of Sobral, looking at shops, houses, talking to people, attending parties. It was almost as if Linda was a sponge trying to absorb the whole of northeast Brazil in the short time we were there.

I saw her concern for the social problems. The compassion that I had seen in her before gave way to doubt. There were times when I could almost hear her saying, "Is it worth it? Why should I be here?" And then she would perk up, start talking about her project, and her spirits would rise.

I worried about what would happen to her after I left. Would the lows get lower? Could she indeed stay there alone?

She and the Kirmises drove me to the airport. We were strangely silent as I waited for my plane to arrive and take me home. I wanted her to prove herself, but I did not want to leave her alone. I had to resist telexing home that I would need an additional two weeks in Brazil. If this were to work, she had to prove her worth to herself to Brazilians.

It was time for my plane to leave. As I started toward the boarding gate, I turned to say goodbye. Any doubts I had about her ability to handle situations were erased as her usual professional handshake was replaced by a quick hug which said, "Thank you. I'm a big girl. I'm a bit scared, but I can handle this."

As I flew back I was seated across from a rich American couple who hassled the stewardess because they had ordered a special meal for religious purposes. As I listened to their complaints, I saw the eyes of a child Linda had photographed sitting in a cart amongst pigs in Sobral. I picked up my pen and wrote:

## BRANIFF FLIGHT 149

I see the  
soft brown eyes  
of the child  
sitting among  
pigs  
his ribs  
showing  
above his swollen stomach.

The stewardess  
picks up the remains  
of the special meal  
pours clean milk  
over scraps  
enough to put meat  
on those ribs  
and allow  
the mind captured  
in the child's  
starved body  
to reach its potential.

If an omnipotent god  
can allow some of his children  
to eat special meals  
for religious reasons  
while brown skinned babes  
starve  
then I join the damned  
for I  
for one  
can not  
will not  
serve him.

28 May 1981

Now we have been back from Brazil for some months. We have written and rewritten, designed and redesigned the research project. Although other changes may have to be made in the experimental design or techniques for measuring vegetation, I am quite confident that our brush management research will be scientifically sound and that it will help solve some of the problems of the ranching industry in Brazil. I am less certain that that research will be applied or that the lives of the people will be changed significantly, but we have to try.

Linda is now in Rio studying language. Her letters show the same insight into the people's culture that she showed on the first trip. Whether

our research project is a success or a failure may not be the important part of this cooperative project with Brazil. What is important, and what I am certain is a success, is that we have properly initiated a bright, competent, young U.S. scientist into a career of international service. Of this I have no doubt.

#### IV. ANALYSIS AND SUMMARY

We think we were fortunate to obtain the first of the international participation grants at Utah State University. We believe the tag-along concept is sound in that it can indeed help to develop a cadre of young people to work in international service.

Some of the strengths of the program are that young people are given experience in a developing country. This experience includes not only the biological and physical aspects of their project but people contact as well. They get to feel the frustration of working in bureaucracies other than their own and in countries where the most elementary and most simple task becomes difficult. Finally, they get a chance to decide if international work is really for them before they have to make a permanent commitment.

The weaknesses are that it is a costly program if the funds come from the project. However, if funded alternatively as we suggest, it may be inexpensive. At any rate, there is always a chance for failure, but we suggest that that failure in itself is a success. Only a small amount of funds has been expended. A new person can be recruited rather than have an unhappy person perform two or three years of unenthusiastic and marginally competent service.

There are some definite and direct benefits to U.S. institutions from a tag-along or junior scientist participation program. The most obvious is that it will build a cadre of young, enthusiastic people with experience in developing countries. We believe these young scientists and managers can be developed at less cost in the long run by using them on the projects at an early stage. In addition, if the experience is positive, it will help recruit new people to work in international areas. It also allows for the utilization of experienced people who cannot spend a large amount of time overseas. The young scientist becomes the hands, the implementer, of the more experienced scientist, who stays in the United States.

There are definite benefits to the host countries as well. They receive people who are young, vigorous, and have the latest techniques at their command. The number of people willing to work in the developing countries will be larger, and the supply of experienced personnel will increase.

We have not commented in the brief time today on the incentives for keeping the young scientists in international work once they have been trained. Suffice it to say that they must be treated as professionals, they must continue to publish in good journals, they must be allowed to present papers at prestigious conferences, and all the other incentives that make a good professional must be applied to them. However, we think that the

concept and program as outlined here can be used to start people off in international service in such a way that they will want to continue in it.

We realize that our sample is small and that the final results of this first experience will not be available until Linda finishes her PhD and accepts employment in yet another country. At this stage, we believe in the junior scientist development experience strongly enough to recommend it to other institutions before the final judgment is made.

THE CHALLENGES OF WOMEN  
WORKING IN SAUDI ARABIA

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ABSTRACT

The Saudi social and natural environments are harsh, but there are many things that can be done to ameliorate both environments. There are many ongoing projects to improve Saudi Arabia's natural resources. These are undertaken by the Saudi government, the Food and Agriculture Organizations, plus major construction and oil firms. The restrictions for women are due to law and social customs. The most serious obstacles are an inability to legally (1) drive, (2) work in the same place as men, and (3) obtain a work permit before relocating (married women only). Effective methods for improving women's work success include networking with other working women, using new ways to deal with people, and establishing one's credibility early. The reader is urged to be sensitive to and knowledgeable about local customs and how a woman is regarded. The reader is encouraged to work in Saudi Arabia because of the delightful people, and the beauty of the country, besides the challenges and rewards of work there.

Introduction

You have undoubtedly heard about the harsh environment - both climatic and social - in Saudi Arabia. A lot of what you have heard is true, and I would be misleading you if I said otherwise, but a woman working in natural resources there can do many things to mitigate the extremes of these environments.

I worked on the eastern coast of Saudi Arabia from 1975-1979 (see Figure 1) with the Arabian American Oil Company. This company is the largest oil producer in the world, and its compound in Dhahran is the largest (non-military) base of U.S. expatriate (foreign) citizens. The

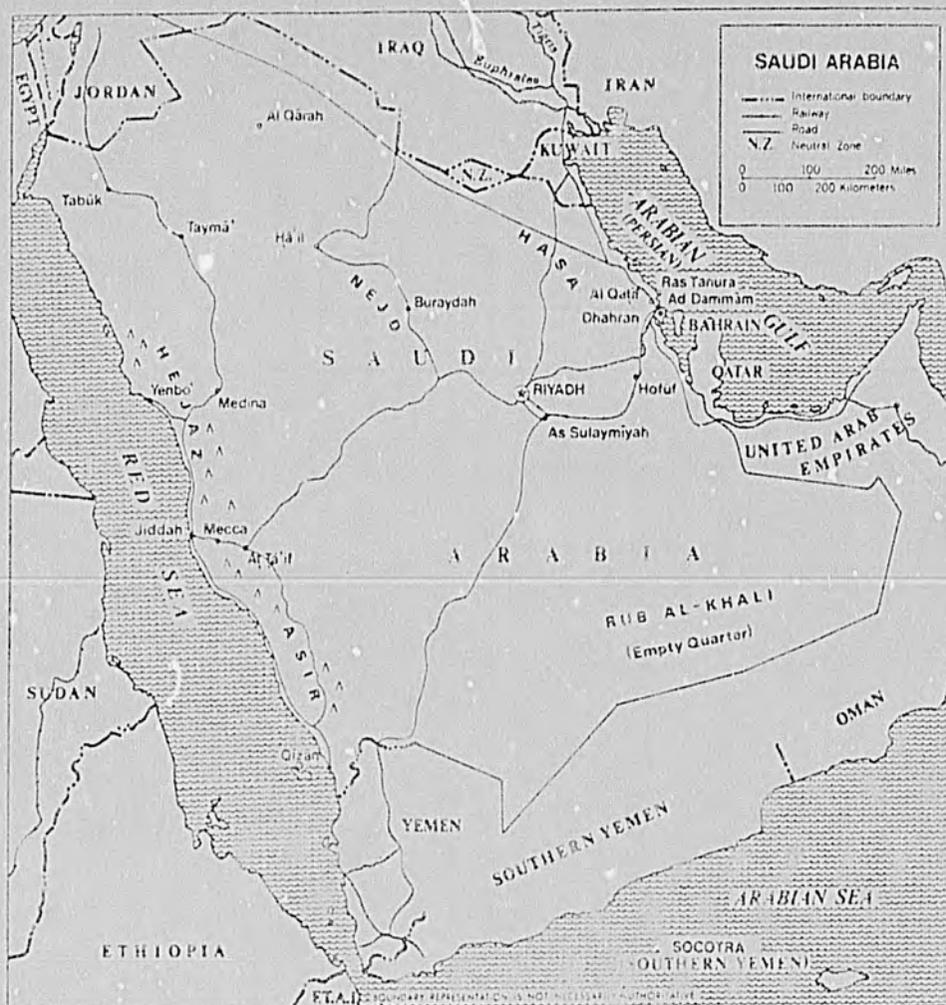


Figure 1

lifestyle on the compound is pretty westernized. ARAMCO explores, extracts and refines oil in eastern Saudi Arabia and sends it all over the world.

#### Natural Environment

It does rain in Saudi Arabia - at least on the coast. I understand the Empty Quarter had a record rain last year with over three inches in 24 hours. Before that, the Empty Quarter had not seen rain in years. Saudi Arabia gets about 100 mm of rain a year, with the rain coming from October to April. Winter temperatures range from the 40's to the 70's and run from the 90's to the 120's in the summer. People tell me there are places in the southern United States - New Orleans, for example, with weather like that. Unlike the U.S. Gulf Coast, humidity is only a problem four to six months a year in Saudi Arabia. Another difference may also be the sandstorms, or shamals, that peak in late May and occur for one to two months a year.

Much of the country's water is supplied by large aquifers. Where these aquifers, or underwater lakes, come to the surface, oases occur.

Water is very scarce, of course, and is regulated by strict social custom. ARAMCO, the oil company, had problems in its early days: the bedouins would knock the valves off the oil pipes because they thought there was water inside, and social custom dictated they had the first right to use the water for their camels. ARAMCO learned to supply water for the camels in order to maintain the pipes.

The soils in eastern Saudi Arabia are mostly sand, or sandstone. Parts of this province are very saline, as the sea once came much further inland. The salinity of the soils is a limiting factor after water scarcity for production of agricultural crops and forage production. The western region of Saudi Arabia is one large volcanic shield, with elevations ranging from sea level to 8,200 feet near the western coast.

These qualities of the climate and soil are expressed in the vegetation present. Salt marshes parallel the eastern coast, and there is a desert scrub inland that is not unlike Arizona. Sand dunes characterize the three great deserts: the Rub al Khali in the south, and the Nafud and Dahna in the north. Most of the oases are under intense production. Dates are the principal crop but there is a trend to diversify production to vegetable crops and alfalfa.

Much of Saudi Arabia's plant and animal life is also found in Africa. The trees that occur include acacias in the central and western deserts and wild olive trees in the southwestern highlands. Date palms (Phoenix dactylis) and tamarisks are abundant in the oases.

But most of the plants in Saudi Arabia consist of small bushes, forbs, and grasses, where you can find them. Some of the more common plants include Cyperus conglomeratus, a sedge, and Panicum turgidum, a grass (both common in eastern coastal sands). Rhantherium epapposum, also called 'arfaj' is common over large areas. Salt bushes such as Haloxylon salicornum, or rimth, appear in more saline conditions and supply the grazing animals the salt needed for survival. Other common plants are broomrape (Cistanche tubulosa), a colorful root parasite flowering in the spring, and desert camomile (Anthemis deserti) which grows in scattered carpets in the sand. Many species of the mustard family are common and wild irises appear with the rains. All these plants are remarkably well adapted to the climate, even if they are few and far between.

The most common grazing animals are the fat-tailed sheep and the camel. The gazelle is almost extinct. The native oryx (which gave rise to the unicorn legends) is being reintroduced from Arizona after their near-extinction in this century. Non-grazing animals include the jackal and the fox. Two-hundred fifty non-native bird species pass through Saudi Arabia on their migration from Europe and many stay to nest and breed (including many raptors). The usual desert reptiles occur--sand vipers, boas, a hooded cobra, and an imitation thereof. Lizards include geckos, monitor lizards, and an equally large lizard, the dhob, which some people have kept as pets.

Off the coast, coral reefs abound. And the fish and other coral based life are spectacular. The Persian Gulf is a major nesting ground for a variety of sea turtles and terns.

The natural environment is harsh, but the plants and animals have adapted to the conditions. Likewise, the Saudi Arabian social environment is harsh, but specific adaptive strategies can be developed in order to work there with greater success.

### Social Environment

The Saudi Arabian social environment, like the desert, requires specific adaptive strategies for women to successfully work there. The government is trying to maintain a balance between the two opposing factors of religion and westernization. There is a fear of a similar collapse from the same type of revolutionary forces as occurred in Iran. The deep-seated piety of the country (and hence the government) emphasizes more adherence to religion while contact with the west is in conflict with this. Foreign labor influences all citizens there. In addition, a very large percentage of the male population is and has been sent abroad to be educated. These individuals have in many cases become much more westernized and the group creates a substantial pressure for change.

It is the religious factor that has created the most restrictions for women in particular, as many of their social customs stem from an interpretation of their religion that is very restrictive toward women. As an example of the connection between regulation of women and religion, the government gave responsibility for the education of girls in 1960 to a group of religious leaders to form the Administration of Girl's Education. It is not under the Ministry of Education, which handles all other matters concerning education.

Social custom manifests itself in many laws that have tremendous impact on women. The following three laws necessitate major readjustment on the part of women working in Saudi Arabia.

(1) The rules for entering Saudi Arabia differ for (a) men and single women, and (b) married women. Single women and all men are issued work permits by the employer. This entitles them to a residence permit. Married women cannot get a work permit issued from the United States. They must enter the country under their husband's residence permit and then apply for a work permit. This arrangement keeps married women from having a written contract before they relocate to Saudi Arabia. It likewise means that even if she were working for an American organization or government agency, all Equal Opportunity laws and other protection offered by the U.S. government do not apply because she would be hired locally.

(2) It's against the law for a women to drive. Actually, tremendous controversy exists over the origin of this--is it only social custom, or a law made by royal decree? ARAMCO continues to issue driver's licenses to women for the compound, and I discovered a few women did drive illegally when they were sure no one would catch them. Otherwise, they rode buses. If a woman is caught driving, her husband could be thrown in jail, or deported, and she would follow soon thereafter. Single women would be deported directly.

(3) It is against the law to work in the same physical place as men. This is particularly restrictive to local women, who otherwise could have been a major source of labor in this manpower-short country. Enforcers of social values, called mutawahs in this case come into office buildings and other working areas and report violations of this law. So most companies really must provide separate working facilities if they choose to hire a woman.

#### Projects Using Natural Resource Expertise

The Ministry of Agriculture and Water administers most of the natural resource projects and oversees most of the technical teams. In 1975, this ministry signed an agreement to bring over more than 80 people for technical assistance in seven areas: hydrology, ground and surface water management, range management, soil survey, land classification, and park management, in addition to agricultural research and transfer. Nineteen of the positions were still open in agriculture, water, economics, extension and research at the time of this writing. Some of the projects administered by the Ministry of Agriculture and Water follow.

A national park is being developed in southwestern Saudi Arabia. Management plans, objectives and operational guidelines have been established. The park management team is implementing the administrative system and park maintenance contracts. They are also training personnel and developing a public awareness program. The water management team is collecting base line data and modeling aquifer systems. The agricultural affairs team is training specialists, implementing range control demonstration areas, and grazing systems.

Sand movement is such a concern that oil is spread on the sand beside the highways to prevent them from being buried, as previous highways were. Oases are ruined by the shifting sand, causing people to relocate. The Food and Agriculture Organization (FAO) experimented with planting tamarisks. This practice proved to be quite successful in preventing sand movement; these trees are planted country-wide. Irrigation patterns in oases are likewise being refined with FAO assistance.

The Arabian American Oil Company utilizes environmental engineering to monitor air pollution created by oil refining and power generation. The Environmental Engineering Department of ARAMCO recently completed pioneering work in marine biology. It published the book, Biotopes, for the eastern province. ARAMCO also has a Local Industrial Development Department that concentrates on assisting farmers in local areas establish vegetable and poultry farms. The project also improvises new techniques for unique conditions encountered in Saudi oases. In addition, the department is experimenting with hydroponics and the use of plastic sheets to retain moisture in the areas irrigated.

Construction firms may or may not consider the use of environmental expertise in their developments. A huge port construction project called in marine biologists for advice, as will another large scale development on the Red Sea. Saudi Arabia is becoming more strict in the environmental regulation arena, so more technical assistance will be needed in the future.

### Why Work There?

As shown above, the opportunities for work are there. Living there also has its "pluses." Scuba diving among the coral reefs is about the best in the world and water sports of all types abound at the coast. The country's history dates back thousands of years, and wide open country is available to roam. It is a pretty country and quite fascinating.

The people are also very nice. The Saudi women are particularly open, and while barriers exist between Saudi men and expatriate women, when these barriers can be overcome, the local people are outgoing and unpretentious. Where else can you mingle with a bedouin, who may not have any idea what an ocean is or where you came from, and a bunch of expatriates from everywhere - Holland to Thailand, and young Saudis educated at Cambridge?

There is still room for significant discovery. The book that ARAMCO put out, Biotopes, doubled the number of species found in the Persian Gulf. And during my tenure there, a friend discovered a new species of scorpion. You can make a lasting mark as the result of your efforts.

And the professional challenge is inviting. The sense of satisfaction one can obtain from making a contribution in challenging conditions can almost be justification enough to work there.

So suppose I've convinced you to attempt to go over. What can be done to overcome some of those obstacles I mentioned?

### Strategies to Improve Professional Success

Remember, information is power, so start collecting information concerning people and projects in Saudi Arabia. It really is amazing how many people have been there. And if you mention a person's name who has been in that country, it's likewise amazing how many people will know her or him. In essence, start building your network, for you'll especially need it there. Also start collecting information about what projects are going on (other than those mentioned here), and what expertise in natural resources is needed.

The U.S. Department of Finance is the umbrella under which the U.S. cooperative agreements are handled, so any questions should be directed to them first. The major construction firms working in Saudi Arabia are Fluor, Bechtel, Brown and Root, and Parsons, all based in California. The Stanford Research Institute is also doing planning for the Saudi government.

It wouldn't hurt to occasionally pick up Oil and Gas Journal, Engineering News Record, the Economist, and the Middle East (which is the best source). These magazines detail the status of ongoing projects, and announce upcoming contracts.

Environmental work is most often done on a project-by-project basis, and learning of those projects is essential. The questions to be asked are: (1) what is the project doing, (2) who is responsible, and (3) what expertise is needed? So you can do your groundwork here. In fact, you may be able to do everything but sign the papers, if you're married. Single women have to have everything done here.

A note about qualifications: while men with degrees are assumed to be capable of doing just about any kind of work, women are many times considered unable to do anything unless specifically trained for four years in that particular subject. The notices of job openings received from the Saudi Ministry of Agriculture and Water state all that is needed is a Bachelor of Science. But the person coordinating placement stated for a woman to have that job, she would probably need a Ph.D. and fifteen year's experience. Almost all research work there is done by people with advanced degrees, unlike much of the work in construction.

All U.S. companies like to state they are an Equal Opportunity Employer. But the Saudi government ultimately makes the decision concerning who will enter the country, and that government is not bound by U.S. laws.

Once there, the place of work will probably not be next to a man (officially) unless employed by ARAMCO. Usually everyone on the project considers this a formality and does not let this interfere with your work or position on the team. This can even be an advantage, since it can allow much more freedom and, depending on arrangements made, the woman's work place could be much nicer than the man's and thus become an informal gathering place.

The inability to drive legally is a real stumbling block. This law precludes a woman from filling a position that would require a taxi to take her to and from a remote work site every day. The organization probably would hire a man instead and give him a company car to use. With a team, there is more of a chance to share rides with others, but it's not the same. A consolation is that many men also prefer to use the buses and taxis so women are not the only employees traveling around town in this manner.

These are the formal restraints. There are millions of informal obstacles, but there is also a multitude of ways to get around them.

The best way to minimize difficulties is to start networking. The women who are experiencing or have experienced the same conditions are invaluable. These women are usually expatriates themselves, and can share successful strategies and key bits of information, in addition to providing moral support.

Word of mouth is an especially important method of communicating information there. Traditionally, Arabs took great pride in their story-telling prowess. The tales of the 1001 Arabian nights were all stories recounted by an Arab woman. A more recent example of how important word of mouth communication is, is that ARAMCO had a position - eight

hours a day - with the job title of Rumour Coordinator. And it was not filled with a woman! So networking, and generally, word of mouth information transfer is common there and has been throughout history.

A group of women formed a network in Arabia and met formally once a month. The core women happened to all be professional, but we collected information which we shared from everywhere, on an individual basis. The core women were industrial trainers, contract representatives, and a systems analyst, for example.

We shared background information because some of us had more recently arrived and didn't know the history behind some events that took place. It thus keeps you from "re-inventing the wheel." Networking splits up the work of finding concrete backup material for requests or proposals, or scarce references that are needed. Likewise, it was a brainstorming session for ideas and a nucleus to make proposals jointly.

This group was a vehicle to share what precedents had been set recently or what strides had been made in other parts of the country. This sharing was especially important to counter the usual saying, "It's against Saudi law," when 500 miles away people were doing it legally on a pretty routine basis. For example, we were told you had to take your husband's name to enter the country. But, we found out that Saudi women keep their own name by tradition and now "liberated" ones are starting to use their husband's names. So Saudi law had nothing to do with it. This type of information is also effective when told, "It can't be done this way," because you just heard "X" company has done it for two years and thought it was the greatest thing since the 19th Amendment.

This network was a support group and reality check--to commiserate, bolster, tell "can you believe this" stories. The network provided inspiration: we would pass around books purchased on vacation. Games Mother Never Taught You, by Betty Lehan Harragan, and Everything a Woman Needs to Know to Get Paid What She's Worth, by Caroline Bird were especially popular. And many of those in the group provided me with a role model - they were successful in their work, knowledgeable, and gracious.

We used the group to share observations and strategies. One woman noticed, for example, how the unwritten dress code was quite different than expected. Casual dress was a sign of professionalism.

The involved women were helped by this network and things did change in the company concerning working women. One woman rose to be chairman of the business department at the training center, and another to head effective writing to engineers. All were among the first women to be sent abroad for professional development courses. We submitted a proposal concerning the employment status of married women and two months later, the program and employment picture was revamped entirely. I'm not saying we did anything but provide some feedback necessary for change, and a couple of ideas, but the company has not made significant changes in their policy toward working wives since.

There are other things you can do besides forming and/or participating in a network to improve your effectiveness and meet some of those challenges you went to Saudi Arabia for.

I would urge those on a team to experiment with new ways of dealing with people. Certainly regular bureaucracy may not work in every case, because bureaucratic procedures can be just as new as any other method of working in a formal organization to many over there. Be creative and compassionate, i.e., human. Experimenting may be especially easy in Saudi Arabia because your past will tend not to follow you, so the consequences of failing are not so great and you can feel freer to experiment. It's once in a blue moon anyone will ever hear of your performance except from what you publish or say. So try new ideas - you have nothing to lose and a lot to gain.

Establish your credibility early; demonstrate that you know what you're talking about. It may mean you'll have to be more vocal at first, but as soon as they recognize the value of your professional opinion, you can relax more. They may never accept you as an equal, but they may agree you could be right on technical issues.

On the same token, the general consensus of women who have worked in Saudi Arabia is that you have to be more restrained, or guarded, about what might be taken as immoral overtures. Remember, to many Saudi's we are brazen hussies for not wearing veils and anything that might, in their eyes, further that impression may justify various kinds of unwanted behavior. Once, on the ARAMCO compound (which was touted as an island of western lifestyle) there were complaints flying thick and heavy concerning local men following women joggers in cars and bothering them. The management (at that time it was mostly American) responded that the joggers were 'asking for it' by wearing shorts. So that type of attitude is common; businesslike manners at all times are the best defense. Friendliness is absolutely O.K., but ensure that it can't be construed as something else.

Do become informed and involved with the local people. You are overseas in their communities to also take advantage of the social opportunities and learning experiences. This can help you understand the way local people would react and behave on the job, based on their values and culture. Learning even a small bit of their language opens a lot of doors. Besides, it makes it just plain easier to live there.

Realize you are different. Women with expertise in natural resources or professional women in general are a different breed of cat to them. But not fitting in can be a distinct advantage. By being different, you can use that to avoid some red tape or other hurdles. You being different means many channels that others have to go through may not be appropriate or necessary. You may be granted things simply because you're a woman - like a better work space. Some men respect you because you don't fit their norm. A friend performed contract presentations to local Saudis and time after time they lauded her, a woman, presenting things to men.

Just like everywhere else, the mentality there is to avoid trouble and confrontations. If you are vocal enough, they may grudgingly say yes, just to quiet you. Likewise, if you are told you can't do something, it may simply mean "Don't get caught at it, because we'll have to deal with it and we don't quite know how." But if you decide to do that something, don't get caught because the eventual way of dealing with it may be quite harsh.

While these observations were gained in Saudi Arabia, I think these same observations and generalities would be true in most of the Middle East and many more places in the world.

The challenges in Saudi Arabia are great. But then, so are the senses of accomplishment and reward. The culture is harsh, but that's simply different, not better or worse. Anyone who works abroad with that idea kept in the back of his or her mind will be a long ways toward a successful working experience.

#### References

Basson, Philip W., John E. Burchard, Jr., John T. Hardy, and Andrew R.G. Price. 1977. Biotopes of the western Arabian Gulf - marine life and environments of Saudi Arabia. ARAMCO Department of Loss Prevention and Environmental Affairs. 284 p., illus.

Nawwab, Ismail I., Peter C. Speers, and Paul Hoyer. 1980. ARAMCO and its world--Arabia and the Middle East. Arabian American Oil Co., 275 p., illus.

Stacey International. 1977. The Kingdom of Saudi Arabia. Stacey International. 256 p., illus.

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## FORESTRY IN INDONESIA

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## ABSTRACT

Forestry in Indonesia includes: 1) teak forestry, 2) social forestry, and 3) tropical rain forest exploitation. Teak forests are managed through a system of clearcutting, reforestation, and thinning. Social forestry demonstrates the role forestry can play in addressing the people's need for food, fodder, fuelwood, cash crops, and housing. Tropical rain forests are exploited for timber concessions, shifting cultivation and transmigration settlements. Timber removal is based on a sustained yield concept, yet management is greatly influenced by markets, transportation, politics, and biological and scientific boundaries. My conclusions are: 1) It is important to redirect the emphasis on teak forestry to tropical rain forest ecosystems and management, 2) The social forestry program cannot meet the demand for its products because the forest base on Java is too small in relation to the population, and 3) It is essential to learn to manage tropical rain forests on a sustainable basis, because harvesting and cultivation will continue.

Forestry in any country can really only be described in both the social and biological context. The diverse forestry activities in Indonesia and the extent to which population density affects those activities provided an opportunity for me to view this relationship from a new perspective during my year as a 1977-78 Luce Scholar. This report is based on my observations during that year, together with the cited sources.

Indonesia is comprised of 13,667 islands of which 990 are inhabited. When referring to Indonesia, the common delineation is Java and the outer islands. There are three main types of forestry in Indonesia: 1) teak forestry, 2) social forestry, and 3) tropical rain forest exploitation. Each of these includes a biological and social component. This relationship is more obvious in Indonesia, where the mismatch of population and forest resources illustrates this interaction. Java represents only two percent of the forest land area in Indonesia, yet supports over 63 percent of its population, whereas the outer islands have 98 percent of the forest land and support only 37 percent of the population.

#### BACKGROUND

To understand forestry in Indonesia today one must recognize the influence of 350 years of contact with the Dutch; initially through the Dutch East Indies Company and later by incorporating Indonesia as part of the Netherlands East Indies. Despite the diverse forest types, it was the teak forests alone which appealed to them. This interest promoted the concentration of forestry activities on teak forests which are primarily on Java and Madura where monsoon climates encourage its growth. Thus, Java was established as the center of forestry in Indonesia.

Forestry legislation, beginning in 1818, was directed at the protection and management of teak forests. The two "main" forestry schools were established on Java and not the outer islands. The curricula continue to concentrate on teak forestry even with the growing importance of the tropical rain forests. This emphasis on teak is reflected in the initial categorization of species and forests, as "teak" and "non-teak"; a distinction which remains today.

#### TEAK FORESTRY

Ninety-eight percent of the forest land is government owned. There are approximately three million hectares of forest area on Java, of which 840,000 hectares are teak forests (Directorate General of Forestry 1976). They are managed by Perum Perhutani (Perhutani) the Indonesian State Forest Corporation. Their jurisdiction is Central and East Java, and Madura. Perhutani is charged with the double duty of profit making and public service (Direksi Perum Perhutani 1976).

The teak forests are a mixture of natural stands and plantations. These stands are managed under a system of clearcutting, reforestation and thinning. The rotation age is generally considered to be 80-100 years, but now on fertile sites, 60-year rotations are predicted.

Before teak is felled, the tree is girdled and left standing for two years to dry. In an attempt to increase the merchantable log length, Perhutani initiated a practice of decreasing the stump height by trimming the butt swell, thus facilitating cutting close to the ground. Previously, a stump was at least 60 cm high, and now stumps are cut within 10 cm of the ground. As a consequence, these stumps are now unavailable for fuelwood, a secondary but important former use.

Logs are bucked into 2 m and 3 m lengths for timber, and skidded by oxen and then loaded on trucks by workers rolling the logs up a ramp. From the forest areas the logs are transported to the sort yard and mills for processing.

In 1975, Perhutani owned and operated nine sawmills on Java (Direksi Perum Perhutani 1976), but it is estimated that 45-50 percent of the teak consumed is stolen wood. Most of this is processed by hand in the villages.

Although Indonesia grows approximately 50 percent of the world teak supply, in 1977 its teak exports were only seven percent of the world teak market<sup>1</sup>. The biggest demand is domestic. Near places where teak timber is obtainable at moderate prices another kind of timber will not be used, even if it is much cheaper and equally suited for the purpose. This is due to Javanese idea that teak is the only timber fit for general use.

Teak is established by sowing seed on a 3 m by 3 m spacing. Stakes mark the seed location. Stones are placed along the contours as an erosion control method. Germination is dependent on the first rain.

This system is very labor intensive. Through manual labor the government continues to provide employment though mechanical operations are practical.

Another way in which Perhutani addresses community needs, is by allowing intercropping between the teak trees. There are several different intercropping systems, but the most common is tumpangasari or the taungya system. Tumpangasari combines food production with teak planting, a long established system of agroforestry. Under this system the worker is allowed to plant crops between the trees in exchange for planting and tending the teak as directed by Perhutani. This allows the worker one to three years of cultivation before the teak crowns shade out the crops. This system has, however, experienced some problems. The most common is the "mysterious" death of teak seedlings, at just about the time their growth would eliminate intercropping.

#### SOCIAL FORESTRY

Java represents only six percent of Indonesia's total land area, but supported 63 percent of the population in 1973. This makes population

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<sup>1</sup> Saryono. 1977. The International Market of Teak. 4 p. Unpublished report on file at Perum Perhutani, Jakarta, Indonesia.

density, averaging 570 people per square kilometer, a very important feature of the forest area (Soekiman 1977).

Renewed interest in the role of forestry in rural community development prompted Perhutani in 1973 to start a community development program aimed at Central and East Java. The program addresses Perhutani's goal of "making the life of the people near the forest more prosperous with the hope of indirectly improving the well-being of the forest" (Soekiman 1977).

The community development program, also called the "Prosperity Approach" incorporated the following programs:

- 1) intensification of the intercropping systems in forest establishment,
- 2) constructing base camps for forest workers,
- 3) planting elephant grass (Napier grass) (Pennisetum purpureum) to improve cattle raising and at the same time prevent grazing in the forest,
- 4) providing fuelwood by extensive planting of firewood species in the forest,
- 5) introducing modern apiculture for honey production,
- 6) establishing sericulture to produce raw silk and silk cloth (Soekiman 1977).

All of these programs are aimed at providing enough resources or additional income for the people living near the forests to lessen their dependency on the forests. This is important because a consequence of this dependency is the overuse of the forest area, resulting in reduced standing stock, increased soil compaction and increased soil erosion on steeper slopes.

Although recently there has been increased emphasis on intercropping and farm forestry, it is not by any means a new approach in Indonesia. Even the use of Leucaena leucocephala (also referred to as L. glauca) (lomtoro) for soil improvement is well documented during the time of the Dutch East Indies Company (Wind 1929).

Intensification of tumpanghari is through improved cultural practices, better (food crop) seed, application of fertilizers, and control of pests and disease. This increases the food production from forest areas, thus contributing to the food supply for those living near the forests. Perhutani is developing other practices, such as improved apiculture and sericulture, as cash crops for people. Unfortunately, it appears that the markets for these products have not developed at the same time.

By far the most common source of forest destruction is a result of the demand for fuelwood. Over 70 percent of the population relies on fuelwood for their primary source of energy<sup>2</sup>. Along with the fuelwood consumed for

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<sup>2</sup> Wiersum, K. F. 1977. Fuelwood in Indonesia, future prospects for a traditional energy source. Unpublished manuscript sent at Fakultas Kehutanan, Universitas Gadjah Mada, Yogyakarta, Indonesia.

domestic purposes, in rural communities large amounts are devoted to industrial purposes such as lime kilns. Large quantities are also transported to big cities for sale. As the population increases more people are forced to turn to the forests to meet their fuelwood needs. Collection is taking more and more time and must be done farther away from their homes.

Foresters in Indonesia have been addressing this problem for a number of years now, by encouraging the cultivation of fast-growing fuelwood species. Leucaena leucocephala was used during the time of the Dutch East Indies Company to improve soil fertility and provide fuelwood (Wind 1929). Now, it is also used as fodder for cattle and some of the pods are used in cooking. Presently, this species is being planted on a wider scale, as are other fast-growing species such as Gliricidia maculata and Calliandra calothyrsus. All of these plants have in common their ability to coppice readily, endure heavy cutting, and improve soil fertility through biological nitrogen fixation. When established they have proven effective in reducing soil erosion.

But "when established" is an important qualifier of the statement. Getting the plants successfully established has been difficult. Scientists in Indonesia know how to plant and tend these species. They also have experience transferring this information to local people. But often people need to cook their food now and will not wait the three years for plants to become established. As the demand has not been successfully met with fuelwood, people have turned to burning other things, like cow dung and crop residues. This is at the cost of these materials being unavailable for other uses, primarily in agriculture.

One of the most successful approaches to supplying fuelwood has been to incorporate these species in home gardens. Well tended and protected, their survival rate is considerably higher. Few village fuelwood lots, like that of the Tawangmanu district in Central Java, have been successful. Lack of protection and competing demands for land use have inhibited their success.

Of course, one question that comes quickly to mind concerns the available wood on the outer islands. Very little of this wood finds its way to Java. Several factors influence this, primarily the cost of transporting and distributing this material between the islands and around Java. The result is that this wood is often more expensive than that gathered on Java. In addition, the people are unfamiliar with these species, so they are less eager to use them.

Cattle grazing is also a major influence on forest survival. Though it is illegal to graze cattle on forest land, in many places it is the only remaining source of fodder. Cattle are important as work animals, and are considered symbols of wealth. In 1973, in an attempt to eliminate forest grazing, Perhutani began planting elephant grass under teak and pine stands for cattle fodder. The aim is to grow enough fodder to stall-feed cattle, thus removing them from the forest area, and perhaps improving their condition by avoiding weight loss during field grazing (Soekiman 1977). The fodder is grown primarily within the pine plantations, which allows for three to five years of production before the tree crowns shade it out.

The pine plantations on Java are exclusively Pinus merkusii. This pine presents an interesting example of the mix of science and sociology. Along with the biological advantages of promoting a pine for the various products it offers, there is special interest in this particular pine. Pinus merkusii is the only pine indigenous to Indonesia, thus having special significance to the Indonesians. The initial growth of P. merkusii tends to be quite slow in comparison with some other pines, for example Pinus caribaea. During one of my visits to a timber concession in Kalimantan, the initial results from a growth study in progress showed P. caribaea with an average total height of 34.7 cm and P. merkusii at 8.5 cm (R. Lowery 1978, Weyerhaeuser Company, personal communication).

Pinus merkusii grows in pure stands in North Sumatra and is extensively planted for reforestation on steeper slopes on Java. It is tapped for resin and will provide chips for future pulp processing. It is grown in nurseries after the seed is collected, dried, and sorted by hand. Seed viability is low, due primarily to the collection system. Often the cones are collected before they mature, and the people extract the seed from the cone by hand picking each seed. These are then bought by the nursery and planted, but low germination rates result. Outplanting would be more successful too, if the nurseries were decentralized, decreasing the effect of transportation and handling on seedling vigor.

Along with its initial slow growth rate, Pinus merkusii tends to develop a crooked stem, making handling and processing the stems more difficult, and less desirable for saw logs. Presently the common use is resin tapping. Wood chips for pulping are an important potential use. The quality of these products is not affected by the crooked stem. The potential demand for long fiber for pulp production has stimulated a lot of interest in cultivating this pine or others. The fact that this pine is indigenous to an area of Indonesia, carries with it a "national" significance aside from its biological characteristics. This appears to facilitate obtaining research funds.

Forest workers usually lead a nomadic existence, living in an area adjacent to their work site. Their houses are constructed from materials found in the forest, such as tree bark for the walls, and teak leaves or alang-alang (Imperata cylindrica) for the roof. This community is called a margersaren.

To improve the living conditions of these workers, Perhutani constructed "base camps". These consist of housing for the workers and their families; a rice barn, school, house of worship, pumping wells, bathrooms and public lavatories (Soekiman 1977). They also provide medical services and encourage activities such as handicrafts, art and the boy scout movement (Direksi Perum Perhutani 1976). In addition to providing improved living conditions, Perhutani uses this system to facilitate mobility, training, and give spiritual guidance. One conflict that has arisen from this effort, is that these base camps often represent a higher standard of living than many of the nearby towns.

So the social forestry program reflects the direct interaction of people and forests. It represents a program where the forestry activities are developed in response to the people's needs. Still the demand for products from forest lands has not been met. In an attempt to alter population density on Java, the government initiated a transmigration (transmigrasi) program. This program is designed to reestablish people, often whole communities, from Java to the outer islands. In terms of its goal, this program is viewed as not very successful, but nonetheless, consequences of the program are apparent on forest management in the tropical rain forests.

### TROPICAL RAIN FOREST EXPLOITATION

The tropical rain forest presents the forester with a new dimension in forest management. The diversity represented in these forests affects all aspects of forest management. It is not uncommon to have more than 100 species per hectare. There exist among these diverse forests, areas where one species may predominate, like Pinus merkusii stands in northern Sumatra but this is unusual. Tropical rain forests are a resource of economic and social importance, and yet in some ways, very little is known about them.

Exploitation has been going on for hundreds of years. (The word exploitation in this context defines a "use" of the resource, without the negative connotation of misuse which is popular today.) The main difference in the last 10-15 years is the scale, directly related to foreign investment and technology. Initially the exploitation was by local communities, usually for their own consumption. The forests supplied primarily fuelwood and secondary products like tanning bark, copal, and camphor. But even as early as 1927 concessions were granted by the authorities to outside groups. The forest area was divided into small concessions called panglongs where exploitation was conducted completely by manpower and thus restricted to a distance of about one mile inward from the seacoast or rivers. A bit later Chinese concessionaires constructed railways to enable them to move deeper into the forests. Hardwoods, principally meranti (Shorea spp) belonging to the dipterocarp family were cut. Nearly all the timber was transported by junks to Singapore (Wind 1929).

After World War I, Japan, and later South Korea and Taiwan, became larger markets for this type of timber, but the demand was filled in the 50's and 60's by the Philippines and later by Sabah and Sarawak. Failure by these areas to meet the demand for wood eventually turned companies to Indonesia.

After Independence in 1945, there began increasing governmental control on foreign investment, until it was eventually prohibited by law in 1965. Then around 1967 the government, in need of money, decided to encourage foreign investment. The Basic Forestry Law was issued at this time, allowing private capital, Indonesian and foreign, to be invested with special emphasis on the outer islands. At the same time, the Philippines and Malaysia, applied restrictions on the export of non-processed wood. So the circumstances were "right" for increased interest and investment in

Indonesian forests. Concessions are granted to domestic firms as well as straight foreign investment, and joint-venture enterprise (Sumitro 1975). By December 1970, after only three years, there were 35 domestic and 49 foreign logging projects, a total investment of \$53 million and \$384 million, respectively, (Soenardi 1977, Universitas Gadjah Mada, personal communication). Timber concessions are also granted to Indonesian institutions to provide financial support for education and research.

Exploitation occurs primarily by granting a concession to a company with the right to develop and exploit over a period of years (5-35) a certain forest area. In return, the company is required to pay royalties, license fees, and other duties. The company often is responsible for employing a certain number of Indonesian workers, constructing wood processing facilities, and providing medical care and schooling facilities.

The tropical rain forests are harvested under the Indonesian Selective Cutting System which has two stipulations: 1) the minimum cutting diameter is 50 cm and 2) 25 seed trees per hectare must remain after cutting. The intent is that the 20-35 year rotation will allow the undersized trees to mature, then these trees will provide for new trees, thus insuring a sustained yield system.

There are problems implementing the system. Although some inventory surveys exist, in general there is a lack of detailed knowledge of commercial timber density and area, species distribution and growth. Overestimation of standing stock is common. The dispersed nature of the individual concessions, the large number of companies, the lack of staff and transport, have resulted in inadequate control over the exploitation. This is complicated by the varying motives and experience of concession holders for investing in logging (Soenardi 1977, personal communication).

Felling is done using chainsaws, but broad crowns, tangled vines and other vegetation make for hazardous working conditions. It is not unusual to need to cut four to five additional trees to get the selected tree down. After felling the trees are bucked and removed by skidder or tractor to a main road system or waterway. Here the logs are peeled, inventoried, and sorted. Rivers continue to play a major role in transportation systems. From the log ponds or sort points, the logs are transported either to different points in Indonesia for primary processing, or more likely, they are exported to other countries. In recent years, Japan was the destination for 50-60 percent of the exported logs. Logs usually need to be processed within three to four months of cutting.

All of the contracts require reforestation of the cutover areas. This takes on a new dimension when dealing with the diversity and environment of the tropical rain forests. The lush environment presents competition for newly established species, and the diversity of species itself presents different requirements for establishment and growth.

Less than 100 species from the 3,000 species available are currently used. Knowledge of or familiarity with certain species characteristics

determine the market, rather than the market assessing the species. This affects reforestation and harvesting. There are reforestation requirements in every contract, but are these species what we want to regenerate? Do our current harvesting practices make that possible? What is the species or combination of species desirable for continued management?

Scientists in Indonesia, as well as other parts of the world, are conducting regeneration research of tropical rain forest species. Tropical rain forests consist of a patchwork of trees at different stages of maturity; from the gaps in the forest canopy which allow new growth to become established, through stands of small saplings or poles; to mature, high forests, often topped by giant emergent trees. The cycle starts with the gap phase and the size of the gap formed in any given forest determines the regrowing forest.

The gap size, therefore, has an important influence on species composition and species distribution in the forest. This affects all phases of forest management. The density of the economic species and different harvesting practices create gaps of varying size.

Many species have little or no dormancy period, and therefore, begin germinating immediately or within a few days, given the right moisture conditions. This lack of seed dormancy has serious implications for foresters, especially with species that fruit infrequently. It is very difficult to store seed in order to raise seedlings for planting when needed, or transport them for trial at a distance. Absence of dormancy complicates breeding for tree improvement programs, which is of considerable importance in developing plantation forestry (Whitmore 1975).

The tropical rain forest environment encourages competition and thus, most reforestation efforts include a tending or weeding phase to establish the seedling. Dipterocarp (Dipterocarpaceae) seedlings, which include most of the commercial species, require shade to be established. Then they more or less quit growing until released, when the canopy is opened either by natural processes or by man. Dipterocarp species respond differently to light, so even once released, the amount of exposure will promote different species within this group (Whitmore 1975).

The issues of concern expressed over exploiting the tropical rain forests include high-grading, yarding practices, failure to replace commercial species, soil compaction from mechanical operations, and the destruction of "virgin forests".

One response to these concerns is the promotion of plantation forests. Plantations have the potential of producing more fiber on less land, thus decreasing the need for raw material from the tropical rain forests. The plantations are usually located on flat land, along existing transportation routes, thereby eliminating the need for additional land to be used for road construction. Some of the problems associated with the tropical rain forests arise again in plantation forestry. What species to regenerate? What management system should be used to account for the fragile soils,

especially with the potential of frequent harvests? Another aspect of plantation forestry is the high capital investments incurred for site preparation, reforestation, weed control, and thinning the stands. This makes the chance of fire, usually associated with shifting cultivation, particularly threatening.

Timber removal through concessions is only part of the exploitation of tropical rain forests. Forest is burned every year to clear land for agricultural purposes. One type of agricultural clearing is called shifting cultivation, or ladang-culture. This method of cultivation is executed by cutting down all the trees in a chosen spot of the forest. The trees are burned so when the soil cools, rice and other crops are sown between the ashes. After the harvest is gathered the ladang is abandoned, and the next season another part of the forest is used. Tropical soils vary in texture and nutrient capacity, so broad generalizations are difficult, but a few seem relevant. The pattern and intensity of tropical rainfall, leaches out many of the available nutrients. The soils have a low level of incorporated organic matter and tend to have a poor structure. Therefore, they are not resilient under cultivation and erosion by surface water is a constant danger (Johnson 1976). If there is not enough "fallow" time between cultivations, gradually large areas become unproductive.

Shifting cultivators and transmigration settlers also affect the timber companies in other ways. Forest roads facilitate the movement of these groups, making accessible more and more land to their type of cultivation and use. Forest camps become the only market for many of the crops produced by newly established transmigration settlements. It is not unusual for these groups to move closer and closer to the forest camps, until finally they become the responsibility of the forest camp director. Transmigration settlements have experienced that frequently after three to four years of cultivation the soils become unproductive, and thus, the people search for jobs at the forest camps or often return to Java. Before long, the company is involved in another type of social forestry.

#### SUMMARY AND CONCLUSIONS

In each of the three major areas of Indonesian forestry, competing uses for forest land reflect the social and biological relationship inherent in forestry. The teak forests of Java are managed primarily for timber production yet address community needs by allowing food production on forest land through intercropping. In addition, Perhutani uses manual labor instead of machines for many forestry operations. The social forestry program, "The Prosperity Approach" demonstrates the role of forestry in rural community development by providing sources of fuelwood and fodder, improving living conditions, and encouraging cash crops. These efforts assist the people, but are also designed to relieve some of the pressures on forest land. Shifting cultivators, transmigration settlers, and timber companies represent an interaction between tropical rain forests and people. There is also an interaction between these groups, which are drawn together by their use of the forest.

Thus in Indonesia, from a long history of competing uses on Java, a social forestry program has evolved. On the outer islands, increasing competition for use of tropical rain forests illustrates a growing interaction between forests and people. Both are clear examples of the biological and social components of forestry. A relationship which always exists, but can be less evident in other situations.

Based on my observations in Indonesia, my conclusions are:

1. Too much emphasis remains on teak forestry and it is essential to redirect effort to tropical rain forest ecosystems and management.
2. The social forestry program, no matter how intensive and extensive, cannot meet the demand for its products because the forest resource base on Java is too small in relation to the population.
3. The need for more knowledge and understanding of tropical rain forests is essential for the wise use of this resource. Forest products are an important source of foreign currency for economic development in Indonesia. It is important, therefore, to learn to manage tropical rain forests on a sustainable basis, because harvesting and cultivation will continue.

## REFERENCES

- Directorate General of Forestry. 1976. Forestry in Indonesia 1976. Directorate of Forestry Planning, Directorate General of Forestry, Jakarta, Indonesia. 16 p.
- Direksi Perum Perhutani. 1976. Perusahaan Umum Kehutanan Negara (Perum Perhutani) Forest State Corporation 1975. No.1.80.118. Jakarta, Indonesia. 59 p.
- Johnson, N. E. 1976. Biological opportunities and risks associated with fast-growing plantations in the Tropics. *J. For.* 74 (4):206-211.
- Soekiman Atmosoedaryo. 1977. Community development programmes in the forests of central and east Java, Indonesia an evaluation of its merits and prospects. Food and Agriculture Organization, Rome 1977. FO: Misc/77/25, October 1977. 23 p.
- Sumitro, Achmad. 1975. Foreign investment in the forest based sector of Indonesia: Increasing its contribution to Indonesian development. Bagian Penerbitan, Fakultas Kehutanan, Universitas Gadjah Mada, Yogyakarta, Indonesia. 239 p.
- Whitmore, T. C. 1975. Growth of seedlings into trees. In: Tropical rain forests of the Far East. Clarendon Press, Oxford. pp. 67-80.
- Wind, R. (ed.). 1929. The Government forest service in the Netherlands-Indies. Fourth Pacific Science Congress. Batavia-Bandoeng (Java). May-June 1929. 37 p.

## FORESTRY ISSUES IN WEST AFRICA

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## ABSTRACT

In West Africa I investigated the impacts of silvicultural practices on the conservation of tropical moist forest and observed social factors impinging on the management of this resource. Selection, shelterwood, enrichment and conversion treatments were evaluated, with the natural regeneration silvicultures emerging as the best handling of the resource. Slash-and-burn agriculture followed by timbering are the major factors in the forest regression. While much work remains to be done in the optimization of silviculture, the true obstacles to forest conservation are not technical but social, political and economic. Professional women of the developed world can contribute much to the conservation effort by working in West Africa and acting as models for greater participation on the part of West African women.

## INTRODUCTION

In support of my professional development, the Thomas J. Watson Foundation, a non-profit, philanthropic organization based in Providence, Rhode Island, funded my proposal to research the role of silvicultural regimes in tropical forest conservation. During 1980-81, I worked in Senegal, Mali, Ivory Coast, Ghana, Nigeria and Cameroon. Project activities included extensive consultation with relevant persons and visits to selected experimental installations and institutes. Hiking, camping, tree-climbing and other pursuits provided familiarization with the bush. Field work consisted of examining neglected stands of diverse forest types and cruising stands treated under various silvicultural regimes. Vegetation sampling and profiles, soil analyses, standing volumes and seedling counts were some of the measurements taken in assessment of the treatments.

At the close of the study, all examined plots were listed under either a selection, shelterwood, enrichment or conversion treatment. A relative and somewhat qualitative ranking of efficiency of timber production of each of the four treatment types was prepared. Some criteria for ranking were: estimates of volume of wood produced/unit area/unit time, suitability of products for end markets, ecological stability and overall usefulness of the treated forest to the human community.

The past national forestry programs of Nigeria and Ghana will perhaps serve as a warning against declaring any one treatment universally superior. Indiscriminate application of a single treatment over a wide area is likely to waste forest potential. Starting conditions of a particular stand under consideration, site factors and management objectives could render any of the treatments the most efficient for timber production.

Conservation and sustained yield were judged consistent with and necessary to the overall aim of adequate supply of timber in West Africa. In this light, the selection systems, followed by shelterwood systems, emerged as the preferred silvicultural regimes.

## BACKGROUND

West Africa may be divided into vegetational zones which form roughly horizontal bands across the rainfall gradient (Fig. 1). Coastal mangrove gives way to swamp vegetation and then to true rain forest in some areas, drier high forest in others. The high forest becomes deciduous toward its northern reaches.

Over much of the territory, the natural forest/savanna ecotone has been eliminated. The forest yields abruptly to the derived savanna, forest-lands altered through human use, now largely agricultural croplands and degraded grasslands. The derived formation may extend hundreds of miles northward to the transition to Southern Guinea savanna, yielding in turn to the Northern Guinea savanna, Sahel and Sahara.

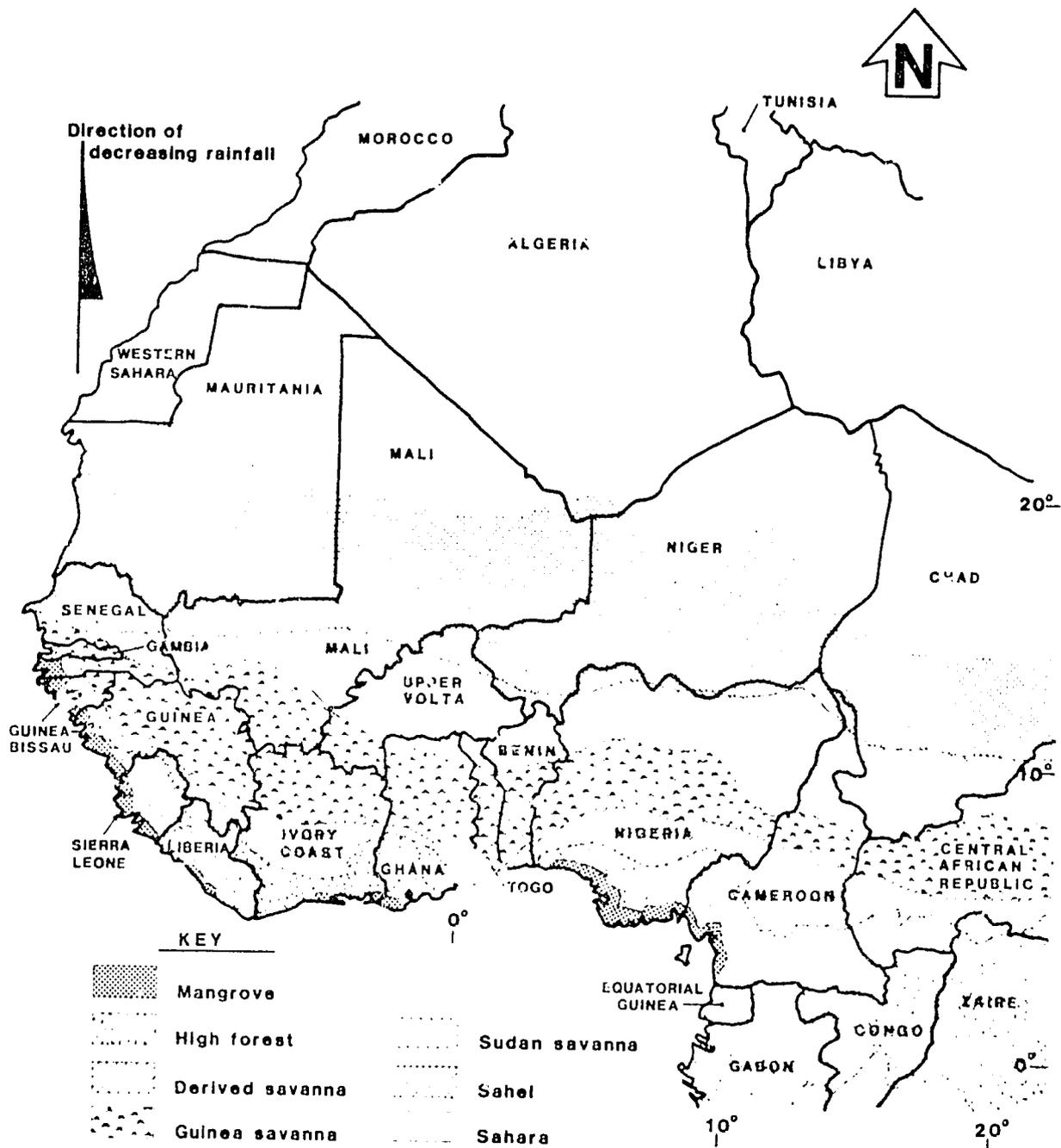


Figure 1. Vegetation zones of West Africa (simplified after Keay 1959).

When the high forests are considered in their social context, their fate is inextricably bound to that of the savanna. All of the study countries have over 50 percent of their land in derived or natural savanna. Together with the forests, these formations form a resource pool for national populations.

Through a series of international agreements, the Economic Community of West African States (ECOWAS) has liberalized the movement of peoples across national borders. Urban magnetism and deteriorating conditions in parts of the Sahel and Sudan savannas have drawn large numbers of subsistence peasants south into the tropical moist forest zone, augmenting the already high rate of population increase (e.g., 3.2 percent in Nigeria, with a population of 86 million and a doubling time of about 20 years). Population densities in the West African moist forest zone are among the highest on the continent. Critical food and fuelwood shortages in the drier latitudes will continue to burden the productive capacity of the tropical moist forest region.

#### Scope of Forest Regression

The tropical moist forest extends 23° north and south of the equator, with the true rain forest confined to about 10° north and south of the equator. Two hundred years ago, these forests stretched almost unbroken over the lowlands of the humid tropics of Central and South America, Africa, Southeast Asia and Indonesia. One thousand or even several million years ago, this part of the world would have looked much the same (Richards 1973). The modern regression of tropical moist forest, however, is so rapid and extensive that it may be characterized as a major event in the history of the earth (Fig. 2). West and East Africa have sustained the greatest losses on a percentage of climax area basis (Table 1). Estimates of the current world rate of loss range from 20 to 45 hectares per minute (NRC 1980b).

#### Factors in Forest Regression: Agriculture

The succession of tropical moist forest is measured in centuries, although the bulk of soil nutrients may be restored within 25 years (Ahn 1970). For 2000 years the density of the human population was low enough to permit fallow periods of 15-20 years under the slash-and-burn agriculture of the Guinea Coast region. Within the existing ecological parameters, this system was probably optimal. Relatively recent advances in medicine and agriculture precipitated a steep rise in the human population which reduced the fallow period to as low as three years in parts of Nigeria and Ghana. The fallow is now insufficient to regenerate forest cover or replenish soil fertility. The ability of the soil to support high forest may be reversed through laterization (Fosberg 1973). The derived savanna is advancing southward while large tracts within the high forest are destroyed. Fragmentation and reduction of forest cover have seriously impaired the stability of the entire vegetative formation in West Africa.

Table 1. Regression of tropical moist forests in millions of hectares (Sommer 1976).

Subcontinent	Moist forest climax area	Moist forest actual area	Regression	Regression in % of climax area
East Africa	25	7	18	72.0
Central Africa	269	149	120	44.6
West Africa	68	19	49	72.0
Total Africa	<u>362</u>	<u>175</u>	<u>187</u>	51.6
South America	750	472	278	37.1
Central America	53	34	19	35.8
Total Latin America	<u>803</u>	<u>506</u>	<u>297</u>	37.0
Pacific Region	48	36	12	25.0
Southeast Asia	302	187	115	38.1
South Asia	85	31	54	63.5
Total Asia	<u>435</u>	<u>254</u>	<u>181</u>	41.6
Total World	<u>1,600</u>	<u>935</u>	<u>665</u>	<u>41.6</u>

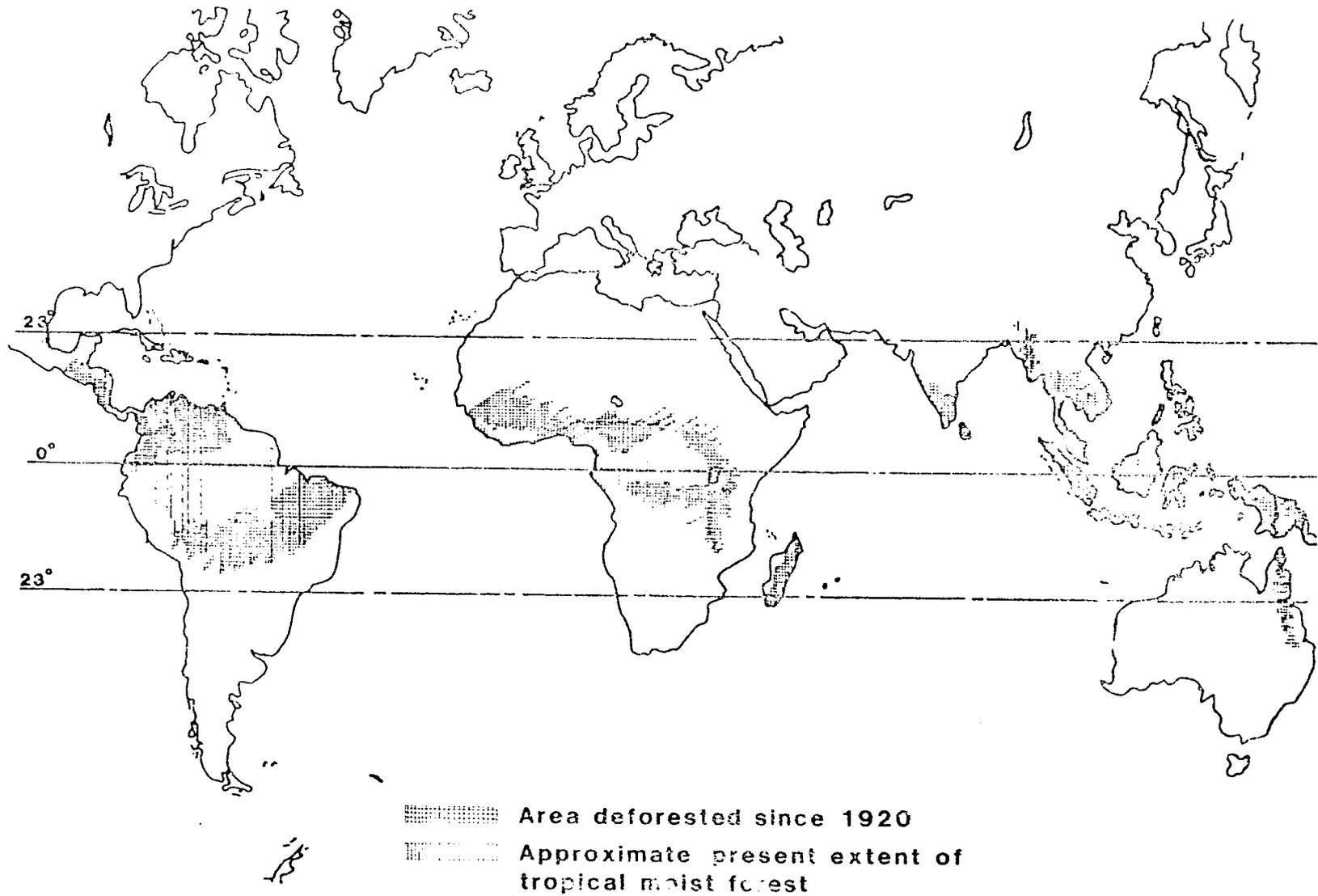


Figure 2. Regression of tropical moist forest from about 1920 to present (adapted from Richards 1973, incorporating data from Myers 1973).

Shifting cultivation, the felling and burning of forest plots for temporary farm sites, is undoubtedly the number one factor in regression of tropical moist forest. Forest farmers eliminate over 10 million hectares per year worldwide, of which four million are in Africa and half a million are in the Ivory Coast alone (NRC 1980a). The number of forest farmers is increasing more rapidly than the total population because the pace of development is too slow to provide alternative employment. While farmers are burning timber to clear land, a fuelwood shortage exists only 25 km from the forest boundary.

### Factors in Forest Regression: Timbering

Timber exploitation is the number two factor in the tropical moist forest retreat. Most exploitation has been outside any management plan, a point underscored by the near-absence of forest outside protected reserves in Senegal, Ivory Coast, Ghana or Nigeria. The forests which were destroyed will almost certainly never be regenerated. Therefore, the management of remaining forest areas is crucial to any conservation attempt.

Selection. The selection system, widely used in private North American forestry, involves eclectic thinning in uneven-aged stands. It is a continuous exploitation under controlled conditions, based on the principles of stand amelioration. This is the most stable and sustainable management system as long as rotation lengths are adequate to maintain standing stock and creaming (the removal of only a few high-value species per unit area) is avoided. Its greatest disadvantage is low yield compared to forest plantations.

Selection systems represent the most efficient means of generating veneer and specified saw timbers. Regrettably, lack of diversification and integration of the forest products industries prevents cropping of fiber and fuelwood simultaneously with the higher-value products. Selectively-managed forests maintain environmental conditions necessary for the growth of the principal agricultural crops and safeguard the land by preventing excessive nutrient leaching, erosion, flooding or parching of the soil. These benefits accrue to a lesser extent under the other regimes. The potential for multiple-use and yield of minor forest produce is highest under selection treatments.

Ghana is the only country visited where the selection system constitutes the core of the national forest policy. It is also the only study country at all likely to maintain its present extent of natural forest cover into the year 2000. For reasons which are unclear, the forest estate is floristically poorer than most areas of West Africa. Its future condition will be determined by how closely principles of stand amelioration are followed now, and also by fluctuations in world wood demand. If the government installed in the recent coup lifts the ban on roundwood exports, the forests will be very seriously endangered.

Tropical Shelterwood Systems. Once widely used in West Africa, the tropical shelterwood system (TSS) has until recently formed the core of Nigerian forest management. Myriad variations on the treatment exist.

Basically, with sodium arsenite or plant hormones, less desirable trees are poisoned, in some cases a very large percentage of them, in others only those directly competing with the desired stems. The slow death of the poisoned trees gradually admits light below, eventually yielding space and nutrients to the living trees. Climber cutting and weed-clearing in the gaps created by the forester may be included in a TSS treatment.

The system was designed by colonial foresters bent on supplying a few choice species to home markets, and whose reference was the temperate forest. The initial aim was abundant regeneration and growth of the valuable species through manipulation of the canopy. Results can best be described as variable.

It is possible to increase directly the stocking of preferred species where silvicultural operations are timed to coincide with abundant seedfall. Where few desirable parent species are available to stock the created gaps, TSS will likely not increase the natural regeneration of these species. The technique works best for pioneer tree types such as obeche, Triplochiton scleroxylon. It is effective to a greater or lesser extent in increasing survival and growth rate of existing seedlings through reduction of competition. Emphasis in its use has thus been shifted.

Efficiency of timber production under TSS is extremely variable. The consensus is that TSS is less economic than other systems in the production of saw timber. Under this system, many species which are today valuable have been poisoned over the years, perhaps amounting to a substantial, unnecessary loss. The number of steps in a TSS treatment make it costly and difficult to administer, especially with a shortage of skilled personnel. Forests under TSS vary from a near-natural to a highly-modified condition. When the degree of forest alteration is slight, ecological stability and secondary benefits of TSS forests may be regarded as comparable to those under selection systems, except that the introduction of poisons may have serious carry-over effects.

Enrichment Plantings. Established enrichment plantings may be seen in Ghana, Nigeria and Ivory Coast, where enrichment was once the bulk of forestry operations. A space is cleared on the forest floor and some of the canopy above is opened. A tree of the desired species is then planted in this gap. Today the technique is little employed because concern has shifted from provision of high-value, slow-growing timbers such as afrosia, mahogany and utile (Pericopsis elata, Khaya ivorensis and Entandophragma utile, respectively) to supplying lower-value timbers such as terminalia (Terminalia ivorensis) in larger quantities. Intensity of enrichment planting depends upon the initial stocking of the forest. Enrichment works best with quick-growing crops, but economics of production compare poorly with plantations of those same crops.

Enrichment which comes through the early stages and is not disturbed by felling operations normally survives to economic maturity and forms part of the next crop which includes naturally-regenerated trees. Although this technique has produced some spectacular successes, such as the Bobiri Forest in Ghana, survival of enrichment individuals is more

often only around 10 percent. Like TSS, enrichment has its uses and has been employed to restock depleted woodlands. The unfortunate trend is away from retaining natural forest, so potential refinement of the technique has been halted.

Conversion. Conversion is replacement of the existing forest with plantations. Costs of wood production vary enormously but are most favorable for low-value, quick-growing crops. Some workers, notably Phillip Kio, Director of the Forestry Research Institute of Nigeria, maintain that high establishment and other costs associated with plantations drop their efficiency rating below naturally-regenerated systems. Plantations have the considerable advantage of producing a homogenous crop at regular intervals to serve a designated market. Volume production may be very high.

Artificial forests are the least stable ecologically and are poorest in the provision of minor forest produce and human services besides the supply of timber. Like all monocultures, forest plantations tend to attract diseases and pests. The closed nutrient cycle which enables the tropical moist forest to persist on highly-leached soils is interrupted during plantation establishment and harvesting, when soils are exposed and nutrient stocks are removed with the vegetation. Extreme cases of erosion have been reported. In the high forest/ savanna transition zone, plantations are subject to large fire losses. The plantation programs of the countries visited are rather new with the exception of long fiber projects in Ghana. It is postulated that ever-growing amounts of fertilizer may be needed to maintain productivity, but it is too early for such evidence.

To the extent that plantations supply the quantities and types of wood required by the human community, they reduce exploitation pressures on the remaining forests. The most appropriate strategy for the maximization of forestry potential is to establish plantations in the derived savanna and on non-productive sites within the moist forest. A number of pioneer trees, such as Albizia and Terminalia spp. can be made to grow satisfactorily in such areas.

Regrettably, action of this sort is often precluded by at least two factors. First, entrepreneurs seek to capitalize their plantations by locating them on exploitable tracts of high forest. Second, cleared forest lands are generally occupied by settlements of one sort or another and these may be politically difficult to remove for tree-planting. It is folly to destroy rare productive high forest for the siting of plantations.

#### BARRIERS TO OPTIMUM USE OF FOREST RESOURCES

Without human manipulation, the tropical moist forests are the world's most productive vegetative units. Skillful handling could put more of the net primary production into the form of commercial timber. While it is true that much fundamental work remains to be done in this area, we do now have the requisite knowledge to produce a regular timber crop. Conservation and use of the natural tropical high forest do not depend on the development of new technological solutions to management problems.

The true obstacles to optimum use of forest resources, including conservation of productive high forest, are foreign exploitation, neo-colonialist institutions, lack of capital, waste, corruption and tribalism, to name only a few items under the social, economic and political headings. Together these problems appear rather more difficult than the optimization of silviculture.

Foreign Exploitation. In the former French colony of Cameroon, I observed the operation of the Societe Forestiere et Industrielle a Belabo (SOFIBEL). A "cooperative enterprise" formed in 1975 for the exploitation of the Deng Deng Forest, 40 percent of SOFIBEL interests are held by the government of Cameroon, 10 percent by an American bank, 10 percent by Swiss interests, 10 percent by French sawmilling. The French control the operation and dictate to the Cameroonians.

The Centre Technique Forestiere Tropical, based in Paris, inventoried the Deng Deng Forest during 1964-66 and pronounced it very rich. A "complementary" inventory was conducted by FAO/UNDP 1969-73. The UN report describes the forest as "profoundly marked by humans" and refers to mountain land-use pressures in the area. During an aerial survey, I noted that large areas of the forest are poorly developed second growth. On the ground with the forester charged with implementation of the FAO project "Amanagement de la Foret de Deng Deng," I saw only three tree species being removed. SOFIBEL's assistant Director, M. Marchand, cheerfully informed me that the khayas, entandophragmas and all other red woods would be eliminated within three years. The FAO forester said that no commercial timber would be left in 15 years.

The management of the forest is allegedly based on a 30-year felling cycle. However, so much damage has been done with bulldozers in road building and timber extraction that few unaffected crop trees remain. Natural regeneration of the high-value trees will be very poor because the seed source is being eradicated, and because of soil compaction and inappropriate light conditions on the forest floor. It will be very expensive to compensate for this destruction later.

SOFIBEL has sawn timber and plywood capacity, but plywood production has been halted. Over 50 percent of the extracted timber volume is exported as roundwood to France, where it is processed to plywood and sold. With one-fourth the Cameroonian investment, the French realize over five times their profit.

When the high-value timber has been removed and the 5000 hectares presently being worked have been thoroughly creamed, the operators of SOFIBEL will apply for another tract in the 366,000 ha Deng Deng Forest. On the heels of the lumberjacks will come the forest farmers. An FAO regional estimate for West Africa is that for every 5 cubic meters of wood extracted, one hectare of residual forest is destroyed. On the doorstep of Belabo, the Deng Deng Forest seems fated to disappear.

SOFIBEL and similar types of foreign exploitation are all too common. This is how French interests helped to denude nearly the entire country of Ivory Coast, once with over 16.5 million ha of tropical moist forest. In 1956, there were still 12 million ha and today there are less than three.

A Combination of Factors. The case of Omo Forest Reserve in Omo State, Western Nigeria, is an example of a combination of social factors, the interaction of which yields a short-sightedness in environmental affairs which is hardly peculiar to West Africa. Here one of the world's finer remnant rain forests is being bulldozed at the rate of 3000 ha/year. So great is the haste of site preparation that huge mahoganies and other valuable woods are windrowed and burnt. Where the heavy machinery has not sufficiently compacted it, the precious red topsoil is borne away on the rain-water runoff.

Gmelina (*Gmelina arborea*), a cheap, short-fiber exotic, is being planted here to feed a pulp mill near Lagos, scheduled for completion in 1983. Shasta Forest Reserve, only 25 miles from Omo, would have been a better sacrifice for a gmelina plantation. Its forest is less spectacular than Omo, which contains Nigeria's first plot reserved solely for conservation, Strict Natural Reserve #1. Omo also contains a Permanent Sample Plot for research purposes. The quality of these sites is jeopardized by the plantation's proximity.

Nigeria has less than 2 percent of its land area under high forest. This area is shrinking fast because the state governments which own the land are converting the forests to plantations. As in the case of Omo, the Federal Government of Nigeria is encouraging this process with a poorly-designed program of cost subsidies. The World Bank has also stained its hands through finance of Omo and other ill-advised projects. Each Nigerian state jealously seeks for itself a piece of the federal pie, regardless of the national interest. Bribery and kickbacks feature where money is handled in Nigeria, undeniably a factor in the popularity of forest conversion. In Sapoba Forest Reserve, Bendel State, former TSS plots are being converted via taungya, a temporary farm crop/ tree interplanting, to plantations of various species. Many of these plots are fully stocked according to estimates of basal area made by Dr. Akin Oguntala and myself. Many plots designated for taungya are today cleared and unplanted in Nigeria, others are planted to a tree density only 40 percent of capacity.

Abundant examples of bungled projects could be cited. Clearly the state of the art in forestry is far more advanced than the practice in the field. We must seek to overcome obstacles to rational forest use which are rooted in human society, as well as to work within the biological limitations of the tropical moist forest ecosystem.

#### THE ROLE OF WOMEN IN FOREST CONSERVATION

The developed world must supply investment capital for conservation projects and the establishment of plantations outside productive high forest. These activities have and will make significant contributions to forest conservation by reducing exploitation pressures on remaining forest areas. Reduction of consumption of meat, paper and energy-based products by the developed world would also conserve tropical forest resources.

Women planning careers in natural resources will find West Africa a rewarding place to work. In Europe one may debate 10 centimeters more or less in the spacing of pine seedlings; in America there are more foresters than there are jobs. But in West Africa foresters are desperately needed. One forester can improve the diet and lives of several villages. The difference between 4 kilometers to the woodlot and 8 or 10 to where wood sufficient to cook one meal can be scrounged is a significant change in the quality of life.

Securing water, food, fuel and frequently shelter are the tasks of women. In West Africa, upward of 70 percent of the agricultural (unpaid) labor is performed by women (International Labor Office 1980). Any attempt to alter the current patterns of resource utilization must not fail to take this into account. Except for programs treating infant health, international aid programs generally have males as their target groups. Certain agricultural extension programs would be more successful if directed primarily at women. Innovation is unlikely to be adopted without the understanding and cooperation of the women who perform the work. In some cultures, women would be more effective than men as project facilitators.

Professional opportunities in West Africa are outstanding. The tropical moist forest biome, only 6 percent of the globe's surface area, is thought to contain nearly half of all species on earth. Probably no more than 15 percent (and possibly much less) have even been given a Latin name, and most are totally unknown (NRC 1980a). What has been a storehouse of genetic diversity for millenia is disappearing. A mammoth effort at collecting and classifying is needed now. The U.S. National Research Council, the Smithsonian Institution, A.E.T.F.A.T. and other organizations are spearheading this work.

The recent domination of Africa by European powers has generated a complex land-use mosaic, interspersing native practice with European techniques and administrative structures. While varying perspectives have thus been brought to bear on moist forest management in Africa, many of the most basic silvicultural questions persist.

Research personnel and foresters with well-developed specialities are needed. But these people will be much more successful at actually accomplishing the tasks of forest conservation if they are able to function as generalists, paying due regard to the human element of technical problems. The record here is so dismal we could hardly fail to improve on it.

In societies where women and children remain the property of men, feminist consciousness is predictably low. Among the few young women encountered in professional training programs, there seemed little concern for professional achievement, although this is far from universally true. Women of the developed world thus have much to offer besides expertise. Up to the present, women have been denied public and professional lives in West Africa, and are extremely scarce as resource management professionals or as scientists of any description. Our presence reinforces the career aspirations of these our colleagues and enables us to engage in meaningful dialogue on several levels.

The critical shortage of trained foresters and forest technicians in some countries has led certain international agencies and governments to encourage the participation of women. Total numbers of women in the paid work force are increasing disproportionately to the population as a whole in the Guinea Coast countries. Definitive statistics are unavailable, but it appears that most of these women are young and unlikely to be considered primary wage-earners. As teachers and role models we can influence these women to contribute to the immense task of forest conservation, upon which our future and theirs depends.

#### ACKNOWLEDGEMENTS

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## REFERENCES

- Ahn, Peter. 1970. West African Soils. Oxford University Press, Oxford.
- Brenan, J.P.M. 1978. Some aspects of the phytogeography of tropical Africa. *Ann. Miss. Bot. Garden* 65:437-478.
- Food and Agricultural Organization of the United Nations. 1979. Forestry Development in Nigeria: Project Findings and Recommendations. FO:DP/NIR/71/546 Terminal Report. UNDP, FAO, Rome.
- Fosberg, F.R. 1973. Temperate zone influence on tropical forestland use: a plea for sanity. *In: Tropical Forest Ecosystems in Africa and South America: a Comparative Review.* E.S. Ayensu, B.J. Meggers and W.D. Duckworth, eds. pp. 345-350. Smithsonian Institution Press, Washington, D.C.
- Hedberg, I., and O. Hedberg, eds. 1968. Conservation of Vegetation in Africa South of the Sahara. *Acta Phytogeographica Suecia* 54. Uppsala.
- International Labor Office. 1980. Yearbook of Labor Statistics. 40th edition. International Labor Office, Geneva.
- Jenik, J. and K.A. Longman. 1974. Tropical Forest and Its Environment. Longman Group Ltd., London.
- Johnson, N.E. 1976. Biological opportunities and risks associated with fast-growing plantations in the tropics. *J. Forestry* (April).
- Keay, R.W.J. 1959. Vegetation Map of Africa South of the Tropic of Cancer. Oxford University Press, Oxford.
- Kio, P.R.O. 1979. Management Strategies in the natural tropical high forest. *For. Ecol. Mgmt.* 2:207-220.
- Kio, P.R.O. 1976. What future for natural regeneration of tropical high forest? An appraisal with examples from Nigeria and Uganda. *Comm. For. Rev.* 55:4:309-318.
- NRC (National Research Council). 1980a. Conversion of Tropical Moist Forests. National Academy of Sciences, Washington, D.C.
- NRC (National Research Council). 1980b. Research Priorities in Tropical Biology. National Academy of Sciences, Washington, D.C.
- NRC (National Research Council). 1979. Tropical Legumes: Resources for the Future. National Academy of Sciences, Washington, D.C.
- Nwoboshi, L.C. 1976. Natural regeneration systems in future tropical timber production. *Nigerian J. Forestry* 6:40-46.
- Ola-adams, B.A. and D.E. Iyamabo. 1977. Conservation of natural vegetation in Nigeria. *Environ. Conserv.* 4(3):217-226.

Richards, P.W. 1973. The tropical rainforest. *Sci. Amer.* 229(6):53-67.

Roche, L. 1979. Forestry and the conservation of plants and animals in the tropics. *For. Ecol. Mgmt.* 2:103-122.

## BIOLOGY AT COLOMBIAN UNIVERSITIES

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## ABSTRACT

During a 3-month tenure as senior Fulbright Fellow in Colombia from September to December 1980, I met and worked with biologists from 6 different universities in this South American country. Each year the Fulbright Commission announces several dozen fellowships for study or research abroad. Prior to my arrival in Colombia, the Fulbright Commission office in Bogota acted as the liason between me and interested universities throughout Colombia. My first 5 weeks were spent in Medellin where I lived at the Botanic Garden and worked at the University of Antioquia with 12 biologists, professors assembled from the faculties of 7 different Colombian Universities. Our group conducted botanical research utilizing the university's computer, laboratory, and museum facilities. Among the 12 biologists were 4 women scientists: a parasitologist, an agronomist, an ecologist and a recent graduate in plant systematics. Other fields represented by the participants were range management, physiology and forestry. The group experience was highly successful and resulted in several major research publications, some to appear in a Colombian journal and another which was recently published in the U.S. The disadvantages to doing research and teaching in Colombia are more than balanced by the advantages which include the existence of a biologically rich flora and fauna, the enthusiasm of the Colombians, the rapid progress that is possible following the introduction of new research techniques, and the respect for education that is typical among the Colombian people.

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The Fulbright-Hays Award program is funded by annual appropriations from the U.S. Congress and 25 countries (Table 1) who share the costs of the program with the U.S. The Council for International Exchange of Scholars in Washington, D.C. (Anon, 1980) administers the grants for American University lecturers and advanced research scholars.

Table 1. Countries Under Agreements With the U.S. to Share Costs of the Fulbright-Hays Award Abroad Program.

Australia	France	New Zealand
Austria	Germany	Norway
Belgium & Luxembourg	Iceland	Portugal
China	Ireland	Spain
Colombia	Israel	Sweden
Cyprus	Italy	United Kingdom
Denmark	Japan	Yugoslavia
Finland	Korea	
	Netherland	

Because of my interest in tropical vegetation, I applied in spring 1979 to go to Colombia. The review process was in two steps, first in the U.S. and subsequently in the country of choice, in this case, Colombia. In December 1979 I received word that my proposal had passed the first review and was being forwarded to Colombia. In February 1980 I was advised that I had been selected for a grant in Colombia. From that point forward my correspondence was with members of the Commission in Colombia or directly with University people there.

I had proposed to teach courses in numerical taxonomy, a relatively new specialty of biology involving studies of variability of natural and cultivated populations of organisms, that can help to bridge the gap between the pure and applied plant sciences. Results from numerical taxonomic research can be used to help recognize potentially valuable new cultivars of plants. I also proposed to lecture on the development of plant museums (herbaria) utilizing my experience as Director of the Ownbey Herbarium at Washington State University. While one large, National Herbarium in Bogota Colombia has long received international recognition and local support, other smaller, regional herbaria are just getting started in Colombia. Biologists at universities outside of Bogota want to enhance their small collections and they need the support of their local administration, which is very difficult to obtain. Visitors help encourage such support simply by taking an interest in the regional herbarium.

Prior to leaving for Colombia in September 1981 I prepared myself by taking a refresher course in Spanish. Workshops were planned and organized through correspondence with faculty members of the Colombian

Universities who had expressed an interest in me to the Commission Office in Bogota.

Six Universities in coordination with the Fulbright office in Bogota, Colombia made arrangements for the workshops and lectures by screening applicants who wanted to participate, making announcements, and in Medellin attempting to adapt the computer program that I sent to their local computer installation. We were able to implement 1 of the 3 computer programs that I brought with me from Washington State University (and this program is now running on their IBM 360). There are few large computers used for research and the state-of-the-art in Colombia lags by several years. Figure 1 indicates the 6 areas in Colombia that were visited during the 3-month fellowship.

Colombian biologists primarily are either government workers or on the faculty at Universities. At the Universities, little time is allocated for research and currently an effort is being made to change this. The training is largely directed toward teaching biology or toward working for the government in agronomy, forestry, plant pathology, range and the medical fields. As Colombians are well aware, their training except for short courses and in some applied areas, is sometimes woefully out-of-date. Thus, their expectations are to be brought up to the state-of-the-art overnight, if possible. This puts considerable pressure on the visitor to show immediate tangible results and even more importantly to fully explain the limitations of the line of research not just the positive aspects.

In Colombia, there is concern among plant scientists for the environment. Virgin forests in Colombia are almost nonexistent throughout much of the central region. The governmental agencies are advising reforestation primarily with exotic species, pines in particular, which tend to create a monoculture forest, so unlike the original or the secondary native forests that encompass tremendous variation in species. While the plant systematists and other biologists in Colombia deplore this, almost no funds are available for research on reforestation with native species. Pines are harvested to provide pulp for the paper industry. The economic pressure results in still more forests being clear cut and planted in pines, further depleting the natural flora and fauna. The system is ripe for major infestations of pests, up to now a minimal problem in the new pine forests.

A long-term project has been recently initiated by biologists to begin to produce a published Flora of Colombia that is anticipated to include about 20,000 native species, a number comparable to all of the species of North America north of Mexico, a much larger area. It is recognized by the leaders of the Universities that such a project is important to science and to practical applications and the arguments have been heeded to a certain extent by the government in Bogota. Several years ago, Colombia initiated a governmental funding agency patterned after the U.S. National Science Foundation, and some of these funds have been made available for the Flora of Colombia project. However, total funds are few and grants are small, up to about \$8,000 usually and generally are awarded for applied research

such as study of food-fish populations, reforestation practices, developing new sources of protein, and combating disease.

While the teaching and research climate in Colombia is favorable in many ways, there are disadvantages. There is no long-standing tradition of research either applied or basic. This results in some ill-planned projects that fail. These in turn tend to demoralize their initiators. The problem of lack of proper equipment and the difficulties of maintaining equipment are extreme. Universities do not seem to budget for maintenance nor do they budget time for research. If a Colombian researcher overcomes all of the obstacles and completes a project, there will be enormous delays in publishing the results. While there are a few Colombian research journals, these may have several years' backlog of manuscripts or no manuscripts at all. In general, funds for exchange of ideas and research results are obtained on a piecemeal basis.

In spite of the difficulties, there are many advantages to research in Colombia. The natural resources have been little studied and with the introduction of new techniques, great strides can be made in a relatively short period of time. With the help of 9 Colombians who participated in the 3-week workshop in Medellin, it was possible to complete a research project as part of the workshop for some 15 Colombians (Gilmartin 1981b). Other portions of the research are published (Gilmartin 1981a) or are in manuscript form under review for publication in Colombia (Sanchez et al. 1983, Uribe 1983, Uribe et al. 1983, Carbone et al. 1983, Bastidas et al. 1983).

Education at all levels in Colombia appears to be much prized and the educators, regardless of sex, are highly respected. Among the 6 universities that I visited, a woman was the rector at one, at another the department chairperson was a woman, and at the Universidad de Antioquia in Medellin the two most obviously highly respected members of the large biology department were women. I could discern no sexual bias within any of the universities that I visited.

The University of Antioquia in Medellin where I spent a total of 5 weeks, is one of the largest of the Colombian Universities with a student body in excess of 20,000. The Biology Department provides the introductory curriculum for prospective doctors, veterinarians, agronomists, foresters, biology teachers and biological technicians. The Biology Department had screened the applicants for the short course that I gave and they had done an excellent job. The agronomist, Olga Salazar, is also the curator of the Herbarium at the southernmost Colombian University in Pasto and is an exceptionally well trained biologist. The plant ecologist, Nancy Bastidas, is on the faculty at the University de Valle and has an active forest research project in coastal Colombia that has been funded by the Colombian government. The parasitologist, Imelda Velez, received her undergraduate training in Germany and did her field work for her degree research in northern Colombia. Meriam Uribe completed her undergraduate research (a recent new requirement in Colombia) at the University of Antioquia. Other participants were equally well prepared.

From Medellin I traveled by bus to Quibdó in the lowland tropics, of western Colombia. The Technological University of the Choco at Quibdó was started about 7 years ago with the mandate to help provide for training the local people in science and engineering with the idea that they would in turn help to develop the province. Here, as in Medellin, I encountered tremendous enthusiasm and goodwill during my stay of 8 days.

The third University to be visited was in the north near the coast, in Monteria. The University of Cordoba has suffered a number of student strikes in recent years but seems to be surviving well with a new rector who is doing his best both to listen to the complaints of the students and to generate the funds to help respond to their needs.

The fourth University that I visited is near the Venezuelan border, The University of Pamplona. Here too, I found a very enthusiastic group of biologists and a sympathetic rector. On very limited funds and poor facilities, the University is managing to provide limited research support for agriculture and forestry.

Probably the most prestigious and best known Colombian University among North Americans is the University of Valle in Cali, Colombia. The physical plant here is good but I encountered more pessimism than in the other universities. This is partly a result of the greater opportunities for progress that the faculty members can perceive coupled with strict budgetary limitations.

In summary, although much effort was involved in obtaining and carrying out the Fulbright award program, I obtained a large sense of gratification both in terms of research accomplished and in terms of opportunities to meet with and work with Colombians. I gained some understanding of current research in Colombian Universities as well as a better understanding of the problems involved in carrying out research both by Colombians and by foreigners to the country.

#### References

- Anon. 1980. Application for 1980 - 1981 Fulbright-Hays Award Abroad. Council for International Exchange of Scholar. pp a-d. Suite 300 Eleven Dupont Circle, Washington, D.C. 20036.
- Bastidas, N., L. Londoño, V. Perez. 1983. Lista de atributos para la familia Piperaceae. Caldasia.
- Carbano, E. H. Olaya, H. Zapata. 1983. Lista de atributos para algunos generos de la familia Melastomataceae. Caldasia.
- Gilmartin, A. J. 1981a. Recent collections of Bromeliaceae from Colombia. *Brittonia* 33:254-256.
- \_\_\_\_\_. 1981b. Morphological variation within five angiosperm families: Asclepiadaceae, Bromeliaceae, Melastomataceae, Piperaceae, and Rubiaceae. *Syst. Bot.* 6:331-345.

- Sanchez, D., I. Velez, J. Santa. 1983. Familia Rosaceae. Caldasia.
- Uribe, F., J. Muñoz, J. Rivera. 1983. Lista de características, familia Ericaceae. Caldasia.
- Uribe, M., O. Benavides, H. Esquivel. 1983. Atributos para la familia Rubiaceae. Caldasia.

AQUACULTURAL TECHNOLOGY:  
A TOOL FOR WOMEN IN DEVELOPMENT

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ABSTRACT

In a subsistence farm economy, labor is usually divided between the sexes. Men and women employ different skills on different tasks, and a rough parity of labor is maintained. However, when a cash-oriented development project is introduced, parity often becomes disparity. Such projects are often biased toward what is perceived--by planners and local people--as "man's work." Thus, while the men acquire new skills and earn cash, the women are often relegated to non-cash income subsistence activities, now increased because the men are off working in the project. The result: women learn no new skills, are denied direct participation in the new cash economy, and must shoulder heavier work burdens. Obviously, planners must more carefully analyze the effects on women of development projects, ensuring that women, as well as men, benefit educationally, economically, and socially. One likely approach is to introduce to an area a technology new to the area, a technology unencumbered by local sex-role biases, and thus open to women. The potential of such an approach is well illustrated by the accidental introduction of aquaculture to the women of a rural village in Guatemala.

INTRODUCTION

A subsistence household economy is rather like a jeweler's balance: on one scale we metaphorically place family consumption; on the other, family production. The factors determining relative "weight" are family size, technology level, and land production conditions. When these are equal, we have, as Chayanov (1966) says, an "equilibrium." But any change in any one of these factors disturbs equilibrium. If equilibrium is to be restored, we will have to re-equalize "weight" by reallocating resources.

Labor is the subsistence farmer's primary resource, and farmers tend to adopt means to use labor more efficiently. One such means is division of labor between the sexes (Deere 1975). Here, males and

females specialize, employing different skills and tools to maintain the equilibrium between a subsistence farming family's food production and food consumption.

Obviously, economic development alters the household economy and thus its equilibrium. This sort of development generally increases a family's involvement in the cash economy. Consequently, some portion of family labor must shift to cash-generating activities. Yet, so long as family size is constant, food demand remains constant, and the amount of labor expended on food production likewise remains constant. Although it may seem that cash would substitute for labor to provide food for home consumption, this is not generally the case. Cash income is often accompanied by expectations of higher living standards. Thus, families spend cash for shoes, medicine, improved construction materials, or more luxurious food items.

Labor to meet the constant--often increasing--development-impelled demand is most often provided by women (Aventurin 1976). Usually, this means that the woman who had been working at optimum level (because the household was at equilibrium between labor and consumption) now becomes overworked. Indeed, some development projects have reportedly increased women's workdays to 16-18 hours (Hoskins 1979). The side effects are often unfortunate: poor health, poor nutrition for nursing infants, and often decreased staple crop production.

Because biases in development planning have often oriented projects toward men (Tinker 1976), it is the men who are taught new skills and technologies (Chaney and Schmink 1976). And, when cash-oriented projects are introduced, it is the men who bring in the cash; the women are relegated to non-cash income subsistence activities. Where before, when the household economy was equilibrated, men's work and women's work were at rough parity, now a disparity in earning power occurs (Boserup 1970).

The problems arising from this disparity and from the over-burdening of women can cancel the positive effects of a development program. Neglecting to analyze a program's impact on women may also cause serious errors that may well lead to the project's failure or, at the least, to its rejection. Clearly, the focus of development efforts must be redirected.

At least two approaches to program development would avoid these problems. First, local women ought to be asked how the efficiency of their ongoing activities might be improved; technologies directed toward that improvement could then be designed. Second, and conversely, a completely new technology might be introduced to women. Such a technology may well supersede traditional sex roles and could, therefore, eventually be adopted by either sex.

This paper addresses the second approach, using as an illustration the accidental introduction of a new technology--aquaculture. The means of introduction predicated that women would be the primary recipients of the new skills.

## CASE STUDY

### General Description of the Community

The community involved is located in the Guatemalan highlands. Due to the current civil war in Guatemala and the political nature of rural economic development in that country, names of specific people, places, languages and other indicators have been omitted. The population is predominantly Indian (95%), of Mayan descent. Although the majority of the population speaks Spanish, the national language, the preferred idiom, depending on locale, is one of 26 distinct Indian languages.

Agriculture is the primary economic activity, even though many cottage industries have developed in recent years. Both subsistence and cash crops are grown. Subsistence crops include corn, beans and squash and provide most of the diet. Cash crops, grown on land owned in excess of that necessary to support the family, include wheat, potatoes, strawberries, broccoli and other vegetables. Cash from the sale of these crops is used to purchase additional land, medicine, tools and other supplemental items. The primary agricultural emphasis, however, is the production of staple subsistence crops. Cash income is regarded as strictly supplemental to the family's subsistence activities.

### The Division of Labor Between Men and Women

There is an extremely pronounced division of labor between the sexes. Very generally, men are responsible for cultivating crops in fields located outside and away from the community, supplying firewood, cattle husbandry, and constructing and maintaining buildings. Women are primarily responsible for food processing, food preparation, weaving cloth for clothing, child-care, and small animal husbandry. This division of labor is not maintained by taboos, however. Wives usually assist in planting and harvesting, while single, divorced or widowed women cultivate their own fields.

The division of labor efficiently and practically achieves the primary goal of producing subsistence food. Women's work and men's work are seen as complementary; and hard work, regardless of sex or of the activity itself, is what gains respect. A woman who weaves beautiful clothing is as highly respected as a man who builds attractive houses; likewise, a woman who produces perfectly round identical tortillas is as esteemed as the man who hoes equidistant, symmetrical rows of corn. Respect generates power and decision-making authority. The traditional decision-making body in the community, the *cofradia*, is composed of separate male and female branches with equal authority. One woman and one man are elected each year to serve as caretakers for the town's saints. The positions entail equal respect and esteem.

Anthropologists and other outsiders have often failed to recognize this division of labor. Women in this community have been described as submissive, passive, traditional and, hence, resistant to change. This distortion is produced by problems of communication and subsequent

inferences arising from the biases of a different culture. Fewer women than men in the community speak Spanish, and women generally spend fewer years in school. Most of the men have adopted western-style dress, while the women continue to wear traditional clothing.

The inequality between men and women in the community stems from the men's involvement in and adoption of western cultural values forced upon them after conscription into the army. They learn Spanish and new skills and technologies, and learn that it is "a waste of time to educate women." Development programs have tended to perpetuate this bias.

### The Cooperative

In the 1960's, a group of local women organized into a weaving cooperative to improve and expand market outlets. Over the years, this organization has developed into an important economic element in the community, helping to convert a skill formerly used for subsistence into a means of generating income. Eventually, the cooperative expanded its scope of activities as specific needs arose. For example, members purchase agricultural supplies such as fertilizer and seeds in bulk; they have conducted minor experiments to test new varieties of cash crops. The cooperative also serves to channel outside donor funds into the community. The cooperative was developed, is composed of and directed solely by women. It was organized around weaving, strictly women's work, and control of the business has remained in women's hands.

### Introduction of Aquacultural Technology

The introduction of aquaculture technology to the cooperative grew out of my long relationship with its members. I spent 4 years living and working with the cooperative in all aspects of its operation. During this time, we attempted fish culture trials, without success. Neither the members of the cooperative nor I had experience in aquaculture at that time. After leaving the community, I entered graduate school in aquaculture, but maintained close ties with the community, returning several times each year. As I learned aquaculture techniques, I communicated them to the cooperative. On one such visit, I discovered that several members of the cooperative had dug fish ponds with machetes and hoes. A work plan was developed, and I instructed an informal training course on pond management. The members with ponds purchased fertilizer and traveled with me to a fish hatchery to obtain seed for stocking. The aquaculture project had begun.

On each subsequent visit to the community, I held additional informal training courses, teaching more advanced techniques to those interested in fish culture. However, the members of the cooperative were entirely responsible for feeding their fish and maintaining the ponds. Although a few people lost interest, a small group continued to work with the project.

### Development of Aquaculture in the Community

Fish culture techniques began to spread by word of mouth. Initially, only cooperative members were involved, but later, other members of the community constructed ponds and joined the group. The fish produced initially were consumed by the families of the weavers. In more recent years, a few women have begun to sell fish in the local market.

It is difficult to evaluate the impact of this project. It has grown slowly over the 6-year period from 3 ponds to approximately 50. In dollar income or pounds of protein produced, the benefits of this project are yet small, but it has continued for 6 years. Some women have been producing fish throughout this period. The prognosis: Aquacultural technology in the community seems to have a firm base that will permit it to grow, albeit slowly. Significantly, the technology has spread almost exclusively among women. Because the technology was introduced initially to a cooperative composed entirely of women, the division of labor within the community permitted the natural dissemination of the technology to other women. A few men have entered the field, but they turn to the women experts for advice.

This new technology, introduced first to women, has at least provided more protein for their families. It has potential to develop into a significant income-generating industry beneficial not only to the women, but to the community as a whole.

### Implications for Women in Future Development Projects

Several important implications arise from this small project that may be useful to women in development projects. Most important is the total involvement in and control of the project by the women in the cooperative. This ensures continuity and incentive for continuing the work. The organization of the women was also important. The cooperative provided a vehicle for rapid initiation of training programs, bulk purchase of fertilizers, and a mechanism for disseminating the technology. Cooperative meetings also provided a forum for sharing problems. Essentially, my role was to make the technology available. The initiative and effort of the local women carried the projects through. This combination has great potential, but the process must be based on the outsider responding to needs expressed by the people in the community.

Finally, another important factor is that the technology, although new to Guatemala and to most of Latin America, is a productive, income-generating activity. The technology must be feasible for an area, but it must also offer some incentive. The potential for generating income is an incentive that will contribute to the development of women and eventually the community.

## SUMMARY AND CONCLUSIONS

The cooperative's aquaculture activities illustrate an important principle, one to be considered carefully by development planners and potential development participants. Traditional sex roles and biases--both in planning and in project locations--that prevent women from participating in income-generating activities may be overcome by introducing activities without sex-role implications for the project location. Aquaculture may be one such activity--for Guatemala and for many other areas of the world.

## REFERENCES

- Aventurin, E. 1976. The division of labour and sexual inequality: The role of education. in *Women Workers and Society*. International Labour Office, Geneva.
- Boserup, E. 1970. *Women's role in economic development*. St. Martin's Press, New York.
- Boserup, E., and C. Liljencrantz. 1975. *Integration of women in development: Why, when, how*. U.N. Development Programme, New York.
- Boulding, E. 1976. Dualism and productivity: An examination of the economic roles of women in societies in transition. Conference on Economic Development and Income Distribution, Estes Park, Colorado.
- Chaney, E.M., and M. Schmink. 1976. Women and modernization: Access to tools. in *Sex and Class in Latin America*. June Nash, ed. and Helen I. Safa, Praeger Publishers, New York.
- Deere, C.D. 1975. The division of labor by sex in agriculture: peasant women's subsistence production on the minifundios. Ph.D. Research Essay, U. of Calif., Berkeley.
- Dixon, R.B. 1978. *Women's cooperatives and rural development: A policy proposal*. Resources for the Future, Inc. John Hopkins Press, Baltimore.
- Hoskins, M.W. 1979. *Women in forestry for local community development*. Grant No. AID/OTR-147-79-83, Office of Women in Development. Agency for International Development, Washington, D.C.
- Libeuf, A. 1974. The role of women in the political organization of African societies. in *Women of Tropical Africa*, D. Paulme, ed. U. of Calif., Berkeley.
- Tinker, I. 1976. The adverse impact of development on women. in *Women and World Development*, I. Tinker and M.B. Bramsen, eds. Overseas Development Council, Washington, D.C.
- U.N. Economic Commission for Africa. 1975. *Africa's food producers: The impact of change on rural women*. Women's Program Unit of the Human Resources Development Division. UNECA, Addis Ababa, Ethiopia.
- Van Allen, J. 1974. *Women in Africa: Modernization means more dependency*. Center Magazine. Center for the Study of Democratic Institutions, Santa Barbara, Calif.

## MINERAL DISORDERS IN RANGE LIVESTOCK IN MEXICO

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### ABSTRACT

Mineral deficiencies and imbalances are among major causes of animals' poor growth, low fertility, and increased death rates. Range livestock, depending entirely on nutrients supplied by available forage, are frequently affected by such disorders. Timely recognition of problems, followed by a corrective mineral supplementation program, usually results in an inexpensive but often dramatic increase of meat and other animal products from areas with previously reduced livestock production. Forage and cattle blood samples were collected from cattle ranches in the State of Veracruz during the first phase of a project designed to identify and correct major mineral imbalances in cattle in Mexico.

### INTRODUCTION

Human malnutrition remains one of the most pressing problems in developing countries. Following the green revolution, increased cereal production helped reduce human starvation in some parts of the world, but nutritional disorders such as protein, vitamin, and mineral deficiencies remain high on a list of problems. In some parts of Africa, Asia, and Latin America, per capita food production actually declined over the past two decades as a result of increasing human population. While severe human malnutrition is often found in individual cases even in affluent United States and European societies, the percentage of malnourished humans rises sharply in developing countries. Since pregnant and nursing mothers, and growing children, are usually affected most severely, the quality of future generations will be influenced most by such disorders. Increased susceptibility to infectious diseases, decreased learning capability, mental retardation, and a variety of organic and metabolic diseases are all known to result from such nutrient deprivation.

Mineral and vitamin deficient diets could be corrected by proper supplementation of relatively cheap synthetic supplements. The main obstacle to such efforts is lack of adequate knowledge and recognition of specific local deficiencies and imbalances necessary for proper formulation of supplemental additives.

Increased production of animal proteins is needed to relieve human protein malnutrition. In many developing countries, cereals are not available in sufficient amounts even for human nutrition, and thus are seldom used as livestock feed. Animal production depends almost entirely on utilization of resources which cannot be used as direct human food, such as fibrous crop residues, grass, straw, weeds, and a variety of range and forest plants. While grazing animals are uniquely adapted to convert such roughage to high quality animal products, severe malnutrition and nutrient imbalances severely limit such conversion. If properly recognized, nutrient deficiencies can often be easily corrected and animal production increased dramatically through inexpensive supplementation of missing nutrients. Increased animal production is often possible without a need for additional livestock feed just through better conversion and utilization of feeds presently consumed by undernourished livestock.

Correct diagnosis of local nutrient imbalances thus represents a single most important step in any effort aimed at increasing animal production from existing feed sources. In addition, such diagnosis often leads to recognition, and possible correction, of similar nutritional disorders in human populations inhabiting such areas.

#### MINERAL DEFICIENCIES AND TOXICITIES

Mineral imbalances, deficiencies, and toxicities are severely inhibiting livestock production of many countries. Nutritionally essential minerals include calcium, phosphorus, magnesium, sodium, chlorine, potassium, sulfur, iron, zinc, cobalt, copper, iodine, manganese, selenium, and molybdenum. In some areas, high concentrations of molybdenum, fluorine, selenium, manganese, and copper become toxic and also limit livestock production. Many factors affect mineral requirements and tolerances of grazing animals, including animal species and breed, age, growth rate, type of production, chemical form of elements and their interrelationship with other nutrients, feed intake, maturity, and lignification of forage.

Forage mineral concentrations are affected by soil type, plant species, stage of maturity, climate, pasture management, and yield. Most naturally occurring mineral deficiencies are associated with specific regions and are directly related to soil characteristics. The content of an element in soil would seem the most important. However, factors affecting availability of minerals, including pH, soil texture, moisture, and organic matter, are often more limiting than soil mineral content. As soil pH increases, the availability and uptake by plants of Fe, Mn, Zn, Cu, and Co decrease; whereas Mo and Se concentrations increase (Williams 1963, Miller et al. 1972, McDowell 1976).

Apparent signs of mineral disorders vary somewhat among different livestock species and localities, but all mineral imbalances result in severe inhibition of livestock production. Low reproductive rate, characterized by first calvings at 4 to 5 years of age, with additional calves only in alternate years, is the most important single factor limiting cattle production in developing countries. Under such conditions, a mature 10 year old cow will have produced only 3 or 4 calves, while a similar cow properly supplemented by deficient nutrients would have produced 8 calves. Slow animal growth, requiring 7 to 10 years rather than the usual 2½ to 3 years to produce animals of market weight of 400 kg, is also severely limiting production of meat. It is not surprising that, on the average, Latin America, with double the cattle numbers, produces only one-half as much beef as the United States (McDowell 1976).

Proper mineral supplementation of livestock feeds requires considerable "fine tuning" in respect to different minerals already present in the feed, but can be economically most rewarding (Underwood 1977). Most producers in tropical countries do not supplement livestock with minerals. Thus, livestock depend almost entirely on minerals supplied to them by the soil-plant chain. However, only rarely can forages completely satisfy each of the mineral requirements of grazing animals. High incidence of mineral deficiencies or toxicities in Latin America has been reported by McDowell (1976); the extent of mineral inadequacies is expected to increase greatly in the future as more Latin American countries undertake mineral research and improve their methods of detection. Such recognition of all nutritional disorders, followed by a properly prescribed supplementation program, should be an essential part of any management effort to increase the output of animal products from existing forages.

#### DETECTION OF MINERAL DISORDERS

Animal response to specific mineral supplementation is the most reliable method of confirming individual mineral deficiencies. Such studies, however, are often too costly and difficult to evaluate under crude field conditions. Thus, chemical analyses are often used to evaluate mineral insufficiencies. Analyses of soil samples can sometimes provide clues to livestock mineral deficiencies but often are difficult to interpret. Analyses of forage samples are preferable to soil analyses, but several disadvantages need to be considered. These include: 1) uncertainty of sample representing what livestock consume, 2) possible contamination of forage by the soil, 3) uncertain bioavailability of forage minerals to the animal. Analyses of animal tissues are considered to portray most accurately the contribution of the total environment (forage, water, soil contaminants, other supplements) in meeting livestock mineral requirements. Methods of chemical diagnosis of livestock mineral deficiencies are discussed in several recent reviews (N.C.M.N. 1973, Miller and Stake 1974, Egan 1975, Conrad 1976, McDowell 1976). Samples of animal tissue frequently collected for chemical evaluation include blood, blood plasma or serum, liver (obtained by liver biopsy), urine, saliva, milk, and bone (by biopsy).

A systematic approach to recognition and correction of mineral imbalances in grazing livestock includes a detailed mapping technique. Kubota et al. (1967) and Kubota (1968) analyzed cobalt and selenium levels of United States forage for the purpose of relating concentrations of these elements to cobalt

and selenium responsive diseases in livestock. Similar mapping techniques have been used in Brazil and Venezuela (McDowell 1976), using forage, blood serum, and liver analyses as the diagnostic parameters. A mapping technique, based on chemical analyses of livestock tissues, and on livestock response to mineral supplementation, was used recently in this project in Mexico.

#### MINERAL SUPPLEMENTATION OF GRAZING LIVESTOCK

To produce optimum animal response, mineral supplementation must be properly adjusted to complement other nutrients in the forage. Only well-balanced mineral supplementation will guarantee full utilization of available forage, and final economic effect (Egan 1975), while incorrect addition of minerals may substantially aggravate deficiency symptoms.

Indirect methods of providing minerals to grazing livestock include use of fertilizers containing deficient minerals, altering soil pH to increase mineral absorption by plants, and encouraging growth of specific forage species. The most economical methods of supplementation include direct administration of minerals to livestock in mineral licks, drinking water, injections, drenches, and heavy pellets. In the United States, beef cattle can be supplied with iodine, copper, iron, cobalt, zinc, and manganese for less than 25 cents per year per animal (McDowell 1976). The benefit derived from such a small investment is obvious on a global basis.

#### MINERAL DISORDERS IN LIVESTOCK IN MEXICO

Serious mineral deficiencies in livestock were reported from various parts of Mexico (McDowell and Conrad 1977, Fick et al. 1978), but systematic efforts to identify major problem areas, and to formulate corrective supplementation, were not undertaken. In the summer and fall of 1981, I had an opportunity to lead a team of professionals from the Department of Animal Science, Autonomous University at Chapingo, Mexico, during a first phase of a project designed to identify, evaluate, and eventually to correct mineral imbalances in livestock. Visual observations of livestock in several states revealed that a number of potential nutritional disorders may be responsible for low livestock production in parts of Mexico. In addition, visual evaluation of meat and other animal products sold at local markets also indicated that such deficiencies probably exist.

The project was designed to identify major mineral disorders, to map in detail all affected areas, and to formulate supplementation programs. The work was started in the State of Veracruz, where livestock production, number of animals, and potential benefits from supplementation are largest. Samples of forage, and cattle blood samples, collected on ranches near Martinez, are at present being analyzed for contents of essential minerals. In addition, liver and bone samples will be taken from these cattle in the summer of 1982 by a biopsy technique to obtain more complete information on seasonal variation. Additional ranches will be sampled through the summer of 1982 to represent main livestock producing areas of Veracruz State.

The results of chemical analyses will be evaluated, areas affected by mineral imbalances mapped, and corrective mineral supplementations prescribed. Information obtained from this project will benefit all livestock producers in mineral-deficient areas. Increased livestock production, resulting from mineral supplementation, is also likely to stimulate interest in mineral disorders and their possible correction in other parts of Mexico.

## LITERATURE CITED

- Egan, A.R. 1975. The diagnosis of trace element deficiencies in the grazing ruminant. In: Trace Elements in Soil-Plant-Animal Systems. D.J.D. Nicholas and A.R. Egan, eds. p. 371. Academic Press, New York.
- Fick, K.R., L.R. McDowell, and R.H. Houser. 1978. Current status of mineral research in Latin America. In: Latin American Symposium on Mineral Nutrition Research with Grazing Ruminants. J.H. Conrad and L.R. McDowell eds. pp. 149-162. University of Florida, Gainesville.
- McDowell, R.L. 1976. Mineral deficiencies and toxicities and their effect on beef production in developing countries. In: Beef Cattle Production in Developing Countries. A.J. Smith, ed. pp. 216-241. University of Edinburgh.
- McDowell, R.L. and J.H. Conrad. 1977. Trace mineral nutrition in Latin America. World Animal Review 24:24.
- Miller, W.J., J.W. Lassiter, and J.B. Jones. 1972. Problems in the use of mineral values for feed formulation. Proc. Georgia Nutr. Conf. Feed Ind. p. 94.
- Miller, W.J. and P.E. Stake. 1974. Uses and limitations of biochemical measurements in diagnosing mineral deficiencies. Proc. Georgia Nutr. Conf. Feed Ind. p. 25.
- N.C.M.N. 1973. Tracing and treating mineral disorders in dairy cattle. Netherlands Committee on Mineral Nutrition, Centre for Ag. Pub. and Documentation, Wageningen.
- Underwood, E.J. 1977. In: Trace Elements in Human and Animal Nutrition. 4th ed. Academic Press, New York.
- Williams, R.D. 1963. Minor elements and their effects on the growth and chemical composition of herbage plants. Mimeo. No. 1. Commonw. Bur. Past. Fld. Crops, Hurley.

DEALING WITH MASCULINE/FEMININE  
GENDER LABELS IN NATURAL RESOURCE PROFESSIONS

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ABSTRACT

To decipher the "secret" codes in professional communication, one must understand the masculine/feminine gender labels attached to certain thought and behavior. In natural resource professions and agencies (like the U.S. or New Zealand Forest Service), masculine labels are traditionally associated with high status, respect and power. Timber management (for example) is historically dominated by masculine images, and of higher status and power than landscape, outdoor recreation, or "dickey-bird" management. Timber management is generally perceived as founded on hard-science; it is justified by economic worth, creates jobs, and is the income "bread-winner" in the U.S. or N.Z. Forest Service. Recreation and landscape management is traditionally perceived as feminine: supported by little science (except some soft social science), largely personal and emotional based, and does not have easily associated economic worth. Although traditionally feminine-labeled attitudes and behavior are gaining more acceptance in natural resource professions, those masculine still dominate. Understanding this gender labeling process is essential to becoming an effective professional in one's own or in foreign natural resource professions.

INTRODUCTION

Natural resource management in North America and the western world has been a male profession dominated by traditional masculine gender attitudes, assumptions, and role models. Young initiates to the professions of forestry, wildlife or range management must be successful in educational rites of passage that select people for attributes identified as masculine in western society (viz., the hard, macho-sciences of math, chemistry, economics), more than for academic abilities in history, literature, or feelings toward the resources to be managed. Toughness in physical and intellectual matters is highly esteemed. Discussion of feelings about terminating plant and animal life in the line of duty or personal/professional uncertainties are rarely encouraged or tolerated. Feelings are not an above-board,

legitimate part of professional decision-making norms. Feelings, we are told, pervert objectivity and are suspect. A good professional focuses on techniques of manipulating the external environment while controlling self. The toughness and logical consistency of hard-science, economics, and professional tradition become the dominant management guide and behavioral norm.

In the last decade women and attitudes/values associated (in the western world) with feminine gender have become established in North America and European natural management. But males and traditional masculine gender values still dominate resource management professions and agencies (like the U.S. Forest Service) in much of the western world and other nations. Women and men who try to influence their own and foreign natural resource management cultures, should be sensitive to the gender biases of these societies and their natural resource management professions.

In this paper I would like to: 1) identify masculine/feminine gender labeling in natural resource management, 2) present some personal and general examples of how feminine gender labeling of professional attitudes and behavior are associated with low status, and 3) close with a plea for women professionals to guard against assuming it's their sexual personhood that's under attack when male peers reject some of their feminine-gender attitudes about the land or their clients. If one tends to take criticism of their professional ideas as rejection of the sexual, ethnic, religions, etc. aspects of their personhood, alienation is often the reward. Learning to accept criticism less personally is a difficult lesson for men or women, but must be learned if individuals and groups of professionals are to mature as healthy, productive people.

Let's turn now to examples of masculine/feminine gender labeling in natural resource management.

#### MASCULINE/FEMININE POLARITIES IN NATURAL RESOURCE MANAGEMENT

In western society both male/female sexuality and masculine/feminine gender poles are losing their rigid distinctiveness. A couple of generations ago sexual distinctions based on hair-length, dress, use of perfumes, or occupational roles made it easier to identify men and women than today. With glandular engineering, it's now possible to convert from male to female. But that's sexuality. This paper addresses gender differences.

Like once clear sexuality distinctions, gender polarities are also becoming less rigid. Recognizing the following masculine/feminine gender polarities as evolving generalities of western cultures (Sargent 1980), let's define them as:

<u>Feminine Gender Pole</u>	<u>Masculine Gender Pole</u>
1. Physical softness, gentleness.	1. Physical toughness.
2. Emotional sensitivity with reliance on intuition and feelings.	2. Mental and intellectual toughness, with objective

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|---|---|
|   | rationality highly esteemed;<br>feelings are suspect in<br>professional matters.                          |
| 3. Sensitive to and desire for<br>mutual supportive relationships;<br>socially sensitive and<br>responsive. | 3. Desire for power, domination;<br>more selfish and insensitive<br>to other's needs and<br>dependencies. |
| 4. Best suited for soft sciences and<br>liberal arts.   | 4. Best suited for hard science,<br>business management, law,<br>etc.                                     |

These gender attributes deal not only with human traits that label one feminine or masculine. They operate to label masculine/feminineness of direction, our physical/natural environment, colors, or professional management beliefs and styles.

Is there any question whether the masculine pole be placed to the right or left column in the above table? Our right hand is associated with rational control, order and status (viz., is masculine). Left hand is mysterious, mystical, suspect and often labelled feminine. Sun and moon, cat and wolf are genderized. Nature is mother--a source of goodness to be taken (and often whimsically withheld by "the forces of nature.") Nature (e.g., virgin forests) are often seen as raw material to manipulate, manage (control) and prove oneself (Dinnerstein 1976, Gray 1979, Griffin 1978). The traditional (masculine) forester role model was achieved by having our rational intellectual prowess (our will) dominate our emotions and other weaker aspects of our "human nature." By strength of will power over physical and emotional weakness, we were to master/ control ourselves, our logger and recreational clients, and the land around us. Dominance and control (not mutuality, support and relationship) are the traditionally respected thought and management styles.

The above observations are general illustrations and examples, based on personal experience; they are not well supported or rejected by research. We've just begun to think about these gender concepts and have yet to establish their empirical validity. Thus many of my observations here are personal and intuitive (i.e., feminine and thus suspect). This is especially true of the next section.

#### THE GENDER EDUCATION OF A JUNIOR FORESTER--ROGUE RIVER NATIONAL FOREST (1961-64)

Much confusion and pain in my early career resulted from naivete of the gender/status attributes of professional attitudes and roles in forestry and the U.S. Forest Service (USFS). Learning to identify and cope with gender/status labeling was a major part of my informal education during the first 5 years out in the "real world."

I joined the USFS in southern Oregon in 1961 in the good ol' days: when men were men and multiple use was timber management with some bother-

some recreation and watershed constraints. High status/masculine roles were in timber sale layout/administration and in fire control. Hunting, drinking and poker were the high status/masculine extracurricular activities.

As a relatively intelligent, enthusiastic, hard-working professional and single-male, I was successful in both professional and off-job roles. The first two years in the USFS, I was triple-A rated and identified as a "comer" in the outfit (a label rich in symbolic masculine imagery). Successful and content, my education about feminine gender labeling in the USFS and forestry profession was yet to start. But then I became involved in outdoor recreation and my life became more complex and conflicting. I no longer comfortably "fit in" with my agency and my profession.

The shock of this career transition occurred the first morning I switched into recreation. Waiting to pull onto the Crater Lake highway on recreation patrol, a senior forester in my peer group opened the ranger station window and waved a secretary's white handkerchief bye-bye at me. In a sing-song, female voice he called, "Have a nice day in the forest, Jimmy. Take care of those California tourists and bird watchers." As I hit second gear, trying to escape this biting humor, the final words were, "...and don't forget to wash the potatoe salad off the picnic tables before you come home." Driving up the highway with a hot neck, a realization slammed me in the stomach that I had suddenly and unexpectedly entered another dimension of professional reality. Things were no longer to be the same at the ranger station.

Involved in recreation on a timber district in 1963, I found myself increasingly at cross-purposes with peers that I had formally little with which to disagree. I challenged their attitudes and behavior toward recreational resources, landscape values, and recreation visitors. They judged my dealings with logger and recreational clients as too soft or "theory Y" (McGregor 1960). Newly married, I discovered other relationships more rewarding than hunting and drinking with the boys. My peers wondered what had become of me. At times, I wondered also.

I fit into the USFS and my profession less and less. I was becoming alienated from an organization and a forester image in which I was once secure and successful. So I retreated back to a comfortable place to regroup; I took a year's leave of absence and returned to school to pursue a master's degree. To my surprise, I was successful in graduate school and never left.

If I were a woman, I would have attributed much alienation with the USFS and my forestry profession as sexual harassment. Much conflict I experienced internally (as my traditional forester images clashed within the evolving me) and much conflict I experienced externally (with professional peers) had masculine/feminine connotations. But the self and peer harassment was of the gender-type, not sexual.

## ON BEING A SENSITIVE ALIEN IN "FOREIGN" CULTURES

Since my early days in the forester and USFS culture, I've learned to approach new professional groups as an alien. Upon entering these groups, I remind myself of my naivete to their cultural and communication systems. I realize they are foreign to me, be they the U.S., New Zealand, or Zambian Forest Service. Thus, these agencies are approached softly, with all my antennae out--probing, searching, learning.

If one fails to realize one is an alien in entering natural resource agencies, it's easy to become alienated by them. If one doesn't approach these groups as a sensitive student, willing and able to learn their ways of viewing and responding to the world, it's easy to become alienated by their "strange ways." And it's easy to assume it is us as persons being rejected, rather than our ideas or ineptitude in deciphering their cultural codes and communication systems.

This is quite a revelation for a technically educated forester. I was trained to be aware of the variety and complexities of natural ecosystems, but allowed to remain naive and simplistic about human social systems. I once thought fact and logic ruled professional lives. I did not realize how potent was our cultural imagery--both general culture and professional subcultural imagery. Understanding/appreciating feminine imagery is an important part of being effective in the U.S., New Zealand, or Zambian Forest Service.

Regardless of one's sex, trying to promote outdoor recreation, landscape management, or concern for songbirds to American or New Zealand foresters will be met with judgements that your concerns are feminine gender associated. For recreation, landscape and songbird management are often perceived as:

- 1) heavily emotional-based;
- 2) lacking in hard science and economic value support;
- 3) likely to threaten manager control;
- 4) and deal with fringe, luxury, fun-and-game aspects of resource management.

Your "feminine" management concerns will consciously or subconsciously be compared with timber management or fire control. They are traditional and masculine:

- 1) they're based on hard science and data;
- 2) their outputs have explicit, measurable dollar value, generated by competitive market system;
- 3) tough management decisions, (like killing trees) are required--best done with masculine fiber and suppressed emotions.

Consider some other examples of feminine labeling in resource management tribes.

Why is it that staff positions traditionally have less prestige than line positions? Which is more feminine, line or staff? Staff positions are supportive and nurturitive of line (masculine) roles. Line officers, in the traditional John Wayne style, were active, assertive and control-power oriented. This stereotype is becoming less valid with changes in respected management styles (Sargent 1980) and as the post-NEPA planning era increased dependency on staff support in agencies like the U.S. Forest Service (Cermak 1979). Fire bosses, district rangers and forest supervisors are more and more dependent on sophisticated staff support. But line officers are still generally the high prestige positions in resources agencies worldwide. If one is a woman staff person, one's position alone generally has feminine gender and lower status.

Listen to many laments about public involvement in resource issues and identify the feminine labels. Professionals often lose control with public involvement. People at hearings get too emotional. In a public involvement world, managers must build trust and supportive relationships with the public. It's not like the good ol' (masculine) days when the District Ranger was captain of the ship.

If one fails to realize this uniqueness of professional groups in North America or the world, it's easy for misunderstanding and alienation to grow. So it is critical for aliens to locate "native guides" when trying to understand and become integrated into "foreign" cultures like the U.S. or N.Z. Forest Service. They help translate and guide one through new, strange professional groups in one's own or in foreign countries. And these "native guides" can become mentors.

#### MENTORS AND KINDRED SPIRITS

Studies of successful men (Levinson et al. 1978, Schein 1978, Vaillant 1977) and women (Henning and Jardim 1977) all identify a mentor relationship as critical to good, successful personal career development. Mentors can play several roles in the development of young professionals: teacher, host/guide, role model, counselor, booster, and/or supervisor. It's the exception to find men or women who have evolved into healthy, productive professionals without having experienced a mentor relationship (Dalton, Thompson and Price 1977, Levinson et al. 1978).

To be a good mentor, one must have wisdom to offer a younger person and the desire to be nurturing/supportive. Being a mentor is largely a feminine gender role, and not surprisingly men are rarely ready to fill that role until after successful mid-life transitions at age 40 or so (Levinson et al. 1978). Inexperienced, technically-oriented, success-focused, insecure, self-oriented young adults rarely are ready or willing to be mentors. Old, alienated, self-centered professionals don't make good mentors, either. Mentors must have something to give and want to share it with others.

If you are a young man or woman professional, search for, find and cultivate mentor relationships. Mentors are critical in being guides and interpreters for young professionals understanding and adapting to "foreign" organizational cultures. And young people must recognize that they are entering unknown "foreign cultures" when joining the USFS, the Utah Division of Wildlife Resources, Weyerhaeuser Company, the New Zealand Forest Service, or the Irish Department of Forestry and Wildlife. It's difficult to make technical/professional contributions in your own or foreign societies if you are naive or insensitive to the secret codes and symbols, the power hierarchy, or the heritage/traditions of groups like the U.S. or N.Z. Forest Service. Guides and interpreters are needed support in these "foreign" cultures; they help one "learn the ropes," feel less alien (and become less alienated).

It may be more difficult for women to find mentors in male dominated natural resource management professionals and agencies. But the personal/professional payoff is too high to not make the effort. There are men in their 40's and 50's that are ready and able to help. Endure the disappointments, frustration and effort required to find them. You, them, your profession and agencies (as well as the resource) will probably benefit from this effort. This is true of your own and other nations.

Now I've focused on mentor support relationships and slighted peer support. Kindred-spirits in one's peer group are a critical source of idea and ideals support. But young peers are often naive to the pace of change and how to successfully instigate it in an organization. One needs both peer and mentor support to develop and be effective in organizational cultures--in your native and in foreign cultures.

#### SOME CLOSING COMMENTS

To be effective in any profession, organization, or nation, one must understand the culture (i.e., understand the language and symbols, the power structure, the technology, the right-behavior). Part of this cultural education is an appreciation of the status and gender labels attached professional ideas, roles and management styles--and to understand how these professional attitudes and behavior are changing (Kennedy 1981).

Guides/translators are essential in helping newcomers quickly understand, adapt to, and become effective in new cultures. Mentors and sympathetic peers can fill such roles in professional life. Building such support relationships in your own and foreign cultures is well worth the time and effort.

For better or worse, women resource managers will probably have to settle for male mentors in the near future. Recognize that most men aren't ready to mentor young men or women until their mid-career years. At this stage of their lives men tend to be more at peace with their and other's feminine attitudes or behavior; and more comfortable with the feminine-support role of being a mentor. At least western men studied seem to

evolve that way (Levinson et al. 1978, Vaillant 1977). Women may experience similar and different stages in their professional career development (Gilligan 1979, Henning and Jardim 1977).

Male sex and masculine gender are dominant in North American and world natural resource professions. So female sex has designated women minority in these professions as change agents. If women professionals are of a staff specialty labeled feminine, believe in resource values and interpersonal management styles similarly labeled feminine, their change agent role is further enlarged. To resist the invitations of alienation associated with such an oft-burdensome change-agent role, one should seek out professional kindred spirits. Many of these support people will be male and cannot share a women's female sexuality. But many male professionals have shared rejection of their ideas and actions associated with the feminine gender. Men and women can support one another as you collaborate to be change agents in your own and other professional societies (Sargent 1980). And I think you, your support group and the land will be the better for it.

#### REFERENCES

- Cermak, R. W. 1979. "Staff, Staff Work and Staff/Line Relations." *Management Notes* 23(2):1-9. Administrative Management Staff, U.S. Forest Service, Washington D.C.
- Dalton, G. W., P. H. Thompson and R. L. Price. 1977. "The Four Stages of Professional Careers." *Organizational Dynamics* 6(1):19-42.
- Dinnerstein, D. 1976. *The Mermaid and the Minotaur*, New York: Harper and Row.
- Gilligan, C. 1979. "Woman's Place in Man's Life Cycle." *Harvard Educational Review* 49(4):431-46.
- Gray, E. D. 1979. *Why the Green Nigger*, Wellesley, Massachusetts: Roundtable Press.
- Griffin, S. 1978. *Woman and Nature*, New York: Harper and Row.
- Henning, M. and A. Jardim. 1977. *The Managerial Woman*, New York: Anchor Press/Doubleday.
- Kennedy, J. J. 1981. "A View of New Zealand Forestry in 'Mid-Life' Transition." *NZ Journal of Forestry* 26(1):43-54.
- Levinson, D. J. et al. 1978. *The Seasons of a Man's Life*, New York: Ballantine Books.
- McGregor, D. 1960. *The Human Side of Enterprise* New York: McGraw Hill.
- Sargent, A. G. 1980. "The Best of both Sexes." *Management* 1(2):20-23.
- Schein, E. 1978. *Career Dynamics: Matching Individual and Organizational Needs*, Reading, Massachusetts: Addison-Wesley.

Vaillant, G. E. 1977. *Adaptations to Life*, Boston: Little, Brown and Co.

WOMEN AND FOREST RESOURCES:  
A THEORETICAL PERSPECTIVE

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ABSTRACT

Examining women's complex interactions with forest resources allows us to re-examine theories of human resource use and design more effective and equitable resource development strategies. An integrated eco-systems model of forest use, which considers the behaviors, values, and knowledge of women and men as part of a dynamic, interacting process, can be used to examine change in forest use, such as changes in fuelwood gathering in response to scarcity. Incorporation of female values and strategies for change increase the likelihood of successful projects. Additionally, the model suggests implications for further research and development, such as how women forestry professionals can be effective in working with host country women.

INTRODUCTION

An examination of women's complex interactions with forest resources, or other natural resources, offers us a means of re-examining theories and interpretations of human resource use, as well as designing more equitable and effective resource development strategies. By focusing specifically on women, we can delineate interactions and interdependencies which exist in human ecosystems, but which have been commonly neglected by Western resource managers. In this paper I will focus on presenting a systems model of human-environment interactions, moving from consideration of global level interactions down to more micro levels, focusing on women's use of firewood. The discussion will emphasize the behaviors, values, and knowledge of women. As indicated in Figure 1, we have commonly examined the male perspective of human-environment interactions. Until we understand the female perspective, we do not know the extent to which, for any given ecological and cultural context, the female and male systems will overlap and interact. This systems approach points to the need for further research and suggests implications for forestry development strategies, including the relationships between women professionals and host country women.

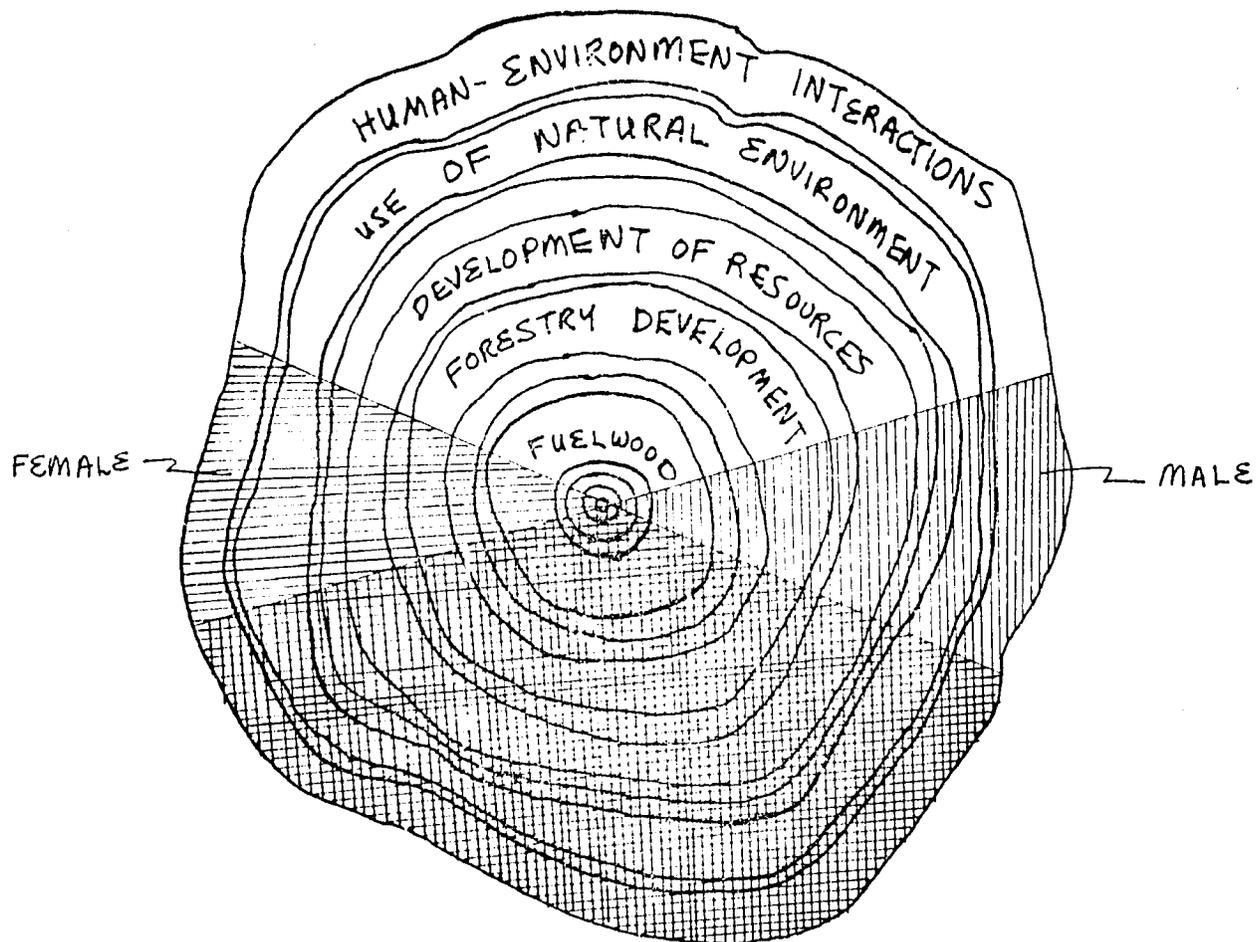


Figure 1. Systems of human - environment interactions showing female and male behaviors, values, and knowledge

## Overview: The Emergence of Social Forestry and the Role of Women in Forest Resources Use

Traditional Western resource management has ignored women. Gender differentiation in Western cultures has affected not only the division of labor, but also the division of resources and the division of space. The out-of-doors in general, and the management of natural resources in particular, has been a male domain of behavior and responsibility (Peterson et al. 1978). Forestry is imbued with masculine values and a masculine ethos (Williams 1978a). In addition, until quite recently forestry has been primarily concerned with the management of forest resources, i.e., trees and wildlife, rather than with the social impacts of such activities.

The traditional view has been challenged by changing social trends and conditions. First, women's roles in Western cultures have been undergoing change. More women now work outside the home. Women have been increasingly entering natural resource occupations, as professional foresters and natural resource managers. In addition, their general use of the natural environment, as in outdoor recreation, has been increasing. Some women have taken on responsibility for the natural world as well, through their efforts in the environmental movement (Merchant 1981).

Second, new scholarship regarding women's roles in non-Western cultures has recently challenged traditional views of women's interactions with their natural environment. Cross-cultural research regarding women and the impact of development on women has demonstrated how gender has influenced use of natural resources and the natural environment, and how this influence varies across culture, time, and ecological space. It is clearly evident that, throughout human history, women have been involved in using forest resources in numerous ways--for subsistence needs such as food, shelter, and fuel, for leisure and recreation, for medicinal, religious, and aesthetic purposes. As users of forests, women are knowledgeable about forest resources and active in manipulating those resources for their own needs and wants (Mason 1976, Hoskins 1979, Scott 1980, Jacobs 1981b).

Third, international development efforts in forestry have undergone a shift from traditional timber-oriented forestry to community-oriented "social forestry" (FAO 1978a,b, Noronha 1980, 1981, Hoskins 1979). This is part of a larger trend in the international development arena, where the focus on economic development (e.g., gross national product (GNP)), has been replaced by development to deal with poverty and provide basic survival needs. Some development has gone beyond poverty issues defined in terms of physical survival to examine development with social equity--in other words, development from the bottom up, empowering people to develop themselves and gain more control over their own lives. For forestry development, this necessitates consideration of how local residents, both female and male, utilize and interact with their forests.

All of these trends point to a need for research on women's interactions with forests. Not only do we need to document and understand women's behavior with resources, but we also need to reformulate questions and approaches to human resource use. Theories of human behavior which have,

either explicitly or implicitly, ignored half the human race, need to be critically re-examined (Elliot 1977, Papanek 1977, Jacobs 1981b, Smith 1979).

## THEORETICAL AND APPLIED DEVELOPMENT STRATEGIES

### Interrelationships of Theory and Development Strategies

All development is based on theory or assumptions regarding human behavior. In many cases the development strategy is empirically oriented, with the underlying assumptions well hidden. It is important, however, for researchers and development planners to make their assumptions and theories explicit. As any student of elementary logic knows, these assumptions will shape the definition of the problem, and hence the possible solutions. If, for example, we define a problem as being one of a "fuelwood shortage" then certain solutions come to mind--plant more trees and conserve on wood use. If, however, the problem is one of an "energy shortage," we may think of energy alternatives to wood fuel.

If the problem is defined as coping with population pressures that exacerbate resource shortages, then other options such as family planning or strategies to provide alternatives to child rearing come to mind. To improve the lives of women in developing countries, women need to develop themselves, through integrated development strategies which will help ease their fuel carrying burdens, meet their energy needs, increase their opportunities for improving their lives, and expand their options beyond childrearing.

There is a very important need for researchers, local development planners, and local participants to work together on development projects. They need to work together from the beginning, in creating locally-appropriate images and strategies for change. As they go along, it is important to monitor and evaluate the project, so that improvements can be made in progress and better projects designed in the future (Lowdermilk and Laitos 1981).

### Historical Overview of Development: Theory and Objectives

Development patterns and objectives. To begin the analysis, we must ask what are the development objectives and how "development" is defined. As Pala (1977) has argued, "One may well ask, 'Integrating women into what development?'" Development objectives vary with both definitions of development and theoretical and applied perspectives. These varying perspectives imply different development objectives for women and forestry development.

Development is generally perceived to be a process of social change--modernization--resulting in greater social complexity. Economic aspects of development include transformation of subsistence economies to market economies, increasing specialization of labor, and increased standards of living (generally measured in per capita incomes). Other sociocultural changes are involved in development, such as rural-to-urban migration, increased literacy, and so forth. While many have tried to model development processes upon historical patterns in the already industrialized countries, others recognize that current development may follow different paths (Rogers 1976).

Researchers disagree about the extent to which development involves changes in the prevailing social structure and distribution of power. With respect to social forestry development programs, Noronha (1980) argues that, "To suggest, however, that a project designer must look to the equities of a proposed project is not to suggest, as Eckholm appears to suggest, that project designers should aim at changes in social stratification...to remold these (socio-political) forces...is, in any event, a long-term process, outside the boundaries of projects, and within the peculiar competence of sovereign nations."

Many development specialists disagree; they interpret development to include "reduction of inequalities...(in) the distribution of economic and social resources" (Dixon 1978). At a recent conference on the sexual division of labor, development, and women's status, researchers agreed that

Development cannot be defined in purely economic terms; it also has important political, social, and ideological features. Moreover, development interpreted broadly implies an expansion of choices, more equitable access to the resources which make life with dignity possible, and greater participation for all peoples (independently of gender, ethnicity, or race) in the decision-making processes that affect them. (Kelly 1981)

However, as development has generally been defined, and particular development projects designed, it has not necessarily involved greater participation or more equitable access to resources: often development has resulted in greater inequalities. Boserup (1970) pointed out over a decade ago in Women in Economic Development that women's position, both absolutely and relative to that of men, has in many areas worsened with development. As Boserup noted:

Economic and social development unavoidably entails the disintegration of the division of labor amount the two sexes traditionally established in the village. With modernization of agriculture and with migration to the towns, a new sex pattern of productive work must emerge, for better or for worse.

Boserup's work has stimulated both researchers and international development planners to consider how development processes have affected women as well as men. Although women are important targets of family planning programs, only recently have they been acknowledged to be social actors involved in other areas of social change. However, given their differential life experiences and differential access to resources, women may experience different impacts from development programs than men.

In many developing countries, ongoing processes of social change accelerated with European colonization. Numerous social, political and material changes occurred which affected the relative status of women and men in a given culture. For example, the replacement of communal tribal property with private property rights assigned to the "male head of the household" deprived women of their customary rights in using land. Not owning legal title to land, they were ineligible for credit. Extension programs were commonly geared to men, teaching men how to use machinery such as tractors. Education and literacy programs were stressed more for boys than for girls. These and

other changes helped to move men into the modernized sector, while the women remained behind in the subsistence sector (Boserup 1970, Boulding 1977, Tinker 1976, Pala 1980, Newman 1981). In urban areas, as well as international tourist resort areas, one particularly invidious role that women have filled is that of prostitution. The need for women to turn to prostitution due to lack of alternative employment constitutes, in the case of tourism, a double exploitation--by nationality as well as by gender (Seidman 1981).

Development strategies thus have been undergoing changes, from their earlier emphasis on economic development, in terms of first, industrial development and second, poverty and survival needs, to an emphasis on social development, stressing equity issues. The equity concerns have emerged out of failure of past development efforts to deal with poverty issues (Rogers 1976).

Forestry development. The world forestry community seems to be following the same stages of development that have been adopted in other development projects. First, there was interest in forestry development as a means of economic development, improving a country's gross national product, with an emphasis on timber logging operations--an "extractive exploitation" mode of forestry (World Bank 1978). More recently, forestry development has focused on two larger concerns--preventing ecological degradation and meeting basic survival needs. These issues are part of the general development emphasis on integrated development to eliminate poverty.

This newer approach, variously termed "social forestry" or "community-oriented" forestry, has emphasized forestry to maintain people's ecological base to sustain a flow of material resources to meet their survival needs and to provide a basis for further development. Some forestry development experts have also begun to address the issue of development with equity. To begin with, if one wants forestry to meet social needs, it is important to understand the social impacts of development. Are, for example, forestry development projects having the same impacts on women as on men? If not, should the project be redesigned to become more equitable?

Women and development. The issue of "integrating women into development" has been very important in the last decade. Numerous studies have documented how the position of women, both absolutely and relative to that of men, has deteriorated with development. Consequently there has been concern with correcting this phenomenon by integrating women into development projects.

Some researchers, however, suggest that this may perhaps not be a desirable goal. The women, of course, have been there all along, affected by development projects either negatively or positively. Perhaps instead, as Papanek (1977) suggests, we need to ask why they have been overlooked and excluded from the development planning and implementation process?

Other researchers, such as Boulding (1981) suggest that perhaps we need to ask the women what they want, rather than trying to fit them into projects designed by men or well-intending First World women development planners. Development planners then can help local women achieve what they desire.

## Forestry Development Objectives

If we accept the premise that forestry development may change the traditional behavior of women and men, what should the objective of social forestry programs be? There seem to be two objectives for considering women in forestry programs. First given the traditional work and knowledge of women, it may be necessary to incorporate women if the project is to succeed. As Hoskins (1979) has argued, if in a given culture work is socially organized such that women weed and water plants, they need to be considered in tree planting schemes. If the men agree to plant the trees, but the women do not agree to take care of them, the trees will die. Furthermore, women may be very knowledgeable regarding the local environment and the social and ecological tradeoffs of various tree species which could be planted. Thus for effective forestry development, it is important to include all the social actors involved, both female and male, to maximize participation and utilize to the fullest extent the range of behavioral strategies available.

Second is the concern with social equity. Although we should not assume that women's status is lower than men's in all cultures, we need to be sensitive to how countless development projects have worsened women's status in comparison to that of men. Therefore, we want to make sure, at the very least, that forestry projects do not reduce women's status relative to that of men; preferably, of course, projects should try to improve women's status, so that the disparity between women and men is narrowed. This is important for numerous objectives of development, but most especially for reducing population growth rates which exacerbates fuelwood shortages.

In discussing strategies for improving the status of women I am adopting Dixon's (1978) usage:

The status of women...is defined here as the degree of women's access to (and control over) material resources (including food, income, land, and other forms of wealth) and to social resources (including knowledge, power, and prestige) within the family, in the community, and in the society at large. It is measured de facto rather than de jure, both in absolute terms and relative to men....

It would appear that there is no way to arrive at a culture-free definition of status, particularly one which reflects its many dimensions. For simplicity, then, this report seeks to examine the extent to which women can transform material and social resources (from any sources) into a particular type of behavior--the ability to shape major decisions about their own lives in a relatively autonomous manner. Note, however, that I am not referring here to control over others, but rather, control over oneself.

Dixon (1978) hypothesized that as women's access to and control over alternative resources increase, they will have alternatives to rearing more children. This change could have important ramifications for forestry development, as smaller families presumably would utilize less fuelwood for cooking and heating.

In addition, however, we must accept the ethical principle that, as individuals women have equal rights to development benefits. Women should have, as Dixon (1978) argues, the same rights as men to determine the shape of their own lives. This right has been recognized and endorsed in a number of international conferences, including the 1975 International Women's Conference in Mexico City and the 1979 World Conference on Agrarian Reform and Rural Development. The latter explicitly states as a principle for action that: "women should participate and contribute on an equal basis with men in the social, economic and political process of rural development and share fully in improved conditions of life in rural areas" (FAO 1979). While we must concede that no individuals are truly independent of others, women in many cultures have had a more narrow range of life choices than have men.

### Forestry Development Strategies

Effective development. If we wish to maximize the effectiveness of forestry development strategies, we need to consider how we can maximize participation in forestry development projects. First, we need to work with local people, both women and men, to understand their needs, their priorities, their perception and knowledge of the problems. As Hoskins (1979) and others have pointed out, women may be very knowledgeable about their forest environment, their uses of forest resources, and their own needs and values.

In addition, we need to consider how we can most effectively involve women and men in forestry development projects. We need to consider both collective and individual strategies. The appropriate strategies for any particular situation will depend on the patterns of interactions of women and men, their relative access to and control over resources and knowledge, and beliefs and values. In many cultures the work of women and men may be segregated, by religious beliefs, taboos, or strong cultural preferences. This will vary by other factors as well, such as kin relationships, class, education, and income. For some projects it may be most feasible to work with women as individuals, whereas for others collective strategies may be most successful. In some cases it will be possible to have men and women work together in all roles, whereas in others it will be more feasible for them to work in a complementary fashion, with the women performing certain tasks and the men others. A third possibility is for collective projects to be completely segregated by gender. Dixon (1978), Boulding (1977), and others have noted the attractiveness of women's co-operatives or self-help groups.

Many researchers have noted the need to have women professionals and technicians, such as professional foresters and forestry extension agents, to work with women. If the local women cannot or prefer not to work with men, then women professionals will be important to reach them (Noronha 1980, Hoskins 1979, Scott 1980). This is especially important in areas of activity that are traditionally female, such as fuel procurement. If, as Jacobs (1981b) suggests, the women "know" that men don't know anything about fuel, they may ignore the advice of male foresters. This does not mean, however, that the women are not capable of learning that men are or can be knowledgeable in this domain.

Equitable development. In designing development strategies that will be equitable for women, we must consider two issues--the level of benefits and the impacts of social change.

The level of benefits may be individual women, groups of women, or families. These units will not necessarily benefit in the same manner. In order to direct benefits to women, it is vital that the dynamics of female-male interaction within the household or family and the community be understood.

An important area that needs to be analyzed is that of women and men's responsibilities toward the family. Development projects commonly assume that either (a) the male "household head" is primarily, or totally responsible for supporting the family, or that (b) the responsibilities are joint (Papanek 1977). In many areas, such as central Africa, women are primarily responsible for feeding and clothing their families or themselves and their children. Development benefits received by the men, then, may be received by the men as individuals and not accrue to their families. Certainly such benefits do not reach female-headed households, unless they are brought in by brothers, sons, or other male relatives. Theorists disagree about the extent to which females are, or should be assumed to be, more responsible toward the family. Blumberg (1981) argues, for example, that women are more centrally involved in the family and food systems, so that benefits directed toward them will improve family welfare, such as nutrition, whereas benefits to males may go to individual purchases, such as radios, bicycles, alcohol or prostitutes. McCormack (1981) argues that family welfare benefits may not be synonymous with benefits for the individual women involved. Some researchers argue, in fact, that women's individual well-being will improve only as they gain autonomy and are freed from serving their families. Obviously family interactions and other female-male interactions will vary greatly by culture, religion, class, and other factors, and need to be carefully examined in context.

We need to research the impacts of social change. If we accept that the interactions of women and men form a dynamic system, will the improvement of female status lead to a deterioration of status among males? It is commonly argued that development projects should focus on basic problems rather than "women's problems," providing employment should not take jobs away from men, or that projects should not act to polarize or divide the men and the women. First, the improvement of the lot of women will not necessarily mean the deterioration of the position of men. For example, if the programs result in the improvement or extension of women's traditional roles, new employment opportunities can be created which will not decrease male employment. If women's access to resources and development benefits are increased, these changes may benefit their families and the men within their families.

Second, we need to acknowledge that many men may fear or even actively oppose development programs for women because they fear a relative loss of power over women, as individuals and within families. There may be fears that with increasing female status, families will disintegrate. Boserup (1970) reports that many African men oppose their wives earning cash incomes as it enables them to pay back their brideprices and divorce their husbands. While it is true that women with more personal autonomy or more resources may

leave their families or divorce their husbands, changes in family stability appear to be happening regardless of this. The number of female-headed households in the world has increased as males are more apt to migrate to cities, plantations, mines, or logging concessions leaving their families behind. Females also are more apt to head households now due to medicinal advances which have increased female longevity. Currently it is estimated that over one-third of the household heads in the world are female (Boulding 1977, Blumberg 1981). While many researchers argue that this proportion is increasing due to the greater migration of males (Blumberg 1981, Newland 1979), Boulding (1977) suggests that throughout history 20 to 50 percent of the de facto household heads have been female. It appears that currently many males, once they can be self-sufficient and no longer interdependent upon other family members, choose to live alone. Huston (1979) found that many Third World women were distressed by deteriorations of male-female relationships--they wanted development "but men and women together." They wanted their contributions to the family, their work, to be accorded worth and respect by male relatives and society at large.

In addition, there is fear about social change in general. Since gender differences form the primary basis for social differentiation in virtually all cultures, changes in sex roles can be perceived to threaten the larger social order. Yet social change has always occurred and continues to occur. The social roles of women and men change over time in response to changing ecological and social conditions. In attending to basic survival needs--subsistence, shelter and clothing, reproduction and socialization, and social integration and organization--men and women have adapted as necessary to keep their culture, their families, and themselves going, "irrespective of gender" (Jacobs 1981a). Blumberg (1981) has argued that this phenomenon is universally true:

...customs are changing and traditions are accommodating to new and urgent survival necessities. There is no evidence of any group anywhere choosing economic ruin rather than permit a change in the traditional, economic role of its womenfolk--if no alternative labor force (e.g., expatriate males) can prudently be recruited. Rather, as history shows, if survival necessities are urgent enough, and alternate workers unfeasible or politically problematic, women may move almost overnight into tasks considered both "inappropriate" and "incompatible." But...increases in women's...activities may not positively affect their autonomy or well-being.

Consequently we can suggest that changes in female and male activities are occurring regardless of specific development programs, and that it would be most equitable to ensure that such changes do not adversely affect one group--such as women--more than another.

#### Toward an Integrated Eco-Systems Model of Forestry Development

There are two major weaknesses in social science theory in general, and development theory in particular. The first is the tendency of much of social theory to view human behavior in an abstract, disembodied manner, divorced from its environment. Although ecological perspectives on human behavior are represented in all the social science disciplines, they remain

peripheral to major issues of their respective disciplines (Micklin 1977, Dunlap 1980, Bennett 1976). Second, social theories have primarily been constructed on models of male behavior and values--or more specifically, middle-class, Caucasian, Western male behavior and values (Millman and Kanter 1975, Sherif 1979, Smith 1979, Janeway 1980, Papanek 1977, 1981, Elliot 1977, Peterson et al. 1978).

If we wish to address the topic of women and their interactions with forest resources, or any natural resources, we must address both of these concerns. To adequately understand human resource use, we need a dynamic eco-system model, which encompasses female and male behavior and values and their interacting relationships.

Past models of development have been inadequate, failing to consider the complexities of impacts on human ecological and social systems. A dynamic eco-system model of human resource use must consider stability and change in human interactions with the natural environment. A systems model necessitates consideration of all the social actors and their interactions and relationships with each other and their environment. The interrelationships of women and men form an important component of such systems. A human ecological systems model views women as equally central as men to processes of human-environment interaction, not as peripheral actors who must be "integrated" into processes of resource use.

Numerous development specialists have called for such an integrated, dynamic, processual approach to development. These arguments have surfaced in the literature on general development, forestry development, and women in development (Lowdermilk and Laitos 1981, Rogers 1976, Eliot 1977, Papanek 1977, McCormack 1981, World Bank 1978, FAO 1978a, Vayda et al. 1980, Westoby 1978a).

Several observers of the women in development area have noted the inadequacy of past theoretical perspectives to explain the differential impacts of development programs on men and women. Elliot (1977) discusses four such theories, which she labels as (1) cultural dualism, (2) social evolutionary thought, which gave rise to both modernization theory and Marxist explanations, (3) developmentalism, and (4) dependency theory. She argues that all of these explanations are inadequate and proposes that a new systemic, interactional model of development is needed which should include (a) women's productive work, (b) women's political roles, (c) "many different kinds of linkages among various parts of the world system," and (d) "change, or lack of change, in women's roles." McCormack's (1981) review of development theory is somewhat similar, emphasizing (a) comparative, (b) developmental, and (c) systemic approaches. McCormack's view of world systems, however, stresses looking at the female world system and interdependencies of women worldwide, in contrast to the male world system. Papanek (1977), however, convincingly argues that a dualistic model of women's work and men's work, or domestic and nondomestic work systems, ignores many of the interactions and interrelationships. Similarly dichotomous concepts of work and leisure, or production for wages vs. production for use value, ignore many female activities and interdependencies between the activities of women and men (Smith 1979, Henderson 1981, Leghorn and Parker 1981). The economic models of development fail to explain the interactions between women and men, even if they take women's productive activities into account, because they

ignore "the existence of noneconomic bonds between women and men" (Papanek 1977).

Forestry development planners have called for the need to examine forestry as a component in integrated development strategies, as part of agricultural and/or rural development strategies. The World Bank (1978) has begun to work towards a model of forestry development considering different modes of forestry exploitation and types of forestry development, which depend upon human and ecological factors. The involvement of women in forestry development has only recently received attention. While the issue has received some applied development interest, it has not yet been critically examined in all its complexity.

An example of the current thinking in this area is that recently expressed by Raymond Noronha, a World Bank sociologist:

Women. The role of women in forestry is just beginning to be appreciated and analyzed. There are too few women involved in the design of forestry programs who could contact local women. In Islamic countries, or among Islamic segments of a population, it is essential that women be used for information and extension work of this kind. But local socio-cultural attitudes often do not permit open involvement of women in development programs. Time will resolve both these problems, but right now there should be an acceptance of the principle that as a matter of course women should be involved in forestry programs, both as designers and as implementers. They should not be thought of simply as gatherers of fuelwood. (Noronha 1981)

Noronha correctly presents the state-of-the-art and a couple of the particular problems which must be addressed. Yet Noronha fails to indicate how "time will resolve both these problems," and fails to incorporate women more directly into his discussion of village woodlot programs. In assessing both successful and unsuccessful village woodlot programs in China, Korea, Gujarat (India), Tanzania, and Niger, he does not analyze the extent to which these projects may have incorporated women. (Nor does Eckholm (1979), whose analysis provides the basis for some of Noronha's interpretations.)

One wonders, for example, if China's successful reforestation efforts have been linked to Chinese efforts to change the traditional roles of women and men. Mao Tse-Tung has been credited with originating the proverb now popular in development circles--"Women hold up half the sky" (Boulding 1977). In the 8th World Forestry Congress in 1978, Chinese delegates remarked on the involvement of women in afforestation efforts, saying that they had been in the vanguard and claiming that female tree planting crews were more successful--in terms of 95% seedling survival rates--than were the male crews.<sup>1</sup>

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<sup>1</sup> Comments made during the session on "Women in Forestry," 8th World Forestry Congress, Jakarta, Indonesia, 21 October 1978 (my personal notes).

Women have been active in forestry efforts elsewhere. In the Indian state of Uttar Pradesh, local women stopped logging operations to protect their traditional fuel gathering rights. Their movement, Chipko Andolan, meaning "Embrace the tree not allowing to cut," has resulted in change of government forest policy to minimize soil erosion, reforest with native species to enhance soil productivity and provide fuelwood and favor rural development rather than commercial timber exploitation (Singh 1978, Chauhan 1978, Severn 1981). Presumably this movement is related to an increasing trend of militant movements among poor rural women in India, who with development have been increasingly marginalized as workers (Omvedt 1978).

Similarly, Thompson's (1981) recent analysis of firewood production strategies in the Sahel fails to explicitly consider the participation of women. In his hypothetical example, Thompson discusses how a male farmer plants trees to ease the burden of his wife's fuel collecting chores. However, as his trees are not legally protected, other women help themselves. His wife complains. Consequently he catches one woman in the act and brings a legal suit against her for theft. Her husband and the male judge think the suit is trivial. The plaintiff finally is awarded the equivalent of \$.50, but is made the laughing stock of the village. Thompson, in presenting this case, focuses on the institutional factors which make it difficult for a (male) individual to grow fuelwood. Thompson does not question the institutionalized patterns of behavior by gender. Why, for example, were the women not involved in the court case? Do they lack legal title to the land? Do they lack access to the legal system? Why was the farmer's wife not growing her own trees? Perhaps the fuelwood production dilemma cannot be solved without the involvement of the women.

Empirical approaches to the inclusion of women in forestry development projects have been developed by Hoskins (1979) and Scott (1980). They have discussed special concerns which influence women's involvement, such as time and mobility constraints, lower literacy, access to wood and alternative fuels, and other factors (Table 1). Their work is important in suggesting empirical factors that need to be examined in designing development projects. Implicit in their work is the need for a dynamic, interactionist model of female and male activities for forest use.

To begin to examine women's use of forest resources in terms of a systems framework, we need a theoretical overview of different modes of forest use. These modes of forest use involve systems and relations of use, or production and distribution of resources. Thus each mode of forest use involves different patterns of social activity, social roles, and relationships between social actors. Building upon a model suggested by the World Bank (1978), I have constructed a series of tables which present an overview of human use of forests. Table 2 presents five basic modes of forestry use, along with accompanying activities and roles, and female participation. Although the World Bank only presented the first four modes of forest use, it seems that a fifth category is necessary. Forests have been used throughout human history not only for productive uses, but also for "non-productive uses" such as recreation, leisure, religion, aesthetics, and preservation. Some of these uses clearly tie into more instrumental ones, such as tourism, environmental quality, and research. These other uses of forests have gained recognition in developed societies, where certain forest areas may be set aside for preservation or recreation, while other areas may have multiple

Table 1

<u>Special concerns regarding women in forestry development programs</u>	<u>Authority</u>	
1) "lack (of) control over land...in some circumstances as tenants on their husband's land"	Hoskins (1979)	
2) lower literacy		
3) less extension work (outside homemaker topics)		
4) time use constraints		
5) mobility constraints		
6) financial resource constraints		
7) "may be invisible as to their inputs and needs"		
<hr/>		
3) fuel availability	Scott (1980)	
a) type of fuel		
b) impacts on agriculture, soil erosion, and depletion of soil		
c) health costs (e.g. smoke, causing eye and lung diseases)		
9) access to wood		
10) cost of fuel (human energy costs in gathering fuel)		
11) village woodlots and tree species		
12) conservation: use of more efficient stoves and cooking behavior		
13) alternative fuels		
14) local participation		
15) trees and nutrition		
16) research, training, and innovation		
<hr/>		
17) lack of trained women professionals to design forestry programs and work with local women, especially in Islamic populations		Noronha (1981)
18) "local socio-cultural attitudes", values, and beliefs		
<hr/>		
Constraints on firewood production:*	Thompson (1981)	
19) tree stock		
20) land and tree tenure and residential patterns		
21) protecting trees from livestock		
22) protecting trees from unauthorized human cutting		
23) enforceability of property rights in land		
24) enforceability of property rights in trees		
25) collective action capabilities		

\*Note: while Thompson's work does not specifically address women, I would suggest that the constraints on firewood production which he outlines may differentially affect women and men in a given cultural and ecological system.

Table 2  
 Modes of forest use and female participation

Mode of Forest Use	Activities/Roles	Female Participation
I SUBSISTENCE FORESTRY	Fuel gathering Food Fiber Shelter, building materials Medicine Religious, aesthetic, leisure	High, may be gender-differentiated
II ENCROACHMENT e.g. slash-burn agriculture	Fuel gathering Fiber Building materials Some food Medicine Religious, aesthetic, leisure  Clear forest for agriculture	High, may be gender-differentiated  Female decision-making Males usually clear land Females plant, monitor produce
III EXTRACTION EXPLOITATION	Large-scale logging operations Industrial processing Export of end-products	Predominantly males Females as clerical workers Some females recently as professionals, wood-workers, sawmill technicians, and firefighters
IV INDUSTRIAL PLANTATIONS AND TREE FARMING	Large-scale industrial plantations Growing of small plantations on private land  Establishment of village plantations to provide tree products, firewood, and building materials	Females as clerical and nursery workers  Some professional and technical staff Few extension workers
V FORESTRY RECREATION, TOURISM, AESTHETICS, PRESERVATION AND RESEARCH e.g. Wilderness areas	Forest recreation e.g. social bonding and identify Tourist services Management Research, e.g. genetic, medicinal Wilderness recreation Environmental quality, e.g. urban Environmental education & interpretation	Some professionals Clerical workers Tourist service workers Increasing proportion of recreationists Teaching, public relations etc.

uses, such as dispersed camping and active logging. Thus we would expect to find some overlap of mode V with modes III and IV. The same types of uses occur in modes I and II, but they are more integrated.

If we look at female participation in these modes, we find that female participation has traditionally been high in modes I and II, and until recently, relatively low in modes III, IV and V. For example, if one examines ethnographic studies of subsistence forest use and slash-burn agriculture, such as the Murphys' (1974) study of the Mundurucu of Brazil, one finds that women used the forest for a variety of their resource needs. Women were responsible for gathering water and wood, cultivating their gardens, and processing the manioc and other food grown. The men hunted, fished, and tapped rubber trees. One form of fishing, which involved poisoning a section of the river and harvesting the fish kill, involved all the people in a village. Given that women utilize the portion of their environment within a two-mile radius of their villages, while the men hunt, fish, and trap in a wider zone, it seems plausible to suggest that the women were responsible for monitoring their portion of the environment and deciding when it was time to clear new land, move the village, and plant new gardens. Two reasons which the women explicitly stated for moving were the buildup of garbage around the village, which attracted snakes and scorpions, and thus especially endangered the women and children who spent most of their time near the village, and the development of leaky roofs. However, one would also expect that as agricultural productivity declined and fuelwood supplies became scarcer, the women would also urge their menfolk to move.

As Lee (1979) has pointed out in his study of the !Kung San, people in subsistence economies have a number of strategies for coping with resource scarcities, such as switching to less desirable resource alternatives, walking further to obtain desirable resources, or moving their camp. He found that during part of the year when the !Kung were in large camps, the older people would switch to less desirable resources near the camp while the younger ones would walk further for desirable resources. All resources obtained would be shared among the camp occupants. Lee mentioned these strategies with respect to food resources, but they seem equally likely responses for fuel scarcities. Other researchers have noted the importance of looking at female and male uses of the environment as they vary over time and space. The use of an area may vary seasonally, for example, with men growing one crop part of the year and women another at different times (Etienne 1980, Michelwait et al. 1976).

Evidence shows that modern women collecting fuelwood are likewise monitoring their environment, adapting to fuel shortages through a variety of strategies. They may walk further to obtain wood, switch from wood to animal dung or crop residues, reduce the amount of wood they use through changes in cuisine or cooking methods, change perhaps to foods that require less cooking or reduce the number of hot meals they serve, increase the amount of help they have in carrying wood by having more children, purchase fuel instead of collecting it, and so forth (Hoskins 1979, Scott 1980, Noronha 1980, 1981, Tinker 1981b). Undoubtedly in some areas women may migrate if fuel becomes too scarce and impossible to obtain. In terms of actively manipulating their environment to produce more wood, women may be involved in planting trees, guarding tree seedlings from animal grazing or trampling by children, burning areas to induce new growth, rotating agricultural use of areas to allow some

areas to reforest naturally, and so forth. The implications of these alternative strategies need to be carefully studied. Use of crop residues or animal dung for fuel, instead of using them as fertilizer, may reduce agricultural productivity. Changes in cooking methods and cuisine may affect health and nutrition. Even changes in fuel type may affect health, through eye, nose, and lung diseases caused by the smoke (Hoskins 1979, Scott 1980).

With respect to the industrial modes of forest use, women have had low participation, but in recent years this pattern has begun to change. In industrial societies, women have worked in extractive exploitation, industrial plantations, and tree farming in clerical and support roles and very commonly in tree nursery work. Recently they have begun to enter professional and technical positions, and their enrollment in forestry curricula in colleges has increased in the past decade. Fewer women have entered wood-working or sawmill jobs (Williams 1978a).

Recreational use of forests has traditionally been more a male domain of behavior than a female one. More developed, less primitive camping has been engaged in by families, while more primitive, e.g. wilderness camping, has been more dominated by men. The recent increase in female outdoor recreation and sports participation in the United States has been widely commented upon, though not carefully examined. In terms of tourist uses of forests, it can be assumed that women have been active in service roles, as they are in other service roles in the economy. Some women have entered management of recreation use in professional and technical roles. Dunn (1977) has shown that the proportion of women in recreation in the United States declined from its early beginnings; after World War II, recreation became identified more as a primitive land-based concern than an urban one, and men took over most of the professional positions within the field. In recent years, the number of women students in the area has climbed.

In order to examine current development strategies, we can consider how various modes of forest use occur with various potentials for forest development. As shown in Table 3, there are various permutations of forest use and forest development potentials which exist.

To consider how forestry development will affect women and men we need to look at its particular project in terms of the mode of forest use, forest development potential, and the type of cultural gender patterns which exist. Since it may be difficult to assess "the status of women" vis-a-vis that of the men in general (Whyte 1978, emphasis in the original), we should look at the status of women and men with respect to access to and control over various forest resources. As an example, we will consider the issue of women and fuelwood in further depth.

First, however, I will propose how a system model can address the concepts of female values and female strategies for change.

Female values and strategies. There has been growing reference in the literature to the concept of "female values" and female strategies for change. What are these, and do they offer us a new perspective on human resource use?

Table 3  
Forest development typology

<u>Mode of Forest Use</u>	Wood-deficient marginal lands	Potential afforestation areas	Overpopulated wood-deficient areas	Wood-abundant poor area	Wood-abundant areas with severe pop. pressures	Wood-abundant rich area
I. SUBSISTENCE	X	X	X	X	X	
II. ENCROACHMENT	X	X	X		X	
III. EXTRACTIVE		X		X	?	?
IV. INDUSTRIAL PLANTATIONS AND TREE FARMING	?	X	X	?	?	X
V. FOREST RECREATION, TOURISM, AESTHETICS, PRESERVATION & RESEARCH	X	X	X	X	X	X

First, it is necessary to distinguish autonomous female values from "shadow values" or adaptive strategies which women have used to cope with their experience. If one accepts that females and males are socialized for different roles and the values appropriate to those roles, then it can be seen that the degree to which female values may diverge from male values may depend on the difference in the roles. With specific reference to the natural environment and use of natural resources, female values may differ from male values to the extent that roles in using the environment differ. Sonnefeld (1967), for example, found gender differences in landscape preferences among Eskimos. Females preferred landscapes suitable for gathering plants, whereas males preferred landscapes suitable for hunting wildlife.

These autonomous female values, which emerge from female experience and socialization, differ from "shadow values." The latter represent values which represent coping with male values and social structure, differential status and opportunities of men and women, and so forth. Female values regarding wilderness areas, for example, may largely reflect the differential opportunities of women to experience wilderness areas. LaBastille (1980) argues that female values of experienced wilderness women are essentially the same as those of experienced men, except that women may be less eager to lead expeditions and less self-confident, which she attributes to their more recent entry to wilderness use.

Just as ethnic value differences may represent a combination of real autonomous values and "shadow values," so may female values (Leghorn and Parker 1981). The predominance of real female values will vary by culture, by an individual's position within that culture, and by the individual's construction of self-identity. Leghorn and Parker (1981) argue that female values are determined by the extent to which a woman is female-identified, rather than male-identified. While this interpretation seems plausible to a certain degree for male-dominated, or patriarchal, societies, it fails to do justice to the variety of experiences within and between cultures. One can explain female values as arising from a number of sources.

The concept of female values has been explored by a number of social scientists in fairly general terms, without much research in reference to specific situations or domains of behavior. Overall, females seem to value sharing, nurturing, reciprocity, cooperation and empathy, with greater sensitivity to interpersonal relationships and family (Bernard 1981). However, females may also be aggressive or competitive in certain situations, using whatever strategies are appropriate (Sherif 1979). Some of the stereotypically female values may, in fact, just represent adaptations to structural constraints (Kanter 1977).

Arguments have been made that these female values represent ecological, organic, survival values. Many scholars have noted the similarity between feminist values and environmental ones (Black 1981, Griffin 1978, Merchant 1980, 1981, Boulding 1977). Merchant (1981) has stressed four similarities. First, all parts of the human-nature systems are interconnected and have equal value, including women and men. Second, we need to be concerned about maintaining our ecological habitats, our homes, as life-sustaining environments. This issue is of particular interest to women and children who spend most of their time in the home. Third, given that we live in a dynamic system where "process is primary" and flows of energy and information sustain

and change the system, decision-making needs to be based on information exchanged among all individuals within the system, both female and male. Fourth, given that energy and resources are finite, we need to stress reciprocity and cooperation in human behavior in order to conserve energy, recycle goods, and share services, with women and men working together towards the production of use-values which minimize adverse impacts on the environment and the human spirit. Thus, Merchant argues that feminist and ecological values overlap in stressing the interconnectedness of all individuals, whether female or male, and how the knowledge, experience, and values of women and men are interdependent.

Concern over female values in terms of international development has surfaced. Boulding (1981) urges that development take account of what women want, rather than trying to co-opt women into male development schemes. Certain development projects are viewed with ambivalence. While appropriate technology may help women with traditional tasks, such as easing their fuel carrying burdens and cooking tasks through more efficient stoves, this technology will not necessarily liberate women from these tasks but may serve to reinforce ideas that women belong in the kitchen (Merchant 1981).

With respect to growing fuelwood, attention needs to be paid to the types of tree species that women prefer--not just for fuel use, but also for medicinal, food, fiber, building material, and other uses, the types of social organization appropriate to the fuel growing and fuel use technology, interdependencies of fuel use with other types of forest use and values, as well as behaviors and values outside this domain.

In addition to examinations of values, we should perhaps consider how female strategies for action may differ from male strategies. Females are more likely to work through non-hierarchical networks than bureaucratic hierarchical institutions. Females' strategies for influencing group decisions may vary from those of males. For example, Frieze et al. (1978) have argued that in American culture, certain types of power are seen as appropriate for men and others for women. Consequently one would expect that it would be most effective for women to utilize strategies which would yield results for them and not undermine their status. Women may influence family decision-making strategies differently than men. In some situations, women may be unwilling to make certain decisions without male support. In other situations women may act in their own interests or the perceived interests of their families regardless of male preference. Examples of these approaches are well-documented in the literature on family planning (Huston 1979).

It seems important to examine and consider how female strategies for forestry use and development may differ from male strategies. This seems to be a fruitful area for evaluation research in which the participation of women and men in all-female, all-male, and joint forestry development projects can be compared. Do women organize themselves differently, seek different objectives? For example, do women in fuelwood collectives handle the "free rider" problem differently than men, perhaps through social pressure and gossip as opposed to material incentives? Or do women have more empathy and understanding of each other's hardships, and hence more willingness to overlook free riders in the short run? How do women use their resources? Dixon (1978) suggests a real strength of women's work cooperatives is to give women control over the fruits of their labor and experience

in decision-making. Women may be able to achieve certain goals collectively that they may not achieve individually. Women in a fuel growing collective might be able to meet their own fuel needs and use the proceeds from sales of surplus fuel to make their fuel use more efficient, such as through construction of more efficient stoves, communal ovens, experimentation with different fuel species, or to start other projects.

## WOMEN AND THE "FUELWOOD CRISIS"

### Description of the Problem

The most crucial and visible global issue regarding women's use of forest resources is their use of fuelwood. This can be considered "most crucial" because of the numbers of women and amount of wood involved. The world forestry community is very concerned about the "fuelwood crisis," as currently over half the world's wood is burned as fuel. In developing countries, 90% of the wood consumption is for fuel (World Bank 1978). The Food and Agricultural Organization of the United Nations (FAO) estimates that currently 101 million people suffer from acute firewood scarcity and another 999 million from shortages: this problem is expected to increase three-to-four-fold in the next 20 years (Pasca 1981). Given recent rises in costs of fossil fuels, particularly oil, the use of cheap alternative energy sources is limited. More attention is being focused on renewable energy sources which are located where the rural poor live. The use of technological alternatives--such as photovoltaic solar cells, windmills, biogas digesters, and so forth--depends upon technological, economic, ecological, and social feasibility. In many areas, continued use of wood for fuel is seen as the most feasible option in the short run, i.e. next 20 years.

There is great concern over the ecological consequences of increasing fuelwood use. As land has been converted to agriculture and urban development, there has been widespread destruction of forests, accompanied by problems of increasing erosion, environmental instabilities, declining agricultural productivity, loss of habitat for wildlife, and loss of plants used for medicinal, religious and material purposes. In tropical regions, loss of forests may lead to loss of nutrients and permanent impoverishment of the soil, with the possible inability for regeneration of plants of any sort. Deforestation has also been linked with spreading desertification (Eckholm 1979).

Furthermore, the increased use of fuelwood may lead to environmental hazards for users. Chopping of fuelwood involves risks of accidental injury. The human transport of wood and other renewable fuels over long distances may lead to back problems, physical impairment, and fatigue. Burning of fuelwood entails hazards such as accidental human burns or possibilities of homes catching on fire. Users may also suffer from eye and lung diseases caused by the smoke of various fuel types. The type and amount of smoke will influence the ability to repel insects, such as mosquitoes or termites, from the dwelling. The smoke will also affect food taste and food preservation, which in turn affects human nutrition (Scott 1980).

The issue of whether collecting fuelwood constitutes "work" is somewhat problematic, depending on one's perspective regarding work. Newland (1979)

reports variations in national economic accounting systems:

Taiwan's bookkeepers...would, however, assign economic value to the woman's water carrying and wood gathering. But in Nigeria, it would be argued that, in rural areas, wood and water are free goods, like air, and so are the human efforts that make them useful. These variations in the kinds of subsistence (or non-monetary) activities that are included in national income accounts illustrate the prevailing inconsistency in official attitudes to the question, 'what is work?' Through the inconsistencies the fact emerges that much of the work that women do is not acknowledged to be productive labor under conventional definitions.

The collection of fuelwood varies worldwide as to whether it constitutes men's work, women's work, or "neutral work" (Cebotarev 1979). Yet many writers acknowledge that it is commonly collected and transported by women (Gamarekian 1979, Eckholm 1979, Arnold and Jongma 1978, Poulsen 1978, Noronha 1980, 1981, Scott 1980, Hoskins 1979). In many, though not all cultures, women may be assisted by their children in gathering fuelwood.

Although more recent global surveys do not exist, we can approximate the degree to which women are involved in fuel gathering through historical cross-cultural data. Utilizing the Standard Cross-Cultural Survey of 186 societies, Murdock and Provost (1980) found data on fuel gathering by gender for 167 societies. They rated fuel gathering as a "quasi-feminine activity", as the overall average for female participation was 72.8 percent. The participation of males varied in degree by region, with the highest in North America (36.7 percent) and the lowest in the Insular Pacific (18.1 percent). Actual breakdowns by societies is presented in the Appendix. Three major limitations of this data should be noted. First, Murdock and Provost (1980) coded their data from the ethnographic accounts as fuel gathering, irrespective of the type of fuel, whether it was wood logs, branches, twigs, animal dung, or crop residues. Second, their data was drawn from ethnographic accounts gathered at various times for different societies, ranging from 1750 B.C. to 1965 A.D., with the majority gathered during the period 1851 A.D. to 1950 A.D. (Murdock and White 1980). Third, the data needs to be viewed somewhat skeptically. Much of it may be influenced by the values of the particular ethnographer. Although ethnographers have long been interested in subsistence and material culture, few have focused explicitly on ecological questions, such as the type of fuel being utilized. Similarly, much of the ethnographic work has focused on the activities of males, because the ethnographers themselves were overwhelmingly male and/or the focus of the inquiry was predominantly male spheres of behavior, e.g., formal political institutions. Recent re-examination of some cultures by ethnographers concerned with female activities has begun to revise some earlier assessments (Jacobs 1981b).

The amount of wood that women carry constitutes for many "an onerous burden" (Noronha 1980). Using FAO (1978b) figures, one can come up with a rough approximation of the numbers of women and amount of wood involved. FAO estimates that over 1.5 billion people use 1.2 billion cubic meters of wood per year. The use ranges from 0.5 to 2.0 cubic meters per capita, depending upon climate, wood availability, and other factors. Where wood is abundant, use averages 1 cubic meter per capita; the overall average, however, is 0.8

cubic meters per capita. If one assumes that three-quarters of this wood is collected by women, then women are carrying and using 900 million cubic meters of fuelwood a year. If one then assumed that two women<sup>2</sup> would collect the fuel for a household of six, then 500 million women would each carry 1.8 cubic meters of wood a year. The energy women expend would depend on the weight of the fuel--dependent on species and moisture content, the distance carried, the amount of time expended searching for the fuel, and so forth. If one adopts Donovan's (1981) assumption that "one cubic meter of fuelwood, presumably air-dry pieces of wood of assorted species varying in size and shape,...weight approximately 600 kilograms," then the hypothetical average weight of wood per woman is 1080 kilograms carried each year. Obviously such figures are not only difficult to compute hypothetically, but will vary from place to place and individual to individual. A good review of the difficulties in actually measuring fuel wood use is presented by Donovan (1981).

As fuelwood usage has increased and fuelwood supplies have become more scarce, the burden on women has been exacerbated. As Poulsen (1979) remarked, "To have to walk 10 km or even more, every day under the tropical sun, and to carry back a heavy load is a terrible strain on the women upon whom the transportation of the family fuel depends." Singh (1978), Arnold and Jongma (1978) and Gamarekian (1979) report that women spend several hours a day fetching water and wood, while FAO (1978) figures that in Tanzania, a household's annual firewood needs may require 300 days of work to collect.

Newland (1979) notes also the time women spend preparing the fuel for use, such as "breaking the torn-off branches of thorn-bush into pieces small enough for the cooking fire." Among the Iranian Zagros nomads this task will take another hour a day on top of several hours of fuel gathering.

Women, of course, are not merely trudging off further and further each day in search of fuel. They are adjusting and experimenting with a variety of responses. One strategy, in lieu of alternative approaches, may be for a woman to breed her own help (Boulding 1977). If children can help their mother collect wood, then as fuel becomes scarcer, a woman may choose to have more children (Tinker 1981). This, in turn, sets up the same cycle for the next generation with increased population pressure on land for food and fuel. However, by changing women's access to resources, the cycle can be changed. Wu (1981) reports that in areas in rural China where biogas digesters have been built and have replaced the traditional use of fuelwood, women are freed from the time-consuming task of fuel collecting and can devote their time instead to agriculture, while their daughters are no longer needed to help them collect fuelwood and so can attend school with their brothers.

<sup>2</sup> This assumption is based on Kelly's (1981) report that: "In North Yemen, for example, it is estimated that in an average-sized family of six to eight persons the labor of two women is required to carry out the minimum household chores necessary for subsistence: fetching water, caring for livestock, gathering fuel, etc." Obviously such requirements would vary with ecological requirements, family structure, and other sociocultural factors.

### Theoretical Perspectives on the "Fuelwood Problem"

Why do women collect fuelwood? We need to ask why it is that the women rather than the men are the predominant fuelwood collectors, what the implications of this division of labor are, and what are possibilities for change. It is important not to assume that this division of labor will not, or should not, be changed by development projects.

The most common theoretical approach to the question of why women collect fuelwood is through an examination of the sexual division of labor. This approach is essentially an anthropological one. Three basic explanations can be offered for this pattern. The first is an organizational efficiency, or functional, argument, such as that of Murdock and Provost (1980). They classify fuel-gathering as quasi-feminine, and explain that it is an activity with female advantage, i.e. it is compatible with childcare, close to home, easily interrupted, not requiring specialization in knowledge or training, and so forth. In their factor analysis of a total of 50 activities, they find it to cluster with other agricultural activities, being performed by women if it is simple or extensive, but by men if it is complex or intensive. A second explanation for the division of labor could be made on the basis of status. Fuelwood has traditionally been abundant and free, hence not of much economic or social value. In a Western economic framework fuelwood has not been accorded market or production value, but rather has been important for its use-value. As fuelwood is not highly valued, according to this hypothesis, we would expect that the gathering of fuel might be a low-status activity and delegated to women. A third explanation would be an institutional one, arguing that the patterns of activity would be established by primary socialization. In other words, activities would be divided up along gender lines so that individuals could be trained, from birth on, to specialize in those activities. Fuel gathering would be done by women because it was culturally defined as "women's work." The degree to which this activity was defined exclusively as women's work would depend upon the degree of institutionalization (Zucher 1977), or the lack of situational flexibility. In some cultures the activity patterns might be modified, depending on how the patterns of fuel collecting fit in with other institutionalized behaviors, such as marketing or tree felling.

An alternative approach to the question of why women collect fuel is to examine the "division of resources" (Blumberg 1981). It can be hypothesized that women gather fuel because of their relative lack of material and social resources in comparison with men. These resources would include power, prestige, information, technology, wealth, and so forth. If, for example, women owned animals or carts, they could have their animals carry the wood instead of themselves.

What happens when fuelwood becomes scarce? The explanations for women's collecting of fuel have different implications for how a social system will respond to fuelwood scarcities. According to the functional explanation, as fuel becomes scarce and can only be obtained at further distances from the home, the activity should be taken over by men. According to a status interpretation, one would expect that fuelwood gathering responsibilities would be assumed by men when fuel or the distribution of fuel become more valuable. An institutional perspective, however, suggests that women will continue to gather fuel as long as it is seen as "women's work"; change in

the division of labor will occur only if the pattern was not highly institutionalized originally, or if other institutional patterns are realigned. For example, if as fuel comes to be marketed for cash, then whichever gender has traditionally been responsible for marketing and trading may collect and sell the fuel. If we look at the resource interpretation we can suggest that as fuelwood resources become scarce, women may utilize alternative resources and strategies.

What empirical support exists for these different predictions? Evidence suggests that women generally continue to gather fuel as it becomes scarce and located further from home. Consequently they may take their children with them, either carrying them if they are infants or using them as assistants if they are older. Alternatively they may leave younger children in the care of older ones, or of grandparents, other relatives, or neighbors. However, if the fuel becomes located too far away, women may stop collecting it and purchase it from men who will gather and transport it using animals and/or carts. Hence the fuel procurement may be taken over by men if it involves animals or the opportunity to earn cash income. Similarly, conversion of fuelwood to charcoal and subsequent marketing of charcoal tends to become a male activity. The purchase of fuel for the household may remain a female responsibility, or it may shift to the men. Women also adapt to fuelwood scarcities through a number of strategies such as shifting to use of other fuel types, conserving use, or increasing their access to resources (Scott 1980, Hoskins 1979, Noronha 1980, 1981, Tinker 1981b, Boulding 1977).

The empirical evidence is fairly meager and more research needs to be done to verify these patterns of change and how they vary with ecological and sociocultural context. Yet it would seem to suggest that the most fruitful explanations are the institutional and resource interpretations. Males apparently become involved in fuel gathering when it is a means for them to further control of resources, such as animals or money, or when it fits in with institutionalized male activity patterns, such as marketing. I would suggest, then, that further research needs to be done to examine fuel gathering in a systems perspective which encompass natural and social resources, institutions, and interdependent and interacting female and male activities.

#### Development Implications

Village woodlots and fuel conserving stoves. In examining strategies for addressing fuel shortages in a given culture, we need to carefully consider the existing eco-system which affects fuel procurement and use, looking at the interactions and interdependencies of female and male activities and values. Strategies for change in fuelwood use need to be assessed as to their differential impacts on women and men. For men to take over fuel procurement, i.e. growing or gathering, may or may not benefit women. If the men free women from some of their work overload, such as by growing trees so that women will not have to walk so far, they may benefit women and/or their families, depending on how their time saved is utilized. However, if male involvement means that females now have to come up with cash to purchase fuel, females' loss of control over fuel resources may lead to a deterioration of their welfare. Similarly, if the time saved merely means that women do less fuel collecting and more other work, this may improve family welfare without necessarily improving the well-being of the individual woman (if

other family members' contributions remain constant) or it may not even improve family welfare (if other family members' contributions decline).

Fuelwood development projects then may, or may not, be of benefit to women. It is important to build projects from what the local women themselves need and want. Strategies for change need to consider the most effective means for involving women and for directing benefits to women and/or families.

Sometimes development projects may have unintended impacts upon the systems to which they are introduced. Hoskins (1979), for example, reports of a development project in Upper Volta where the women were supplied with carts to ease their fuel carrying burdens. The men, however, took over the carts for their own purposes and did not help with fuel procurement. Analogous situations exist in other development projects as well, where increase of the availability of water meant that women had less help from other family members in obtaining it or where prenatal and child nutrition improvement programs have failed because supplemental food was consumed by the men of the household who traditionally eat first (Scott 1979). Thus in order to direct benefits toward women, it is vital that the dynamics of female-male interaction within the household or family and the community be understood.

One important consideration is whether or not to try to involve women as individuals or as members of groups, such as households or female groups. Dixon (1978), for example, has argued that female work cooperatives offer the greatest hope for female participation as well as female control over the development benefits. More specifically, Dixon proposed the establishment of non-agricultural work cooperatives for young women with three or fewer children which would offer women alternatives to child rearing, mutual support for non-traditional roles, control over their earnings (which would be kept in the cooperative rather than dispersed in income which their husbands or fathers would control), and offer them functional education in basic literacy, controlling money, decision-making, and political skills.

It may be argued that such cooperatives will be threatening to the local men, and that projects working through individual households may have a better chance of success. For example, it may be easier to introduce more efficient cookstoves into individual homes than to bring women out of the home to work on a communal woodlot project. However, involvement of women in communal projects will depend on whether the project is all female, a complementary project where the men perform one group of tasks and the women another (such as the men planting trees and the women weeding and watering them), or completely heterogeneous. A number of institutional factors may affect the feasibility of joint projects, such as national policy and support for equal involvement of women (Huston 1979).

#### RELATIONSHIPS BETWEEN PROFESSIONAL WOMEN AND HOST COUNTRY WOMEN

The relationship between Western professional women and host country women has a number of dimensions that need to be carefully examined. First, there is concern over the degree to which professional women can relate to host country women as women. Several commentators have noted that forestry

development programs involving local women can only work if professional or technical women are available to assist them (Noronha 1980, 1981, Hoskins 1979, Scott 1980). This situation may exist because of local attitudes and beliefs regarding the separation of men and women, or the preferences of women themselves to work with other women. The abundance of women professionals may be highest, in fact, among Islamic cultures where purdah<sup>3</sup> is practiced. Boulding (1977) notes that in Islamic cultures there are a high proportion of women professionals, notably doctors and teachers, because their clients need to work with women. In Bengal women are suitable as masons, building more fuel-efficient stoves, since they can gain access to Islamic and Hindu homes (Scott 1980). The greater ease with which women professionals can contact local women has been widely commented upon by anthropologists (Golde 1970, Wax 1979).

However, we need to remain aware that other attributes of professionals will have an important influence on their ability to work with host country women. As Wallman (1978) suggests, one's education, class, income, marital status, age, ethnicity, nationality, religion, and other social attributes will be important and may override the salience of gender. She suggests, in fact, that gender may be less important in cultures outside of North America. Consequently, one's status as a forester or a foreigner or a college-educated person may be more important than being female. These other attributes may work to one's advantage or disadvantage in dealing with host country women. Boulding (1981) suggests that many Third World women feel hostility and contempt for First World women, whom they see as "handmaidens" of technological imperialism. Boulding argues that recent international meetings have made it apparent that First World women cannot speak for Third World women. Pala (1976) has similarly argued that First World women cannot expect to use Third World women for their own objectives, be it their development schemes or their research interests.

We need, thus, to be very clear about the manner in which we, as natural resource professionals, propose to help host country women. We cannot presume, for example, to drop in out of the sky and offer them our improved species of Eucalyptus or test out our theories of social change and fuel gathering. We need, instead, to work from the bottom up, to work in collaboration with local women and local researchers, helping them to define their interests, their options, and their images and strategies for change. We need to be aware of our interdependencies with them--not only what we can teach them, but what we can learn from them. McCormack (1981) has recently suggested that if we look at our interdependencies in terms of a world system of women, we can work together from a basis of shared concerns.

<sup>3</sup> Purdah is the institution of "female seclusion," i.e., the spatial, social, and symbolic separation of women and men practiced by certain classes of Muslims and Hindus (Dixon 1978). Among classes that can afford to do so, women may not work outside their homes nor work with men. The degree to which contact between the sexes is segregated will depend upon a number of factors, including religion, class, caste, geographical region, education, values, and economic necessity.

The ability to which women professionals may be able to interact with host country women will, I believe, depend upon the extent to which women professionals identify with and care about host country women, trying to assist them and learn from them. Women professionals have a choice in terms of how they wish to identify themselves--what values they hold dear, what types of social change they wish to work towards. As Black (1981) and others have suggested, the women may be able to lead the men in new directions of change, new modes of resource use.

#### Future directions: personal reflections

When I attended the World Forestry Congress in Jakarta, Indonesia, in 1978, I was struck by the position of women within forestry. Out of 2300 official participants, only 20 of us were women, of whom 6 were students. There was a session on "Women in Forestry" scheduled as part of the sessions on Forestry for Employment Promotion. Even though all other aspects of forestry affect women, only here was a session officially scheduled. When I was asked to give the position paper on Women and Forestry (Williams 1978b), I felt that I was taking on a responsibility to speak for the needs of women and children, to represent those whom forestry commonly overlooks.

Several aspects of that session stayed with me. First, many participants were just beginning to see the complexity of the issues. Much more is involved than merely having women in positions as professional foresters. Many men were unwilling to acknowledge that women might have different values, needs, or strategies for action. They assumed that as the number of women in professional forestry schools was beginning to rise, it was just a matter of time before "the problem" would be solved. One of the other women students voiced the hope that when the next World Forestry Congress met in six years, there would be no need to have a special session on women in forestry. Many of the men echoed this desire. I felt that all this talk about women and men makes many foresters uncomfortable--they wanted to get back to discussing traditional forestry. Underlying all of this was a strong feeling that this was a very dynamic and even potentially explosive issue--how can one change the roles of men and women without totally unraveling the social fabric?

Another aspect of the session that bothered me was talk of roles for women in forestry. Many participants were proud to point to their own country's progress in employing women in certain roles, such as women working in tree nurseries.

This seemed to me very undesirable, the beginnings of a sexual stratification within forestry itself. I argued that I thought all roles in forestry should be open to women. Yet I recognized that in many cultures it may be difficult at this time for women and men to work together, so that gender-segregated work crews may be the only feasible option.

But it seems vital that women enter positions where they can affect forest policy. Women are currently more apt to be in entry-level positions or in staff positions, rather than in line policy-making positions. When the official national delegations at the World Forestry Congress met to agree on

the Policy Declaration of the Congress, there was not a single woman among them. Of the four policy recommendations I made regarding women and forestry, only part of one was adopted. The Congress was willing to endorse the idea that there should be equal employment opportunities and "that steps should be taken to increase the proportion of women employed." However, more specific steps to change forestry to attract and keep women were too controversial. In the discussion section, proposals to strengthen the policy declaration were hotly debated and rejected. Equal opportunities are a beginning, yes--but we have such a long way to go.

Recently I attended a conference held in Seattle on Renewable Energy: Global Perspectives. It was a follow-up to the UN Conference on New and Renewable Sources of Energy held last August in Nairobi. I was saddened to hear Jill Severn and Zoreh Tabatabai explain how they were two out of only three at the official conference, and that they had had to speak up to bring the Conference's attention to women. The men did not, of their accord, mention these issues. My reaction to this was one of sadness--wondering, have we made no progress? Yet I also felt inspired--this is a big change and we shall have to just keep working away at it. The discussion that followed their comments revealed, once again, how volatile the subject is; many men in the audience grew defensive. Some expressed their support and understanding, in varying degrees. One of the speakers, Dr. Usmani from the United Nations, explained that the U.N.'s rural energy projects were taking women's needs into consideration. They had, for example, designed a communal water source rather than piping water into individual homes, so that the women could continue to meet and gossip--a sort of women's club. This remark drew hisses from many of the women in the audience. Jill Severn explained that if the men knew what the women were really talking about, not merely "gossiping," they'd be worried. I think that this incident is very revealing. We have begun to consider women in development projects, to take their needs into account. Dr. Usmani certainly is trying to understand what it is the women want. However, we have a long way to go in understanding the complexity, richness and variety of what women are doing, how they are interacting with and shaping their natural, material, and social environments. We do not need to belittle development efforts made to date on the behalf of women, but accept them as steps in the right direction. We have quite a challenge in front of us, and can use all the help we receive.

I think we need to consider the extent to which men can speak for women, or development professionals can speak for host country people. Nonetheless, women professionals have some unique roles to play, if they choose to accept them. First, they can facilitate forestry development from the bottom up, working with and learning from host country women. Second, they can re-conceptualize development theories and strategies to fully account for women's activities and values. Third, they can sensitize development planners to the impacts of programs on women and children. Although we know that some of our male colleagues are sensitive to these issues, we cannot assume that men will speak to women's issues or address women's needs. Black (1981) has remarked, "Women's autonomy on an individual or a group basis is never a centrally important cause for men. Women's efforts therefore remain crucial for any change in their situation."

It is difficult, of course, for women professionals to speak out on these issues. As many of us are just beginning our professional careers, it is hard to assess how we can deal with these vital concerns which are not commonly defined as central or important to our professions. We are, individually, vulnerable. This makes it difficult to challenge the policy, values, and directions of our profession. Yet it is vital that forestry adapt to changing social needs if it is to remain of value to society. If we do not bring these important issues to the attention of foresters, who will?

### References

- Arnold, J. E. M. and Jongma, J. 1978. Fuelwood and charcoal in developing countries. *Unasylya* 29(118): 2-9.
- Bennett, J. W. 1976. *The Ecological Transition: Cultural Anthropology and Human Adaptation*. Pergamon Press Inc., New York.
- Bernard, J. 1981. *The Female World*. The Free Press/Macmillan Publ. Co., New York.
- Black, N. 1981. The future for women and development. In: Black, N. and Cottrell, A. B., Eds. *Women and World Change: Equity Issues in Development*. pp. 265-286. Sage Publications, Beverly Hills.
- Blumberg, K. L. 1981. Rural women in development. In: Black, N. and Cottrell, A. B., Eds. *Women and World Change: Equity Issues in Development*. pp. 32-56. Sage Publications, Beverly Hills.
- Boserup, E. 1970. *Woman's Role in Economic Development*. St. Martin's Press, New York.
- Boulding, E. 1981. Integration into what? Reflections on development planning for women. In: Dauber, R. and Cain, M. L., Eds. *Women and Technological Change in Developing Countries*. pp. 9-32. AAAS Selected Symposium 53. Westview Press, Boulder.
- Boulding, E. 1977. *Women in the Twentieth Century World*. Halsted Press Division/John Wiley & Sons, New York.
- Chauhan, S. K. 1978. Tree huggers save forests. *Development Forum (U.N. Centre for Economic (Social Information) VI (8) (Sept.)*: 6.
- Dixon, R. B. 1978. *Rural Women at Work: Strategies for Development in South Asia*. The Johns Hopkins University Press, for Resources for the Future, Baltimore.
- Donovan, D. G. 1981. Fuelwood: how much do we need? Newsletter #14, Institute of Current World Affairs, Hanover, N.H.
- Dunlap, R. E., Ed. 1980. Ecology and the social sciences: an emerging paradigm. Special issue, *American Behavior Scientist* 24(1) (Sept./Oct.).
- Dunn, D. R. 1977. Women in recreation. *Parks and Recreation* (July): 24-30.
- Eckholm, E. 1979. *Planting for the Future: Forestry for Human Needs*. Worldwatch Paper 26. Worldwatch Institute, Washington, D.C.
- Elliot, C. M. 1977. Theories of development: an assessment. *Signs* 3(1): 1-8.

- Etienne, M. 1980. Women and men, cloth and colonization: the transformation of production-distribution relations among the Baule (Ivory Coast). In: Etienne, M. and Leacock, E., Eds. Women and Colonization: Anthropological Perspectives. pp. 214-238. J. F. Bergin Publishers, Inc., New York.
- Food and Agriculture Organization (FAO) of the United Nations. 1979. Report. World Conference on Agrarian Reform and Development (Rome, 12-20 July).
- FAO Forestry Department. 1978a. Forestry for Local Community Development. FAO Forestry Paper 7. FAO, Rome.
- FAO Forestry Department. 1978b. Forestry for Rural Communities. FAO, Rome.
- Frieze, I. H., Parsons, J. E., Johnson, P. B., Ruble, D. N. and Zellman, G. L. 1978. Women and Sex Roles: A Social Psychological Perspective. W. W. Norton and Company, New York.
- Gamarekian, B. 1979. World Bank Noting Women's Influence. 23 December, New York Times.
- Griffin, S. 1978. Woman and Nature: The Roaring Inside Her. Harper & Row, Publishers, San Francisco.
- Henderson, H. 1981. Foreword: Seeing our global economy whole. In: Dauber, R. and Cain, M. L., Eds. Women and Technological Change in Developing Countries. pp. xvii-xxii. AAAS Selected Symposium 53.
- Hoskins, M. W. Sept. 1979. Women in Forestry for Local Community Development: A Programming Guide. Grant No. AID/OTR-147-79-83. Office of Women in Development, Agency for International Development, Washington, D.C. 20523.
- Huston, P. 1979. Third World Women Speak Out: Interviews in Six Countries on Change, Development and Basic Needs. Praeger Publishers, Publ. in cooperation with the Overseas Development Council, New York .
- Jacobs, S-E. 1981a. Continuity and change in gender roles at San Juan Pueblo, New Mexico. Paper written for the Advanced Seminar on the Tewa (School of American Research, Santa Fe, New Mexico, 23-27 February).
- Jacobs, S-E. 1981b. Integrating women into applied anthropology for the future. Shimkin, Demetris, Eds. Cultural and Educational Futures, vol. 2, nos. 2 and 3. Stanford University Press, Stanford.
- Janeway, E. 1980. Powers of the Weak. William Morrow and Company, Inc., New York.
- Kanter, R. M. 1977. Men and Women of the Corporation. Basic Books, Inc., Publishers, New York.
- Kelly, M. P. F. 1981. The sexual division of labor, development, and women's status. Current Anthropology 22(4): 414-419.

- LaBastille, A. 1980. *Women and Wilderness*. Sierra Club Books, San Francisco.
- Lee, R. B. 1979. *The !Kung San: Men, Women, and Work in a Foraging Society*. Cambridge University Press, New York.
- Leghorn, L. and Parker, K. 1981. *Woman's Worth: Sexual Economics and the World of Women*. Routledge & Kegan Paul, Boston.
- Lowdermilk, M. and Laitos, W. R. 1981. Towards a participatory strategy for integrated rural development. *Rural Sociology* 46(4): 688-702.
- Mason, O. T. 1976. *Women's Share in Primitive Culture*. Gordon Press, New York. (Reprint of 1894 edition publ. by D. Appleton).
- McCormack, T. 1981. Development with equity for women. In: Black, N. and Cottrell, A. B., Eds. *Women and World Change: Equity Issues in Development*. pp. 15-30. Sage Publications, Beverly Hills.
- Merchant, T. 1980. *The Death of Nature: Women, Ecology, and the Scientific Revolution*. Harper & Row, Publishers, New York.
- Merchant, C. 1981. Earthcare: women and the environment movement. *Environment* 23(5): 6-13, 38-40.
- Mickelwait, D. R., Riegelman, M. A., and Sweet, C. F. 1976. *Women in Rural Development: A Survey of the Roles of Women in Ghana, Lesotho, Kenya, Nigeria, Bolivia, Paraguay and Peru*. Publ. in cooperation with Development Alternatives, Inc. Westview Press, Boulder.
- Micklin, M. 1977. The ecological perspective in the social sciences: a comparative overview. Paper presented at Conference on Human Ecology (Seattle, 4-6 Oct.).
- Millman, M. and Kanter, R. M., Eds. 1975. *Another Voice: Feminist Perspectives on Social Life and Social Science*. Anchor Press/Doubleday, Garden City, N.Y.
- Murdock, G. P. and Provost, C. 1980. Factors in the division of labor by sex: a cross-cultural analysis. In: *Cross-Cultural Samples and Codes*. Ed. by Barry, H. III and Schlegel, A. pp. 289-311. Univ. Pittsburgh Press, Pittsburgh. (Originally publ. in *Ethnology* 12 (April 1973): 203-225.)
- Murdock, G. P. and White, D. R. 1980. The standard cross-cultural sample and its codes. In: Barry, H. III and Schlegel, A., Eds. *Cross-Cultural Samples and Codes*. pp. 3-43. Univ. Pittsburgh Press, Pittsburgh. (Originally publ. in *Ethnology* 8 (Oct. 1969): 329-369.)
- Murphy, Y. and Murphy, R. F. 1974. *Women of the Forest*. Columbia University Press, New York.
- Newland, K. 1979. *The Sisterhood of Man*. A Worldwatch Institute Book. W. W. Norton & Company, New York.

- Newman, K. S. 1981. Women and law: land tenure in Africa. In: Black, N. and Cottrell, A. B., Eds. Women and World Change: Equity Issues in Development. pp. 120-138. Sage Publications, Beverly Hills.
- Noronha, R. 1980. Sociological Aspects of Forestry Project Design. World Bank AGR Technical Note No. 3. Agriculture and Rural Development Department, Central Projects Staff, Washington, D.C.
- Noronha, R. 1981. Why is it so difficult to grow fuelwood? *Unasyuva* 33(131): 4-12.
- Omvedt, G. 1978. Women and rural revolt in India. *Journal of Peasant Studies* 5(3): 370-403.
- Pala Okeyo, A. 1980. Daughters of the lakes and rivers: colonization and the land rights of Luo women. In: Etienne, M. and Leacock, E., Eds. Women and Colonization: Anthropological Perspectives. pp. 186-213. Praeger Publishers, New York.
- Pala, A. O. 1977. Definitions of women and development: an African perspective. *Signs* 3(1): 9-13.
- Papanek, H. 1981. The differential impact of programs and policies on women in development. In: Dauber, R. and Cain, M. L., Eds. Women and Technological Change in Developing Countries. pp. 215-227. AAAS Selected Symposium 53. Westview Press, Boulder.
- Papanek, H. 1977. Development planning for women. *Signs* 3(1): 14-24.
- Pasca, T. M. 1981. Concerning wood energy. *Unasyuva* 33(131): 2-3.
- Peterson, R., Wekerle, G. R. and Morley, D. 1978. Women and environments: an overview of an emerging field. *Environment and Behavior* 10 (4) (Dec.): 511-534.
- Poulsen, G. 1978. Man and tree in tropical Africa: three essays on the role of trees in the African Environment. 31 pp. IRDC-101e. International Development Research Centre, Ottawa, Canada.
- Rogers, E. M. 1976. Communication and development: the passing of the dominant paradigm. *Communication Research* 3(2):213-240.
- Scott, G. 1979. Recognizing the "invisible" woman in development: the World Bank's experience. World Bank: Washington, D.C.
- Scott, G. 1980. Forestry projects and women. World Bank, Office of the Advisor on Women in Development, Washington, D.C. (Report based on research by Mary Elmendorf, Consultant, May 1980)
- Seidman, A. 1981. Women and the development of 'underdevelopment': the African experience. In: Dauber, R. and Cain, M. L., Eds. Women and Technological Change in Developing Countries. pp. 109-126. AAAS Selected Symposium 53. Westview Press, Boulder.

- Severn, J. 1981. Wood Shortage 'other' energy crisis in developing nations. 23 August, The Seattle Times.
- Sherif, C. W. 1979. Bias in psychology. In: Sherman, J. A. and Beck, E. T., Eds. The Prism of Sex: Essays in the Sociology of Knowledge. pp. 93-133. The University of Wisconsin Press, Madison.
- Singh, A. 1978. The role of women in forestry. Winning Competitive Student Essay, 8th World Forestry Congress (Jakarta, Indonesia, 16-18 October).
- Smith, D. E. 1979. A sociology for women. In: Sherman, J. A. and Beck, E. T. The Prism of Sex: Essays in the Sociology of Knowledge. pp. 135-187. The Univ. of Wisconsin Press, Madison.
- Sonnefeld, J. 1967. Environmental perception and adaptation level in the Arctic. In: Lowenthal, D., Ed. Environmental perception and behavior. pp. 42-59. Dept. of Geography Research Paper No. 10. Chicago: Univ. of Chicago.
- Thomson, J. T. 1981. Public choice analysis of institutional constraints on firewood production strategies in the West African Sahel. In: Russell, C. S. and Nicholson, N. K. Public Choice and Rural Development. pp. 119-152. Research Paper R-21, Resources for the Future, Inc., Washington, D.C.
- Tinker, I. 1976. The adverse impact of development on women. In: Tinker, I., Bramsen, M. B. and Buvinic, M. Women and World Development. pp. 23-34. Praeger Publishers, New York.
- Tinker, I. 1981. New technologies for food-related activities: an equity strategy. In: Dauber, R. and Cain, M. L., Eds. Women and Technological Change in Developing Countries. pp. 51-88. AAAS Selected Symposium 53. Westview Press, Boulder.
- Vayda, A. P., Colfer, C. J. P., and Brotokusumo, M. 1980. Interactions between People and Forests in East Kalimantan. Impact of Science on Society 30(3). (Reprint No. 13, East-West Environment and Policy Institute, East-West Center, Honolulu).
- Wallman, S. 1978. Epistemologies of sex. In: Tiger, L. and Fowler, H. T., Eds. Female Hierarchies. pp. 21-59. Beresford Book Service, Chicago.
- Westoby, J. C. 1978a. Forestry, foresters and society. Journal of Forestry 23(1): 64-84.
- Westoby, J. C. 1978b. Forest industries for socio-economic development. Paper delivered at 8th World Forestry Congress (Jakarta, Indonesia, 16-28 October).
- Whyte, M. K. 1980. Cross-cultural codes dealing with the relative status of women. In: Barry, H. III and Schlegel, A., Eds. Cross-Cultural Samples and Codes. pp. 335-361. Univ. Pittsburgh Press, Pittsburgh. (Originally publ. in Ethnology 17 (April 1978): 211-37.)

Williams, P. J. 1978a. The role of women in forestry in the United States. Winning Competitive Student Essay, 8th World Forestry Congress (Jakarta, Indonesia, 16-28 October).

Williams, P. J. 1978b. Women in forestry. Position Paper presented to 8th World Forestry Congress (Jakarta, Indonesia, 16-28 October).

World Bank 1978. Forestry Sector Policy Paper. World Bank, Washington, D.C.

Wu Tsenglei, F. 1981. Solar energy in China. Paper presented at Renewable Energy: Global Perspectives Conference (Seattle, 19 November).

Zucher, L. G. 1977. The role of institutionalization in cultural persistence. *American Sociological Review* 42 (Oct.): 726-743.

Appendix

Standard Cross-Cultural Sample: Fuel-Gathering by Gender<sup>1</sup>

Exclusively by women (N = 94)

1. Nama Hottentot	59. West Punjabi	125. Montagnais
3. Thonga	60. Gond	126. Micmac
4. Lozi	62. Santal	127. Sauteaux
5. Mbundu	64. Burusho	133. Twana
6. Suku	69. Garo	140. Gros Ventre
7. Bemba	70. Lakher	141. Hidatsa
9. Hadza	73. Vietnamese	144. Huron
11. Kikuyu	78. Nicobarese	146. Nachez
12. Ganda	79. Andamanese	148. Chiricahua Apac
13. Mbuti Pygmies	85. Iban	151. Papago
15. Banen	86. Badjau	159. Goajiro
16. Tiv	87. Toradja	160. Haitians
17. Ibo	88. Tobelorese	161. Callinago
19. Ashanti	89. Alorese	162. Warrau
21. Wolof	90. Tiwi	163. Yanomano
22. Bambara	91. Aranda	166. Mundurucu
23. Tallensi	93. Kiman	167. Cubeo
25. Wodaabe Fulani	95. Kwoma	173. Siriono
26. Hausa	96. Manus	174. Nambicuara
27. Massa	98. Trobrianders	175. Trumai
29. Fur	99. Siuai	176. Timbira
30. Otoro Nuba	100. Tikopia	178. Botocudo
31. Shilluk	102. Fijians	179. Shavante
35. Konso	104. Maori	180. Aweikoma
36. Somali	106. Samoans	183. Abipon
37. Amhara	108. Marshalllese	185. Tehuelche
38. Bogo	110. Yapese	
39. Kenuzi	111. Palauans	
40. Teda	113. Arayal	
43. Egyptians	114. Chinese	
46. Rwala	117. Japanese	
47. Turks	118. Ainu	
48. Gheg	120. Yukaghir	
53. Yurak Samoyed	123. Aleut	

Predominantly by women (N = 24)

8. Nyakyusa	72. Lamet	143. Omaha
24. Songhai	82. Negri Sembilan	145. Creek
28. Azande	103. Ajie	147. Comanche
32. Mao	119. Gilyak	156. Miskito
33. Kaffa	122. Ingalik	157. Bribri
49. Romans	124. Copper Eskimo	170. Amahuaca
52. Lapps	134. Yurok	171. Inca
66. Khalka	142. Pawnee	186. Yahgan

Equal by both women and men (N = 12)

2. Kung Bushmen	63. Uttar Pradesh	121. Chukchee
14. Nkundo Mongo	68. Lepcha	150. Havasupai
42. Riffians	76. Siamese	154. Popoluca
44. Hebrews	94. Kapauku	158. Cuna

Predominantly by men (N = 12)

54. Russians	128. Slave	138. Klamath
57. Kurd	129. Kaska	149. Zuni
71. Burmese	132. Bellacoola	152. Huichol
115. Manchu	137. Wadaika	184. Mapuche

Exclusively by men (N = 25)

10. Luguru	65. Kazak	135. Eastern Pomo
18. Fon	77. Semang	153. Aztec
20. Mende	81. Tanala	155. Quiche
34. Masai	92. Orokaiva	169. Jivaro
50. Basques	97. New Ireland	177. Tupinamba
51. Irish	109. Trukese	181. Cayua
55. Abkhaz	112. Ifugao	182. Lengua
58. Basseri	116. Koreans	
61. Toda	131. Haida	

No data by gender (N = 11)

41. Tuareg	83. Javanese	164. Carib
45. Babylonians	84. Balinese	165. Saramaca
67. Lolo	136. Yokuts	172. Aymara
80. Forest Vedda	139. Kutenai	

No data on fuel gathering (N = 7)

56. Armenians	101. Pentecost	107. Gilbertese
74. Rhade	105. Marquesans	168. Cayapa
75. Khmer		

Fuel gathering activity absent (N = 1)

130. Eyak

<u>Summary</u>	<u>N</u>	<u>%</u>	<u>Corrected %</u>
Exclusively by women	94	50.5	56.3
Predominantly by women	24	12.9	14.4
Equally by both	12	6.5	7.2
Predominantly by men	12	6.5	7.2
Exclusively by men	25	13.4	15.0
No data by gender	11	5.9	-
No data on fuel gathering	7	3.8	-
Fuel gathering activity absent	1	0.5	-
TOTAL	186	100.0	100.1

<sup>1</sup> This data was coded by Murdock and Provost (1980). I generated this list from the Standard Cross-Cultural Sample computer tape put out by the Human Relations Area Files.

CHANGING SEX ROLES  
AND ADAPTIVE STRATEGIES

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What I'm here to do tonight is talk a little bit about sex roles--about the very difficult concepts of masculine and feminine--and some adaptations to help men and women work together in the professions and survive. It's very important to understand that we don't do most of our thinking about sex roles in a logical way. I went to school just down the road at Washington State University, and was taught that all decisions come from logic and thought. At 13, I thought that there was enough information in the library (which was enormous) to solve all the problems of the universe (not to mention all my own personal problems) simply by logic. However, decisions based on thoughtful information, logic, and reason are only half of the real decision-making process. The other way we make decisions is based on personal experience, emotion, history, culture--anything that maximizes our defense mechanisms. And when we talk about masculine-feminine, we learn a lot about defense mechanisms.

A classic example of this logic/emotion conflict is the way women dress. Here I am, wearing a double-breasted suit. I have grown up to wear not just my mother's clothes but also my father's. Logic (according to Malloy's Dress for Success) would dictate that the new businesswoman, especially a businesswoman in banking, has to wear a black, brown or navy blue skirted suit, if she hopes to be successful. Now why would a black, brown or navy blue skirted suit be the most successful outfit for a woman in the banking business? It's non-threatening! Logically, the least threatening thing to a male banker is someone dressed as a little male banker, wearing a skirt! It's clearly not male, because it's cut off at the knees, and it's clearly not female, because what feminine woman would wear a suit like that? The idea is, of course, that you can effectively neutralize the whole sexual issue. But have you noticed that women in those business suits don't stick with the logic. When I put on a double-breasted suit, I always do my nails. Emotion tells me, "If I'm going to dress up like a man, I've somehow got to hold on to my femininity."

It's a dilemma, trying to find a balance. I was working with a woman, a forester, one of the few women in the professional track. She told me that the first time she went out on the trail she wanted to look really professional, so she wore a plaid shirt and overalls and "waffle stompers" and the whole set. And the guy says, "Who's the dyke?" So the next day, she wore a pink T-shirt and designer jeans, and they said, "What are you trying to do, honey, turn us on?" It's a real dilemma, finding that balance between logic and emotion, femininity and masculinity.

Perhaps part of the problem is found in the continuing acceptance of the "insidious plot" theory. The insidious plot theory has two sides. The female version is that all the men in the world got together about 10 million years ago and had a meeting. At this meeting, they decided to give women a hard time--and they've been doing it very well. Conversely, the male version is that women all got together about 20 years ago, had a meeting, and decided to get even. And they are doing very well! As satisfying as the theory may be, subscribing to it can lead to some real on-the-job tension, but it's not really an insidious plot; it's just that a lot of values are changing, and it's hard to keep up with them.

I think maybe the best thing to do before we get to the present and future, is to talk about how we got here, because feminine and masculine are not logical concepts. If they were, we would all be dressed the same, and we would be doing what was appropriate for our strength and our intelligence. Nail polish is a classic example. How could any efficient, competent, reasonably intelligent woman wear nail polish? It's ludicrous! It takes a half an hour to apply, it chips, it's useless, right? If you break a nail, you can't even type.

The male equivalent, especially in the forest, is cowboy boots. Can you think of anything more useless on a trail than pointy-toed, high-heeled cowboy boots? I once asked a man, "Why are you wearing those boots?" He said, "You know, that's how we used to be able to tell the men from the women. Fifteen years ago, if a guy showed up in Hush Puppies, we knew that he had a little problem, and we wouldn't let him stay. Then new guys started wearing waffle stompers. It was a real problem, because we knew that there was something wrong with somebody who didn't have his boots on, but there was all this stuff about those being more comfortable and more suitable and being better trail shoes. So now you can't tell by the shoes somebody has on. But I don't feel safe in anything but cowboy boots."

So it's not that different, but it has nothing to do with logic. We can't adapt on a totally logical basis, which is what feminists have been trying to do. We feminists have been saying, "Why don't you simply be decent and humane?" It takes much more than that, because masculine and feminine are not logical concepts.

I have developed a "10-minute history of the world" to explain the entire history of masculine/feminine. It's a little general and I'm going to move very rapidly, just to give you a feel for your history. If you cannot come to terms with history, you're going to have a very hard

time understanding the changes we're facing as men and women. We are all caught in history, caught in our own time, and only a small part of our decisions can go beyond our emotional and cultural background.

So let's talk about males and females. To go all the way back in history, to look at ideals in terms of male and female, we must consider the fact that we used to live as small bands of human beings--primarily hunters and gatherers--with a high infant death rate and a high maternal death rate. We forget that 99 percent of our economic history was spent as hunters and gatherers. Those who survived were those who could best exploit the environment. So what was the kind of man you wanted to have as your man thousands and thousands of years ago? Or even 30 or 40 years ago? What was he like? What kind of man was he in economic terms, in this hunting and gathering society? He was strong. Was this not a time when it was better to be the third or fourth wife of Charles Atlas than the first wife of Woody Allen? Have any of you seen those Charles Atlas advertisements? This luscious woman is sitting on the beach (she's supposed to be that way, that's why I'm using that word) with this guy who's probably very sensitive and thoughtful, but he is thin. Along comes this big man who kicks sand in the face of the thin guy. What does she do? She gets up and goes off with the big guy. Her friend races home, cuts out the coupon, mails it in to Charles Atlas, lifts weights for six weeks, and goes back down to the beach, now even bigger than the other guy. And he bips the other guy in the nose, because he's still on the beach, and then what does the woman do? She comes back to him! Her mechanism of choice is bulk. If you're talking about a hunting and gathering economy that makes sense: you're talking about the possibility of starvation. You're talking about the person who's going to provide protection, the person who's going to provide that antelope on the doorstep. You're talking about survival.

We forget there was a time when we woke up in the morning and said, "Am I going to eat today?" Now when you wake up in the morning you say "Am I going to eat too much today?" In fact, if you look at the latest paperbacks, the question is not "Am I going to survive?" It's "Is there enough ecstasy in my life?" "Am I fulfilled?" It's a whole different thing. We forget that our masculine/feminine roles came out of a need to survive. So the strongest male was more likely to be the one that most women wanted to spend time with.

We're talking about an individual who was still with us about 30 or 40 years ago. I like to call him "The Stud." Cowboy boots fit this image quite well, because, for me, the classic example of The Stud is Gary Cooper in High Noon. This man, only a couple of decades ago, was a hero in every sense. He represented some kind of refinement over the old economic system of the hunter or gatherer, but what were this ultimate male's qualities?

Seven desperados, high noon, Grace Kelly waiting at the train. It's his wedding day, and he can't be a coward. You hear Frankie Laine singing in the background: "I could not be a craven coward." The message is that a man knows that his masculinity is more important

than his life. How many gunfights do men in our society see by the time they're 10 years old? What's the message of 90 percent of those gunfights? It's that your masculinity is more important than your life, and you don't get Grace Kelly or even Carmelita in the saloon if you aren't masculine.

What were some other characteristics of The Stud? He was a man's man, one of the boys, not real smart. (It was possible to be a smart stud, I think, but they didn't celebrate that a lot.) He didn't talk much either. In 1960 when I was in high school, we used to consider a man effeminate if he talked a lot. Nobody was hot for the guys on the debate team. The entire dialogue on all the Gary Cooper and John Wayne movies was "Yup," "Nope," "Howdy." The tall silent type, a man who would protect you, a man other men could count on, a man who would bring home the antelope, a stoic, a person of real courage, or, possibly, a fool. That is why High Noon is the celebration of the American hero, a classic film. But if you've seen any John Wayne or Gary Cooper movie, they're pretty much the same thing.

If you want The Stud so that this tribe can survive, who was the guy you didn't want in your tribe? We used to call them cowards, wimps, sissies. The message was that you not only didn't want this person as your spouse, but in some tribes you couldn't even stay in the tribe. Among the plains Indians, if you failed the warrior initiation rites, you could commit suicide, or you could become a eunuch. You could take some kind of role unique in the society. Not only was there no acceptance of individuals who might be described as gentle or creative, but there wasn't even room for them in some groups because we had an economic and a social system based on strength.

Let's consider these roles in 1980. What do we now call a guy who doesn't talk much, who's into arm wrestling? Macho. There are times when we all would like to have someone like that around, but we now use the word "macho" as a putdown. Do you know what it does to somebody who for 30 or 40 years has been a successful American hero-- even if it's only in Eugene, Oregon--when all of a sudden, his wife says, "You never talk to me", "You don't know how to communicate", "You're not sensitive", and "I don't need you to bring home the antelope anymore."? What does it say? It says, "You've become obsolete." How could that happen in 20 or 30 years?

What do we now call men who are thoughtful, good communicators, gentle, and have a full range of emotions? Liberated, sensitive. So The Stud has become Mr. Macho, and the sissy has become the sensitive man! It's a dilemma. You can still go to a playground now if you have a third grader and ask, "Are there any sissies here?" And it will take your third grader two seconds to identify them--"He's a sissy; he's a sissy." They're in the middle, still trying to make the change.

The main reason for this is not political or social, it's economic. Computers and word processing are the number one jobs for the future. Imagine for a moment John Wayne sitting in front of one of those little computer consoles--you know how frustrating they are, if you've ever used them--and the thing says, "Syntax error, try again." Now what's he going to do? He's going to kill it. John Wayne would shoot it!

Technology is the reason we have these changes, and it's important to understand that the forklift truck has probably contributed more to equal rights than most of the speeches, because it has given women equal access to the means of production. There is still a strength differential. Men are still stronger and faster than women, and you can arm wrestle until you're blue in the face, and you'll hardly ever beat one. But the strength differential has lost its economic power. It's tremendously important that we understand that--because there are all sorts of people who want us to go back to the old ways. The only way to get women out of the work force, the only way to go back to the old model, is to give up our technology. And nobody's going to do that.

Let's consider women. The ideal woman that you wanted in your group was a good mother; the number one thing was motherhood, because a tribe could not survive without children. The number one value was woman as reproducer. And, of course, many of our sexual rules and most of our definition of femininity have to do with reproduction. What happened if a man went out 40 years ago and fooled around. How did you find out if nobody actually saw him? How could you know? Lipstick on the collar, motel receipts in the pocket? How do you know? But how do you know if a woman 30, 40 years ago went out and fooled around? She got pregnant. Twenty or 25 years ago, we were afraid we could get pregnant from the toilet seat in the gas station. Now a lot of you are too young to remember that fear, but I grew up with warnings of "Don't go too far." And then I'd ask my Baptist father, "What's too far?" and he'd say, "You'll find out." They didn't tell you, and you really didn't know. I can see some of you nodding--you remember that fear. So not only was the need to control female sexuality built into the need to control the reproduction of children--because a society has to have control over its children, and women of course in reproducing have a different evidence level than men for various kinds of transgressions. But there's another element, and that is paternity. Women always knew who the father of their baby was. Men only knew what women told them. We don't think of that as important now, although everyone of you knows someone who knows someone who wasn't sure.

So control of female sexuality was tremendously important for a lot of reasons, not part of an insidious plot. When I was 10, I realized that the ideal woman was the Madonna; she reproduced without sex. I was raised in the Anglican church, and I went to Father Franklin when I was 10. He said, "Jenny, what do you want to be when you grow up?" And I said, "I want to be a Madonna." It was obvious in my church that there was no other option for women. And he said, "You can't be a Madonna but you can be like Sister Gladys Mary," who was a nun. I said, "I don't want to be like Sister Gladys Mary. People are nice to her, but she doesn't have any kids of her own." And he said, "Well, she's got all those kids in school." And I said, "But people say 'Isn't it sad that a lovely person like Sister Gladys Mary doesn't have her own kids?'. I don't want to be like that." He said, "Well, Jennifer, if you want children, you can be a wife and mother for the church." And I said, "No. To do that, you have to sin." Because at 10 years old, I had an Anglican mother and a Baptist father, and I knew it was

wrong. And I was never going to do it. So I said, "I want to be a Madonna. It's the best deal. You don't have to sin, you get the kids, and everybody thinks you're neat." And he said, "Jennifer, there are not enough immaculate conceptions to go around." And I, of course, then asked, "What's an immaculate conception?" at which point, he refused to discuss it with me any further and didn't speak to me. I think, for the rest of my career in the church. But the model was reproduction in a nonthreatening environment, through a nonthreatening situation.

If we go back in time, you needed a woman who not only would have children, but would care for them. You needed a woman to be there tending the hearth. You needed a woman who was not running around with the other guys while you were out on the hunt. You needed a stable hearth. I was Betty Crocker Homemaker of the Year in 1960, and I got a little pin that said "Home is Where the Hearth is." We've forgotten about the keeping of the fire.

So the Madonna was as essential as The Stud. But of course, it's unusual to pair those two together. It's a real dilemma, and we all are familiar with the double standard. So who is the woman you didn't want in your tribe? Do you remember? We didn't let them into pep club. Sluts. We called them "skids" in my high school. The Madonna and the whore. Always the two choices for woman, and the feeling that if you made one mistake, immediately you plummeted to the other end of the spectrum. Do you remember those fears?

What do we now call a woman who devotes her whole life to her homemaking, and who never has any outside activities, other than volunteer work. What do we call women who really fulfill this Madonna role? "Just a housewife" is one example. But be careful of stereotypes; we've done a lot of harm to our sisters already. That's one of the reasons the Equal Rights Amendment is in trouble; we alienated so many of our sisters. We didn't tell them how valuable we felt parenting was, and of course it's tremendously valuable. There is a new group, in Washington State anyway, called "Displaced Homemakers." What is a "displaced homemaker"? A displaced person is a person without a country. A displaced homemaker is a woman without kids or a house--widows, divorcees--women whose husbands are disabled or unemployed end up as displaced homemakers. And it's a tragedy. This was once a lifetime guaranteed role. You graduated from high school, and you were a good girl, and you got to marry a doctor or a lawyer, and then you lived happily ever after. My mother said, "Good girls get to marry doctors and lawyers, and bad girls marry gas station attendants."

What do we now call women who stay out alone at night, who have independent sources of income, are occasionally seen in bars with other women or with men who are not their husbands, who actually go on business trips unescorted and stay in hotels and motels unchaperoned, who are assertive? Professionals. Businesswomen. When I first started working with prostitutes in 1968, the term "working women" referred to prostitutes on the street; it did not refer to general working women. And, of course, they also called themselves professionals. It's an interesting change, isn't it? Can you see what we've done in 20 or 30 years?

For example, we have a president now who is the Gary Cooper: the hero, the cowboy, the gentleman stud. When you're in hard times, you choose someone like that. You want a hero; you need an illusion. He has a son who is a ballet dancer. Now that in itself is not that interesting, but his father did not go and see his son dance until last year. Now we could assume he was too busy, but the impression given by the press is that he felt uncomfortable. Now a man of his stature feeling some discomfort seeing his son in ballet gives you some idea of the incredible change in one generation that we're asking people to make.

The reason the Madonna has become the displaced homemaker is we've reversed the population mandate. Do you remember when you could go to you county fair and get a reward for having the most kids in the county? They had to be natural children. If you had 12 kids, you got a trophy, unless someone else had 14. What happens if you've got 12 natural children now? Does anyone give you an award? What do they call you? Irresponsible. Catholic. Mormon. On Public Assistance. Doesn't understand the connection. In 30 years we've gone from celebrating large families to saying large families show irresponsibility. Instead of being worried about not having enough people, we're now worried about having too many. We can't go back because of technology and population. So we have to go forward, and that's what I'm talking about.

You know about some of the positives and negatives of all of the changes, and I want to spend just a few minutes discussing strengths, both of women and men. The key, of course, to adapting is understanding this history, not thinking of it as the insidious plot, but as a vast, technological, economic and population change that a lot of people are caught in.

It doesn't feel very good to be obsolete. Ten years ago women were told, "When you're home with kids you're nothing." And it doesn't feel good for men who have been raised not to communicate, not to show emotions, to be told "Look, honey, I can get the antelope at Safeway. I don't need your protection. What I want you to do is be able to communicate with me. I want you to have a full range of emotions." One man told me the best thing about equal rights was now when there was a burglar in the house, he and his wife took turns. He no longer had to kill dragons to prove he was a man. But women still mistake kindness for weakness because during so much of our history we depended upon male physical strength. In her essay, "In Praise of the Sensitive Man," Anais Nin says we women do not reward the men we say we want as our friends and lovers. In fact, the joke is that we spend all day with these lovely sensitive men, and then at night we go out to the local country western tavern and see if we can find 'Tex'. Our sexual activities resonate to a different and earlier model. Look honestly at your sexual fantasies--a lot of cowboys. That is going to take longer to change than it does to change economics. Equal pay you can understand. Fantasies are something else. We told men that part of equal rights was that they didn't have to be a lifetime meal ticket any more. A lot of men still say they don't think women should be employed until all men are employed, and that sounds very

crude until you recognize that men do feel their masculinity requires them to be lifetime meal tickets. And that women, in fact, will not carry through on saying, "I won't think less of you if I bring home the bacon sometimes."

A lot of us are caught in history, caught in the middle. A stockbroker who had taken three months off because the stockmarket was terrible, came to me for counseling; he was depressed. His wife was doing well in her business and they had agreed that he'd worked for 16 years, so why not take three months off? The first month, everything was fine. He fixed cabinets and squeaking doors around the house and read books he'd never had time to read. He felt great. The second month, he heard her telling her mother, "Gee, Mom, what if he doesn't go back to work? What if he turns into a bum?" The third month, she had an affair. And when they came to me, she said, "I just got this feeling that he wasn't the same man anymore." All this because so much of his masculinity had been linked to his ability to produce, just as so much of a woman's femininity has been linked to things like feminine symbols for reproduction.

We have a lot of strengths, and I hope the end result is not women adopting the stud model. Instead of some nice balance between the qualities of the stud, the sissy, the Madonna and the whore, what I've seen is a lot of women not opting for their own model, not opting for an amalgamation of their past and the present, but becoming studs! You can go to seminars to win by intimidation, to be a businesswoman who doesn't deal with feelings, who "runs in the fast track." Haven't we seen enough of what that model does to men? What's the message? The message is that we're moving so fast in these sex role changes that we're missing the balance. And women are forgetting the qualities they have to offer, and men are forgetting the qualities they have to offer. I want to share with you those qualities, and then we'll deal with what you need to survive in this decade.

Women have a special heritage, a special power, and I see them walking away from it; that is not the way to adapt. This heritage is something we should cherish. First of all, women have an awareness of whole systems, because we had to live with both the in-laws and our own family. We had to keep everybody somehow functioning together. We couldn't isolate ourselves, but men in their work environment frequently could. Women also have an ability to deal with feelings. We frequently say that women have been economically deprived, but, in truth, men have been emotionally deprived; they've been denied a full range of feelings. Women have not. Yet today women are attending seminars to learn how not to use their intuition, to learn how not to cry at work, to learn how not to feel. But I can't think of anything that we need more in the professional world than emotions and sensitivity. And we're throwing it down the drain for a stoic model already proven nonfunctional.

Women can live with uncertainty, partly because we have lived for so much of our history with other people making the decisions: "Dear, we're moving to Poughkeepsie." And according to the corporate model, you say, "Oh, fine." You get the packing boxes and you pack every-

thing up, and he goes on ahead to his business meetings, you gather up the children, you move everything. Within 24 hours you settle into a new house, giving a party for all the other vice presidents, saying, "Oh, I'm sure we'll love it here, dear." We may complain about adapting, but in fact that psychic flexibility is a strength. The fact that women have that ability to adapt and to live with uncertainty is a positive quality, and there's no reason to deny it. Women have an orientation toward the longer term, which is essential in business. And we learned it in the back seat of cars in the drive-in. If I say yes, there's an 18-25 year obligation--forever compared to the obligation of the male. Men have been able to separate the creation and inventing of something from the following it, from the responsibility for it. Women have maintained it; all of society needs it.

Moreover, women understand cultural oppression. If we're going to survive in this decade, given the world that we live in, not the world that people would like to pretend we live in--the actual world in terms of population--we must have a deep understanding of cultural oppression and what it does to individuals. Women have that understanding. But I see them giving it up, walking away from recognition of individuals who live in circumstances that once were comparable to ours.

Women have a unique perspective and a unique potential, and don't let anyone talk you out of it, because your strength in adapting is to keep all of your past strengths while you add new ones. We must not believe that we need to abandon one dimension to move on to another. Why abandon all of those qualities just because they're womanly, because they're feminine?

There are things we can learn from men. They have a lot of qualities that we need, even though we occasionally disdain them. For example, men have much more experience with independence. There was a time in my life when I realized that I could no longer say, "Well, I'll give this up and go home and have a baby." I used to hold that out as an alternative. If I got tired at work, I'd say to my husband, "I'm going to go home and have another baby." And he once said to me, "I can't do that. I can't go home and have another baby." We always had a dependent alternative. Men have much more independence and it's something we need to learn.

Personal courage is a quality that I've seen in both men and women, but I've seen a great deal of it in men. I joked about the burglar in the house, but if you have a long history of Gary Cooper, it does add something to your ability to handle threatening situations.

Men are better risk takers than women, better able to deal with professional insecurity. We always had to plan for the security of our children, the stability of the home. Men are better at solitude. We're learning, but men have so many more models for being alone. We grew up thinking being alone was sick, being alone was bad breath, being alone was being a spinster. Men grew up with images of Davy Crockett in the forest and the idea of the man on the quest. A man alone was thinking and a woman alone was pining for the man. Men can teach us a lot about solitude.

Men have had so much more experience with responsibility and teamwork, and a lot of it comes, of course, from sports. Any of you that have little girls playing soccer must realize they're learning some very valuable skills.

Men are also better at depersonalizing conflict. Women personalize conflict. This took me a long time to learn. I learned it from my husband, who's a politician. Somebody would say something nasty about him, and I would go to a party a week later and I'd see this person and I wouldn't talk to them. And then I'd notice that my husband was over there chatting with him five minutes later. I'd say, "Honey, why are talking to that man? You know what he said about you." He said, "Sweetie, that was on the last project. We're working on a new project now." Women personalize conflict, because so much of our conflict came out of family relationships which were personal and intimate. We haven't had as much experience dealing with business type conflicts, and so are unable to separate it from ourselves. There are many things that men and women can learn from each other.

There are some other things women need to look at in adapting. Women have high needs for approval. If you didn't get approval, you not only didn't get into pep club, but you didn't get to marry anybody. You were an outcast. A lot of our needs for approval were built on punishment which was excessive if we stepped over the line. We still have those desperate needs for approval, and it doesn't work in most professions. We need to build our self-esteem and our self-worth and not be so dependent upon others. It interferes with our ability to adapt. We have a lot of ambivalence about self-worth, because of our history. We've been devalued, and you can't make those changes in how you feel about yourself in just one generation. Nobody likes criticism, but women in particular handle criticism poorly. We personalize it. We also devalue our achievements. And we are accused of being unable to collaborate with women, competing rather than cooperating. But it doesn't take long to understand the source of that competition. Thirty or 40 years ago, your entire future as a woman, economically and socially, depended upon one decision: who you married! You made that decision between 18 and 21, and you competed with other women for the few elite men who would make your life wonderful. Harlequin Romances are selling millions, and the theme is always competition for the man who will make your life beautiful, exciting. It's hard for us to collaborate, but we're getting better at it. There's no question that the biggest gift of the Equal Rights movement is sisterhood. We've now got some special relationships that we didn't have before.

Women also fear success and confrontation. We fear that such things are not feminine. We expect people to read minds. We don't want to confront; we want them to know that our feelings are hurt, or that we've been discriminated against, or that we don't like what's going on. Because somehow it's not feminine of us to say something, and if they were really nice, they'd know anyway. Mind reading does not work. It's not how men operate, and it doesn't work very successfully in business.

We also find it hard to give up old strategies that don't work. Most of us are caught between the old styles of hustling and the new styles of hustling. The new styles are based on confidence and efficiency, determination and commitment. The old styles are being cute, needed, sexually seductive, and all the rest. Most of us play whichever style will work at the time. We're caught in ambivalence. But because men are ambivalent as well, the mixed messages are incredible. We're caught between knowing what we don't want and not knowing what we do want. And the clarification of those messages is essential.

Perhaps the key if you want to adapt, if you want to be successful in the kind of changing world we have now, is to know what's important to you. Ask yourself: "What do I want?" It's not an easy question to answer, is it? But whether you are female or male, it's very hard to get the best from what you do if you don't know why you're doing it. Try this little exercise; it may help you discover what you want. Every morning spend 30 seconds asking yourself: "What do I want?" Jot down the first three "wants" that come to mind, no matter what they are. Do that for seven days in a row. Then, go over the list; cross off those things that are really what your mother wants, or what your father wants, or what your spouse wants, or what you think the Forest Service wants. Pare your list until you get to the things that you want. And if you know the things you want, you'll get them.

Developing such a list is hard for women; women know what they don't want--they've had a lot of training in that. But women don't truly understand what they do want. Men, on the other hand, have had considerable training in what they should want, but they're just beginning to discover what they don't want. In consequence, many men and women are confused, and end up fighting over things neither really wants.

You also need to know what's truly important. In your job, are ethics most important? The balance between home and work? Community service? Creativity? Money? Status? Colleagues? Environment? You must know what is important to you; no job is going to have it all. Women have not spent enough time in the work force, so we have this feeling that the job should include everything; it should be paradise! We have forgotten that jobs are primarily to earn money. It's nice if you can work creatively in a pleasant environment with pleasant people. Basically, if you get paid, that's supposed to be enough. But many women have very unrealistic work expectations. These women are very disappointed when they don't find the comradeship or the creativity. A contemporary woman's view of work is often not the male traditional view of "I've got to work to eat," even though most women work to eat. Behind that is the perception that, "I'm working because I want to be a career woman." That, however, implies an artistic choice which is not a realistic option for most women. Even so, you may still be trapped in that perception, and that makes it hard to adapt.

So here we are in 1980, where a couple of things are tremendously important. First of all, we need a tolerance for people's history, a tolerance for people's sense of masculinity and femininity. You cannot

pull people kicking and screaming into 1980 and assume they've had the same experience as you. We need far more tolerance from men as well as from women. It's not an insidious plot. It's an adaptation to a new environment, to a new technology, to new reproductive values--and it will take time. And patience seems to be one of the things that is hard for us to learn.

For this decade you must come to terms with your own personal history as masculine or feminine, and then give the same respect to someone else's history. Come to terms with your physical image. That's hard for women and for men. The fact that we are consumed by the rejection of our physical image is one of the things that gets in our way as women. There was a time when you got married if you were a Barbie doll and you didn't get married if you weren't. That has led to a tremendous rejection of physical image, and when we look at hazing and harrassment on the job, women's sensitivity to their physical image is one of the key areas. If you can't come to terms with your physical image, you can't even get to personhood. You're forever stuck in the cheerleader syndrome, and it gets in your way. This problem gets in men's way as well, but men could always compensate for homeliness with money, and women were never taught that they could compensate for anything if they weren't 5'2" or whatever. Esquire magazine did a recent survey of the women that young professional men of 30 wanted to marry. They had done the same survey 30 years before. Then the men had answered that they wanted her to be 5'2", blonde, built, and a nice girl. Thirty years later in 1981 the number one quality they wanted in their women was competence. They said in effect, "I don't want to be married to Betty Boop! I want someone who will share my life, who will share my responsibilities." The second thing they wanted was for her to be about this tall, etc., but it was the second thing.

Avoid buying the male model. Now I would tell men to avoid buying the female model. There is a balance in between, and we can offer each other both a great deal in that sense.

Work on an ability to take risks, to give up investment in the structure. Often when you're fighting with someone else, it's because you don't want to take a risk. You want to hold on too tightly. Recognize that you're caught in continuous physical and psychological change. Things are going to just keep moving, and you really can't assume that anything is going to stay in place. And if you accept change and make an adventure of change, you won't be resentful when you're faced with it.

Recognize that success is a journey, not a destination. Most of us grew up with the idea that some day we would get there. We forget all the stuff that goes on in between. "As soon as I can walk, I'll be there. When Mom lets me cross the street, that's when I've got it made. When I get to go to school, then I'll really have it together. Look, when I finally get my driver's license, then I'll be there. When I graduate from high school. Well, you know, it'll be when I get married. Then I'll have it; that'll be it. When I have my first baby. When the kids finally grow up and leave, then I'll finally have it. When I retire." Success is the journey; it is not the destination.

Success is every single day, yet many of you are pushing for goals that have nothing to do with today, that only have to do with some striving as your whole life goes by. That's a nonfunctional male model.

Set up alternative plans, regardless of what you think your future is in your business. Set up at least three alternatives, three alternative lives. If you lose one, you've got another.

Individuals who are going to be successful in this decade are going to rely on intuition; they're going to rely on their insight. They're going to believe that everybody can win instead of fighting among themselves. That's a hard one. You can choose win/win, you can choose win/lose, you can choose lose/lose. Win/lose means I can't win unless you lose, and we see a lot of that. Lose/lose says that if I'm going to lose, so are you. And win/win says we can both succeed in this. That's what men and women have to talk about when they're working together. Those who are going to survive have visions, and they act on their visions. They don't limit themselves; they don't take themselves too seriously. You can't survive without humor. Survivors see problems as challenges, not obstacles. They continue the learning process; they can handle criticism. They have some sense of meaning in their lives beyond themselves, a sort of philosophy or a spiritual center. Those who are going to be successful in this decade don't ask themselves about masculine and feminine or men and women. What they do ask is, "What do I want? What is truly important?" And if they can answer those questions, they know it's exactly what the other person wants as well, especially when you ask, "What is truly important?" We need balance. I hear of people swinging from one extreme to the other. Women give up families to enter business; men give up business to be with their families. Where is the balance? After a year of asking people for their definition of nirvana, a man finally said to me, "Ecstasy is when you can go to your own home and feel comfortable." I think the key issue when we talk about adapting, when we deal with masculine and feminine, is you have to be able to go home. And if you forget that, all the economic success in the world is not going to give you what you want.

## COMMUNITY MANAGEMENT OF NATURAL RESOURCES

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### ABSTRACT

Management of natural resources is a challenge communities have faced throughout the ages. Residents select their resource management strategies in relationship to technologies available within their socio-cultural, economic, and political realities. New technologies are required as rapid changes in developing societies have made many former management schemes inadequate. Professional development programmers for community level natural resource management need to learn about the total technical and social environment of the community and the multifaceted nature of the interest groups living in the community. Women not only have separate social and technical information, they have distinctive needs. Because of their particular economic role, diminishing availability of natural resources near homesites impacts most directly upon them. Development programs must incorporate women's as well as men's separate knowledge and skills and focus on solving their separate problems for the benefit of the family and community, and for the potential success of the program.

### CUSTOMARY LAND USE PRACTICES

Community natural resource management planning is not new. Communities have always had ways to divide, utilize, and conserve, in order

to maximize their various natural resources. When outsiders see as irrational the local choices of land and water use by farmers, or of land and natural vegetation use by herders, it may be because changes have occurred too rapidly for the community to develop adequate new management strategies, or it may be because the outsiders judge the benefits by different standards or incomplete information. The selection of how to use natural resources is based not only on understanding the technology, but on understanding the socio-cultural, economic, and political dynamics of the particular community.

### The Dyak Farmers

An excellent example of adjustment in community use of farming land, caused by changing social, political, and economic forces, comes from a study done in Indonesian Borneo (Dove 1978). There the Dyak farmers use swidden or "slash and burn" agriculture. At one period of history they exploited primary forests, in another period secondary forests, and finally they came back to primary forests. A person who was technically focused might not understand that the Dyak choices were based on an understanding of the technical implications and differences caused by each change. The farmers, however, understood that the primary forest required more work to clear and the soil was less productive, but throughout the growing season less weeding was required. Therefore, weighing carefully these technical choices, they selected which land to use based on the type of life they lived.

During the early period they were headhunters surrounded by headhunters. In this case farmers chose to farm the primary forestlands so that while they were clearing, people of neighboring villages were also working to clear land and all the farmers could work with relatively little threat to their safety. Because land from primary forests required less weeding and tending throughout the year, their wives and children could be left safely in the village when the men went out on warring parties. Their choices were therefore made on the basis of the period that the labor was required and the safety of their families.

When headhunting was outlawed, the Dyak community changed to using secondary forests which gave increasing yields and allowed more spread out labor requirements during the growing season. Because the community was no longer threatened by neighboring headhunters, emphasis turned to the largest possible production.

However, a third change came about and the group switched back to primary forestland. Increasing numbers of neighbors began to settle, causing fear of future land shortages. A custom developed that once a farmer cleared land, he could claim it, even passing it down within the community to the next generation. Farmers chose to clear as much new primary land as possible as they considered the previously farmed secondary forestland already "theirs." Because it was also customary to clear only the field next to the one previously used, farmers revived a custom which allowed them to clear more fields than they could farm in one season. Among their customs was one which classified certain signs as foretelling bad luck. If, for instance, a specific type of bird sang

while one cleared land, it indicated that this field would not bring forth a good crop. After farmers started clearing a field, they would declare they had heard this bird or had seen another sign and they would leave the first plot and move to clear the adjoining one. The farmers accumulated more land in this way.

An outsider looking at the technical use of land and land use planning would see only an illogical, superstitious, confused land use. To understand the choice, one must understand the total contexts within which the Dyak people were working and selecting the most overall rewarding use of their resources.

### The Touareg Herders

An example of a changing pattern of the use of water and natural vegetation management comes from the Touareg herders called Blue Men of the African Desert. In the early historical period before colonization, the Touaregs had very strong groups of herders that maintained strict control over large areas of land across the desert and into the Sahel. They controlled both the vegetation use and the water use by limiting the number of people who were allowed to cross their land, enter their territory, and to drink at the wells. They also limited the number of their own animals to be sure they did not tax the carrying capacity of their vegetation and water.

With the influence of Muslim law, the herders adopted the custom of being hospitable enough to allow outsiders to cross their territory with one drink at each well. This put an added stress on the environment but the Touaregs still maintained a careful watch over the animal/resource balance. However, when the colonists arrived and broke the power of the Touaregs, the entire resource management changed. Later governments created new wells opening access and use of this area still further, encouraging groups that previously had not ventured so far into the desert. At this point the Touaregs found no reason to continue to limit the number of their own animals. What resources they did not use, outsiders would.

After the most recent devastating drought, observers noted that the overgrazed desert and Sahelian areas could not support even minimal numbers of animals. They concluded that the herders had no concept of the carrying capacity of the land and no idea of limiting their own herd size. Outsiders did not understand that the Touaregs used their resources in the way that appeared to them most suitable within the realities of their changing socio-economic and political contexts. Their choices were not made irrationally, nor were they made without an understanding of the consequences of their natural resource use or misuse.

### NEW DEMANDS ON RESOURCES

Throughout the world, the socio-economic and political situations are changing. Moreover, the demographic and technological situations are also changing. Old ways are becoming impossible to sustain.

In Sierra Leone, cutting trees on hillsides and along streams, which has been forbidden by custom throughout the generations, is now being done. Local people realize that cutting these trees is causing eroding soil and silting ponds. But introduction of cash cropping and growing numbers of local residents has increased pressure on available land and made it such a scarce resource residents feel they can no longer afford to follow former conservation practices (FAO 1980).

In India where women have traditionally collected fuel and fodder and raised vegetables, women are finding that with the increasing over-use of land near their homes they are unable to continue providing these commodities for their families. A number of cases have been reported of women committing suicide because of this inability to fulfill their family obligations (Mishra 1978).

In Yemen, where the mountainsides have been terraced and farmed for generations, the farms are becoming smaller as the population grows. Farmers are no longer able to fully sustain the family through farming. Men are leaving to get jobs in oil fields in neighboring countries and women, unable to add to their activities the adequate repair of terraces, are having to watch these old walls break and the soil wash irreparably away (Weber 1981).

There is interest among all these peoples in finding new technical solutions to ease their land pressure and to increase availability of natural resources.

#### RESOURCE MANAGEMENT PROGRAMS

There is new interest among American and other technically trained development professionals in introducing to these developing countries new integrated programs with natural resource planning at the community level. This interest is growing because of disappointment with earlier development strategies: it is evident that industry, even agro-industry, cannot be built without an effective agricultural program based on sustainable use of resources; and the sector specific programs with which donors have been involved, have proven less than effective. Agricultural production agencies, which have seen soil being ruined after they have cut all the trees and opened land to erosion, are now becoming interested in planting trees. Foresters are realizing they cannot fix a moving dune without addressing the livestock problems.

#### The Social Science Perspective

As a social scientist accustomed to looking from the local residents' perspective, I welcome more integrated community-based agro-forestry, farming systems, and community resource planning. However, I plead for two social science perspectives to be integrated within this technical focus.

Local Knowledge. First, as the Dyak and Touaregs have shown, modern technical information does not come into a vacuum. Each community is a storehouse of technical, social, political, and economic information based on historical, geographical, and ecological reality. Technically trained professionals will be able to predict much more accurately the potential success of their ideas if they can successfully tap this source of information.

Community Dynamics. Communities are not made up of static, organized interrelationships. Communities contain competition, feuds, loyalties, and conflicting needs. Even "the poor" is not a static monolithic group. What helps poor farmers may disadvantage poor herders; what helps urban poor may disadvantage poor rural dwellers; what helps poor men may disadvantage poor women. To illustrate the point let us look at the latter, the specific interrelationship of men and women and its effect on resource planning. Examples from Africa, Latin America, and Asia all show the following: 1) women are generally limited to resources around the household because of their nurturing as well as economic roles; 2) women are generally involved in subsistence activities while men are more active in cash crops and other market economy ventures; 3) women have traditionally used resources in an extensive, not an intensive manner; 4) as resources dwindle and men leave the rural areas, more women are becoming heads of rural households; and, 5) as natural resources become scarce, women are the first to be disadvantaged (Palmer 1980).

West African Family Economic Roles. Let me talk a little about West African farming communities where I have worked most recently. Families have separate and complementary economic activities. It is very common for men and women to raise cereal crops together, however, men are responsible for the family's grain supply. Men can sell surpluses for money with which they may buy personal items. Men also raise most of the cash crops.

Women are responsible for the vegetables, oils, leaves, fruits, etc. which make up the nutritive stews that are served with the starchy cereal staple. Women raise vegetables or surplus grains on extra bits of land near home. They make and trade or sell surplus items in order to obtain salt, sugar, and other needed supplies. Beyond this, women are responsible for their own clothing, spending money, and the clothing and school supplies of their own children. Women gather and carry wood for cooking and wild foods from the bushlands. They collect water from ponds or streams or wells near their home. They raise small animals on nearby brush, tree leaves, and grasses. When women grow vegetables, it is on otherwise unused lands near their households. They may also fish in nearby waters. They make medicines, crafts, and often obtain housing materials from these lands (Weber and Hoskins 1982).

Women's Increasing Resource Problems. In the past, collected and gathered items seldom entered the market economy. However, with the demographic and technical changes, and the increasing value for land used in an intensive way, availability of land to use in an extensive manner is becoming more limited.

As resources become scarce, women, whose contribution to the family's well being is based on an extensive use of good lands near the household, are the first to lose their resource base. There are many examples of development programs which exacerbate this problem. For instance, male farmers who head households are being favored in land tenure programs. This disadvantages women headed households and reduces traditional protection of womens' farming activities if men run short of funds. In designing most agricultural and forestry development programs, women's use of land is neither considered nor protected. Examples from agricultural rice projects often show areas of land being allotted to families by the number of working members in the family. When women work in the rice fields all day, they do not have time, nor are they given land upon which to raise their traditional vegetables. Land that is generally seen only as bush or waste land is in fact the land from which women collect many products necessary to their way of life. Such a resource is not ordinarily provided to families in agricultural production schemes.

In forestry projects, bush lands are usually cleared in order to plant fast growing trees. Local residents cease having access to this land and the resources on it when projects begin. Though the newly planted trees may increase land production and value, families that had counted on resources these areas provided may find themselves suddenly disadvantaged in favor of fuel for urban dwellers or for timber revenue for the government.

New Economics of Family Resource Allocations. Many communities and families can no longer afford large areas of bush land near the village for collecting fuel, food, and other products. They can no longer leave these lands unplanted for the benefit of grazing small animals or collecting wild products. However, the economics of benefits foregone have never been adequately assessed by developers and perhaps by the families themselves. While men introduce cash crops, women are finding it necessary to walk further for fuel. Women are ceasing to make local medicines. They are having to purchase more oils, leaves, foods and crafts items for their own use and have fewer items to trade or sell. Some women are having to give up garden areas and must purchase more or serve fewer vegetables.

Melinda Smale has done a very interesting study in Mauritania of all the items that herders' wives formerly collected which they are finding increasingly difficult to locate and are frequently having to purchase (Smale 1981, Fleuret and Fleuret 1980, O'Kafor 1980). In numbers of countries in the last five years whole new major market areas have sprung up where one can purchase these formerly readily available products. Kjell Christophersen of the university of Idaho, has been developing a methodology for realistically assessing the economic value of these formerly invisible items. Project planners need better ways of estimating the value that is foregone when bushland and womens' garden plots are converted to intensive farming or forestry (Weber and Hoskins 1982). Without this information microeconomic assessments are inaccurate. Without more complete understanding of current land use, developers may not understand the most common reason local residents resist new land use recommendations. We also need research which provides new technology

options for producing these essential items more intensively or economically.

Women's Access to Improved Technology. If programs begin to focus on research and new technologies for producing these formerly hidden items, the programs will have to be carefully designed or women may still be disadvantaged. Moving from extensive to intensive use of land requires technical knowledge that is not always available to women. This is a problem of particular interest when viewing ways to increase resources traditionally seen as women's.

An example of a typical approach to technical agricultural training comes from Upper Volta. Men were given information about higher productive seeds and various methods of plowing. In most areas of Upper Volta it is the women who do the majority of gardening and farming, and in this program only the men were being trained. Program officials acknowledged the truth of this criticism and announced that the school would start training teams of husbands and wives together. Upon later investigation, however, one saw that the new program they offered emphasized only consumption skills for women, such as hygiene and nutrition, and continued to emphasize agricultural production skills for the men. If women are to improve their use of resources, this access to information must be changed.

An example of women's limited access to improved technology comes from Niger. A voluntary organization introduced cement-lined wells and improved seeds through the extension service. In one community the extension service, made up of men, provided these improvements to local male residents. The men then proceeded to take over the land that was traditionally gardened by women for the new type of highly lucrative irrigated gardens. In areas where the standard of living is already low, it is crucial that economic roles of all the productive family members be increased, not stifled.

## CONCLUSIONS

Any agricultural or forestry innovation may increase the production of an area and the income of the local family. At the same time, however, the changing use of resources may decrease the family's level of nutritional and general well being, as well as women's ability to fulfill their traditional economic roles. In natural resource planning these sexual differences and needs must be considered and alternatives developed which are economically and socially viable as well as technically responsive.

We need new concepts of land use planning that focus on needs and interests of all family and community members. Currently, if you ask men about forestry species, they may tell you they need timber trees for cash income. Women might talk about access to fuelwood, fodder plants, fruit and nut trees, and trees with tertiary products. Women in Sierra Leone in one evening named 31 uses of forestry products,

identifying which came from the different stage of regrowth on the fallow land and which from the high forest. The men, however, knew and used different forestry species for different products. Currently, if you ask men what crops they want they may ask for peanuts or cotton, whereas women may want more access to gardening for family consumption. These demands are all legitimate and should all be considered.

Women need to have better technologies made available to them which might include rearing traditional plants in a more efficient manner. They need to have choices of species to use as live fencing and in hedgerows. They may need access to trees that yield medical ingredients, foods and such items as tannin for tanning leather. When resources are allocated, women must receive the lands closest to the village if they are to continue their nurturing role. Altogether, there should be a more realistic land use planning to assure the family and the community the best from the total resources available.

As we work with more technical aspects of local resource management we must learn more about local subsistence needs. We should study extensive, as well as intensive use of land, looking at the real economic value of free goods which could be lost with alternative land uses. We must disaggregate information and statistics, bending over backwards to talk not only with the male and powerful village elders but also with the people of the disadvantaged classes, and certainly the women of all classes. We must also include women professionals on the teams that plan and evaluate projects. These women have a better chance of communicating with local women in all planning efforts.

In summary, I would like to reemphasize the following issues. We must look at technical, social, political, and economic information known already in the communities, and learn from the experts who are community residents themselves. Men and women both have separate and complementary knowledge and we must no longer ignore the expertise of women. We must realize that communities are not made up of static, organized, monolithic groups. They are made up of a number of individuals, many of whom have conflicting needs. Men and women often have competing needs for land use, and when we look at the communities, we must address the needs of both.

As we call for integrated resource planning, we too must integrate our technical and social science approaches and make our best information and skills available to rural women and men residents in developing countries so they may better meet the challenging days ahead. Community management of natural resources may not be new, but never has the demand to maximize resources for the benefit of the total population been so great.

## REFERENCES

- Dove, Michael. 1978. "The Significance of the Distinction Between Primary and Secondary Forest in the Swidden System of the Melahan Kantu." Paper presented in the Department of Anthropology, University of California, Santa Barbara.
- F. A. O. Assistance to Local Community Forestry in Sierra Leone. 1980. Rome: FAO/SIDA.
- Fleuret, Patrick and Anne Fleuret. 1980. "Nutrition Consumption, and Agricultural Change." in Human Organization, Vol. 39, No. 3.
- Mishra, Anupan and Satyendra Tripanthi. 1978. Chipko Movement: Attarakand Women's Bid to Save Forest Wealth. New Delhi: People's Action.
- O'Kafor, J. C. 1980. "Trees for Food and Fodder in the Savanna Areas of Nigeria." in the International Tree Crops Journal, Vol. 1 (1980): 131-141.
- Palmer, Ingrid and Ulrike von Buchwald. 1980. Monitoring Changes in the Conditions of Women - A Critical View of Possible Approaches. Geneva: U. N. Research Institute for Social Development.
- Smale, Melinda. 1981. "Hidden Economic Uses of Trees, Shrubs and Bushes; A Case Study from Mauritania." Mimeographed.
- Weber, Fred. 1981. Personal communications.
- Weber, Fred and Marilyn Hoskins. 1982. Harvest and Use of Natural Vegetation in Arid and Semi-arid Africa." Newsletter, International Union of Forest Research Organizations (forthcoming).

## WOMEN OF THE FOREST: AN INDONESIAN EXAMPLE

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## ABSTRACT

The involvement of Dayak women in the forests of East Kalimantan is outlined in this paper, focusing on agriculture, collection of minor forest products, and gathering of wild foods. The results of a multidimensional scaling technique, called "Galileo," are then presented. Differences between young people's and adults' perceptions of people and their environment are investigated as indicative of the directions of change in the community of Long Segar. The possibility that the differences observed reflected a simple difference in life experience under conditions of social stability as well as under conditions of change prompted a replication of the Galileo with the same ethnic group in the remote interior. The uniqueness of the young people's responses in Long Segar, as contrasted to the other 3 groups, suggests that the Galileo indeed provides some useful quantification of the directions of change.

## INTRODUCTION

Since my earliest days in Anthropology, I have been interested in such amorphous topics as "world view," "epistemology," "cognition"---all the things that are so difficult to gain access to, and which, once accessed are so hard to convey to others. In this paper, I'd like to provide some conclusions I drew on the basis of a year's participant observation in a Kenyah Dayak village in East Kalimantan, about women's perceived roles, particularly as they relate to resources and their management. I will then provide you with the results of a quantitative study of cognition which I designed to supplement my qualitative, ethnographic approach. The importance of women's roles in development and resource management is beginning to be widely accepted, but a general uncertainty about how to act on this realization remains. The research reported here represents part of a larger attempt to address that problem.

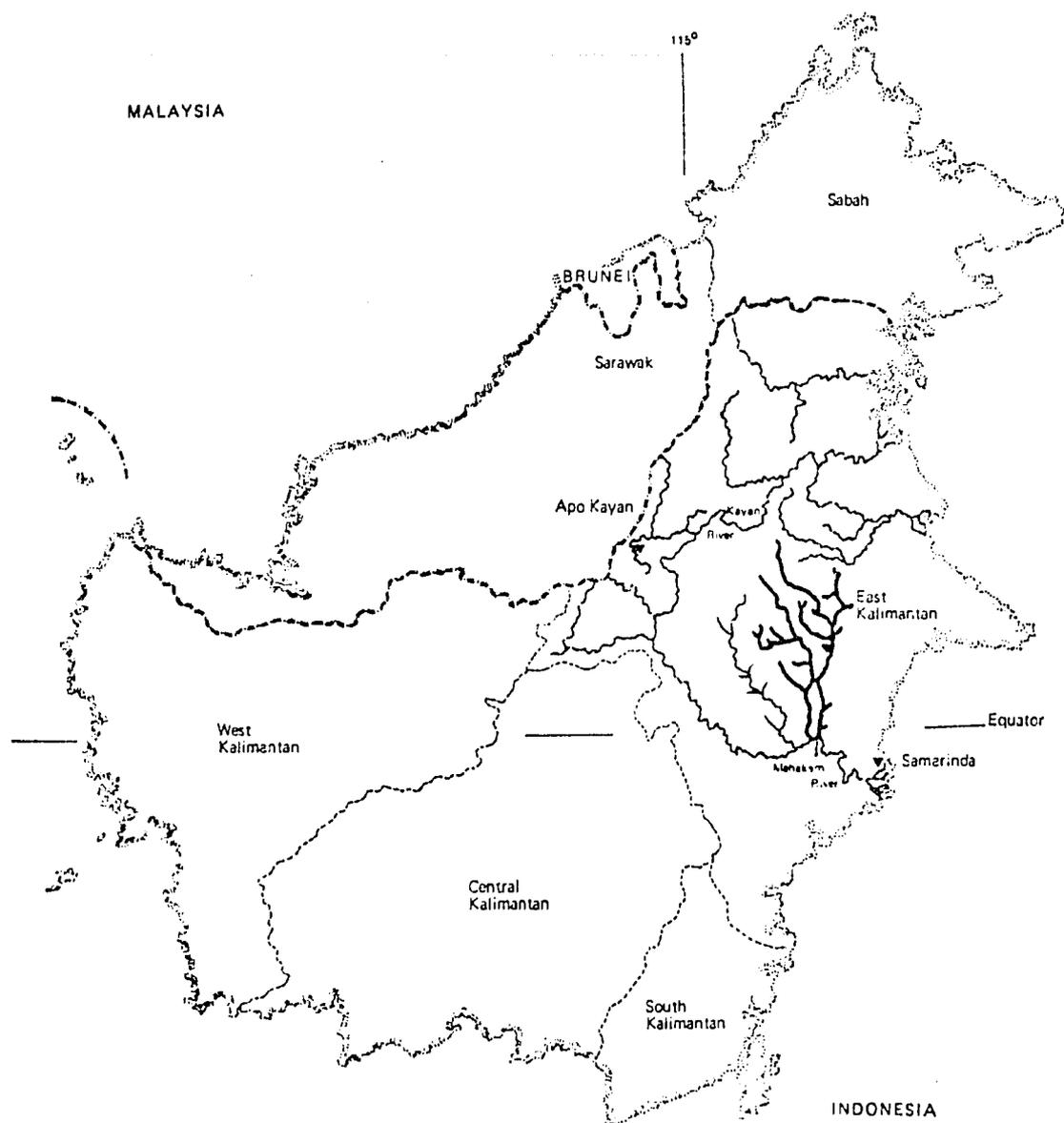


Figure 1. Map of Borneo. Long Ampung is represented by the triangle in the Apo Kayan; and Long Segar is the triangle near the center of the Province of East Kalimantan.

## THE RESEARCH CONTEXT

Between October 1979 and September 1980, I conducted ethnographic research in Long Segar, East Kalimantan (Indonesia Borneo, see Figure 1). Long Segar is a Resettlement village, located 2 days and 2 nights upriver from the provincial capital, and populated by 1000 Christian, Uma' Jalan Kenyah Dayaks who moved there from the remote interior regions of Kalimantan between 1963 and 1972. These people practice shifting cultivation for their economic base, supplemented to a small degree by wage labor, gardening, collection of minor forest products, and commerce. Their village is situated along the Telen River, within equatorial, primary forest which has been leased to an American timber company for timber extraction.

The research reported here was part of a project to document the "Interactions between People and Forests in East Kalimantan."<sup>1</sup> In an effort to generate research results that would be useful for the many environmentally and developmentally critical policy decisions being made in the area, we adopted an unusual (but fruitful) research strategy (Vayda, et al. 1980). Rather than focusing on a particular community as the unit of study, we identified a problematic human action (in this case, cutting down the forest) and investigated the factors that impinged on or affected that action. Participant observation was the basic research approach, with more focused and quantitative sub-studies being undertaken as deemed useful and necessary. The holistic, contextual, ethnographic investigation of interacting causes and effects could thereby be maintained at the same time that relevance to important policy issues and a practical focus were assured.

I did not, for instance, delve deeply into questions of religion or ritual, once I determined that such domains had little impact on people's use of the forest. On the other hand, I devoted a good bit of attention to the activities and beliefs of personnel at the American timber company in whose timber concession the village was situated, as well as noting the changes in the price of lumber in the provincial capital and the price of logs on the international lumber market. Factors that influenced people's involvement in the cutting down of trees were traced outward and investigated far beyond the confines of the village; yet some areas which have traditionally been of interest to anthropologists were comparatively neglected in this study. The following section summarizes the most important interactions between women and their tropical environment.

### WOMEN AND THE FOREST IN ETHNOGRAPHIC PERSPECTIVE

The Kenyah live deep within a humid tropical rainforest. They are inti-

<sup>1</sup> This project was supported by an award from the U.S. Forest Service-U.S. Man and Biosphere (MAB) program "Consortium for the Study of Man's Relationship with the Global Environment" and was administered by the Environment and Policy Institute of the East-West Center. The project was carried out in association with the Indonesian MAB program (Lembaga Ilmu Pengetahuan Indonesia) and with the cooperation of Mulawarman University (Samarinda). Comparative data collection in 1981 was supported by the Hawaii Institute for Tropical Agriculture and Human Resources, in Honolulu, as part of its Women in Development Program (made possible by a U.S. AID Title XII Strengthening Grant).

mately involved with the forest, for hunting, agriculture, and collecting, on a daily basis. Before going into the specific activities that women perform in the forest, it is important to emphasize the sex role flexibility that characterizes Kenyah traditions. Although men are much more likely to engage in wage or contract labor and to fell large trees, and women tend to spend more time cooking and caring for children, the notion that one activity or another is genuinely inappropriate for males or females is virtually absent. I've seen a man chuckling to himself as he tried to do some beadwork, because women usually do that, and I've seen women fretting as they built a fieldhut, because there was no man around to help them. But a man cooking or a woman wielding an axe are common enough sights. The disapproval and social pressure that often accompany American attempts to deal flexibly with sex roles are entirely absent.

The most obvious interaction between Kenyah and the forest relates to agriculture. Every year people of both sexes go into the forest to choose land to clear for their ricefields. Once the land has been chosen, the process of clearing begins. Women are very actively involved in the clearing of brush, vines, and the many trees with a diameter of about 6 inches or less (using a large knife, baing). The next stage, felling of large trees, is almost always done by men---in the most remote areas, with an axe, in Long Segar, usually with a chainsaw.

There is a close symbolic tie between rice cultivation and women's sex role, among the Kenyah. Women spend most of their lives in the village and its near surround, whereas most men go on periodic expeditions lasting anywhere from 3 months to 10 years. Women are also reputed to be more hardworking than are men. So women are the backbone or mainstay of agriculture among the Kenyah. In a time allocation study, I found that women actually performed 54% of the agricultural labor (Colfer 1981). When I asked all adult women whether they preferred male or female children, most expressed no preference. But those who specified females justified it on the basis of women's diligence at rice cultivation; those who preferred males emphasized men's expeditionmaking and greater strength.

The burning of fields is performed by both sexes, as is the planting. A man walks around a field with a dibble stick, making holes into which 3-4 women (and sometimes a man) drop seeds. In a very short time, the seeds have sprouted and begun to grow; then comes the weeding, much of which is done by women. The harvest is done by all available persons.

Gardening, even more than rice cultivation, is considered to be predominantly the work of women. Gardens are maintained near the fieldhuts at the ricefields and in the soil around people's homes. Gardens made in ricefields lead us naturally into the process of forest regrowth and the differing implications of the stages of regrowth for women's activities.

Once a ricefield is harvested, regular visiting of the ricefield stops (except when a cash crop is planted in the recent ricefield, in which case its harvest marks the cessation of regular visiting). The cassava, pineapples, and sugarcane that were planted at the same time as the rice, have not yet reached maturity. Meanwhile a thick vegetative cover is already surrounding these growing plants. This stage, from 1 to 2 years after a ricefield's harvest, is called bekan. People continue to make periodic trips to bekan to harvest the other crops that continue to grow.

As the years pass, and the forest grows up to cover the ex-ricefield more completely (jekau bu'et), different edible plants, like ferns, begin to appear. Fruit trees, wild or planted, provide another harvestable commodity that women (and men) take advantage of.

Old secondary forest, or jekau dadu', provides still more fruit trees, and other minor forest products become important, like rattan, tepo (an unidentified fiber used for weaving), and nanga (*Eugeissona*, used for roofing material). All of these are collected by both sexes. Deer and boar, hunted primarily by men, begin to inhabit the area.

Finally, the forest returns to its near-"virgin" state, mpa'. Identified locally by the presence of very large trees, mpa' has its own complement of products for the people: Deer, boar, fruit, sang (*Licuala*, for making hats and baby mats), pandanus, rattan.

As the forest gets older, and more remote from the care required by agricultural or horticultural endeavours, women spend less of their time there. Women who are reputed to be more fearful beings than men, are considered to be frightened by the spirits, killers, and animals that inhabit the deep forest.

Women's use of the forest is most directly tied to their responsibilities relating to food. As noted earlier, women are the mainstays of food production. Men go on expeditions, young people go off to school (these days), old people and young children cannot work. Yet the supply of rice and other supplements continues to be provided---most reliably by the adult women.

A secondary use of the forest is for the collection of minor forest products. The Kenyah have traditionally lived in almost entirely self-sufficient communities. The move, by some of them, to lowland areas like Long Segar, has changed that somewhat, but the forest is still a source of a great multitude of useful products. Homes, rice storage units, baskets, mats, walls, roofs, implements, canoes, toys, and other things are constructed from locally available materials---mostly from the forest.

Women are active in collecting plant materials to be dried and woven into baskets and mats (e.g., pandanus, rattan, tepo, bamboo). They participate in firewood collection. They harvest bamboo for containers; they collect pineapple fiber and transform it into twine and thread. They even participate in the splitting of ironwood to make shingles.

Normally women do not go with the men to cut down and hollow out large trees for coffins; they do not cut down trees and saw them into lumber with chainsaws; they do not make canoes. But tasks are not rigidly pre-specified by gender. The person who is most adept at a given task is encouraged to do it among the Kenyah.

Agricultural, horticultural, and gathering activities have been performed by Kenyah women, probably for centuries. However, since their move to Long Segar, a new component has affected their relationship with the forest: Commerce.

Kenyah of both sexes exhibit a lot of discomfort with the idea of commerce. Their tradition has been to give, not trade or sell, things. This tradition

derived, not particularly from any sort of innate ethnic generosity, but from the facts that 1) things were generally about equally available to anyone who wanted to expend the energy to get them, and 2) surplus was not storable. Money was not used.

Now money is used---for medicine, schooling, sugar, coffee, tea, candy, soap, kerosene, needles, cooking pots, knives, chainsaws, outboard motors, and assorted other commodities. Money can be obtained by 2 major ways: Wage or contract labor and the sale of rice. The sale of labor is disproportionately available to men vis-a-vis women, and the returns are higher. The entry of money into daily Kenyah life introduces a "good" that is not equally available to anyone willing to expend the effort to get it--and women are the probable losers. The direction of social change appears to suggest that women will go from a situation of active involvement in the subsistence sphere (a necessary but not sufficient precondition for high female status, according to Sanday 1974) to an unenviable situation of economic dependence on men whose tradition is to leave periodically.

The alternative source of money is the sale of rice---a good that women do have adequate control over. The recent adoption of three technological devices grants all Kenyah added time and energy to produce more rice (the chainsaw, the outboard motor and the rice huller). And a concomitant of greater rice production, given the available agricultural technology, is the cutting down of more forest. The men are actively wielding the chainsaws that remove the forest canopy (with all that that implies) to create fields, but the women are collaborating wholeheartedly. More production means a better standard of living, higher family prestige in the community, and some maintenance of their prestige as women vis-a-vis men. To the degree that female-dominated rice production can approach the income-generating capability of the males, high female status can perhaps be maintained (at an unknown cost to the forest).

Although rice is regularly traded now, other income-generating possibilities have been consciously rejected by the Kenyah. Neighboring Kutai villagers regularly sell ironwood shingles and rattan; Kenyah only do so under duress, maintaining simply that "Kenyah don't do that." This distaste for commerce appears to be shared equally by men and women. By August 1980, 10 Long Segar families (including males and females) had, however, set up small-scale shop-keeping in their homes, in response to the profitability of commerce.

#### A QUANTITATIVE, COGNITIVE VIEW

As noted earlier, the overall research strategy for this project included the use of ethnographic, qualitative methods as a base and the development of more specific, quantitative methods as appropriate and useful to focus on important aspects of Kenyah interactions with the forest. Because of my skepticism about any one method, I viewed women's lives using several methods. Although I will be concentrating on the cognitive study in this paper, I will briefly summarize the results of 3 other sub-studies of interest: One is a time allocation study based on observation of actual behaviour and the other 2 are based on interview surveys of all adult women in Long Segar and in Long Ampung (the remote, interior village from which Long Segar's inhabitants migrated).

The time-allocation study (Colfer 1981) involved randomized visits throughout the year to village households, and recording of the activity that each household member was engaged in at the time of the visit. Women's active involvement in rice cultivation and gardening are reflected, as is their active involvement in making containers, mats, beadwork, and other potential cottage industries.

The second study conducted, an interview survey, was designed to reveal women's involvement or lack thereof in economic, political, and family planning decisionmaking, and trade, in a relatively traditional village (Long Ampung) and in Long Segar. These data have yet to be completely analyzed, but generally women are very involved in economic decisionmaking, and marginally involved in political decisionmaking in both communities. Although family planning has not been an option for Long Ampung women, they expressed interest in it. In Long Segar, women are interested in it and act on that interest when the opportunity presents itself.

The third study relates to male migration and its impacts on women. The longstanding pattern of male circular migration was documented in both communities, as well as changes that have occurred with the move to Long Segar. The most important finding for the purposes of this paper is the fact that women successfully maintain their families for long periods in the absence of their men (Colfer 1982).

It is interesting and gratifying that generally all of these studies, including participant observation data, tend to reinforce one another. The studies discussed have included the kind of broad, contextual data provided by participant observation, some straightforward and systematically collected observations of people's behaviour, and people's responses to questions about what they have done and regularly do. But I also wanted some verification of my observations about cognition, about how the people see their world and the important aspects that relate to their interaction with the forest and with the outside world. These are the data that I would like to focus on in this paper. They were collected using the Galileo method.

Galileo is a research method/computer program designed for "cognitive mapping," using multidimensional scaling. Although the computer program is based on sophisticated mathematical manipulations (Woelfel and Fink 1981), the research procedure is fairly simple and straightforward. A researcher isolates a domain of meaning. In this case, I was interested in the differences in people's perceptions of and attitudes toward the two sexes in interaction with their environment and their work. There is a detailed procedure one can go through to ensure the relevance of the concepts chosen (Woelfel, Holmes, and Kincaid 1981), including recorded, unstructured interviews, concept-by-concept content analysis of those interviews, and choice of the most frequently mentioned concepts.

Several factors, including my 10 months' residence in the community, Woelfel's lack of rigidity about the importance of adhering to those procedures, in this kind of situation and some definite time constraints, resulted in my choosing the relevant concepts largely on the basis of my own judgement and familiarity with the community. I included concepts which 1) were commonly discussed in the community, 2) related to interactions between people and forests, and 3) had potential relevance to "development" or increased income for

the people. The 11 concepts were: forest, ricefield, garden, male, female, child, work, me, good, trade and cottage industry. A standard form is modified and used, simply pairing every concept with every other concept.

The next step involves the choice of a criterion pair. The criterion pair is the conceptual yardstick used by the respondents in measuring the distances between each of the pairs of concepts. In this study, I set "red" and "white" at 10 units apart.<sup>2</sup> Respondents were then asked, "if red and white are 10 units apart, how far apart are forest and ricefield?", "forest and garden?", "forest and male?", and so forth. If the respondents thought 2 concepts were twice as far apart as red and white, they indicated 20 units; if they thought the 2 concepts were half as far apart as red and white, 5 units was the appropriate response. A ratio scale is used.

There is some disagreement among users of this method regarding the advisability of using a "ruler" or a "yardstick" as a measuring device; or in other words, should we choose a criterion pair that represents a small conceptual distance or a large one? At least one Galileo user has rejected the use of a criterion pair altogether (Canan, et al. 1981). In this case, I chose a criterion pair that respondents considered to represent a very large distance. Indeed, none of the Long Segar respondents considered any of the paired concepts to be as far apart as red and white. The possibility that they did not understand that they could specify a distance greater than 10 units cannot be ruled out; on the other hand, discussions during the interview process definitely corroborate the fact that the people generally considered red and white to be very far apart. A subsequent Galileo survey in Long Ampung did elicit responses over 10.

The sample of respondents can be chosen in a variety of ways, with a random sample being preferred methodologically. In Long Segar, again because of time constraints, I utilized naturally occurring groups (men working together on a village project, women working together on a church project, and teenagers assembled at the school) as well as individuals to whom I had ready access. I aimed for wide representation in terms of age and sex. The adult group was composed of 19 women and 30 men, ranging in approximate age from 19 to 67 years. The young people included 19 males, 19 females and 5 whose sex is unknown, ranging in age from 15 to 21.

In the school setting, the survey instrument was given to all the students at once, the procedure was explained, questions were answered, and the students filled in their own questionnaires. Among the adults, in most cases, the interviewer (Lee Ndjau or myself) asked the distance between each pair, and filled in the questionnaire.

Some have questioned the reasonableness of asking illiterates and people with minimal education to make judgements like this about their own perceptions. Certainly making such judgements requires thought and is something of a challenge for most people. But I found that the respondents in Long Segar seemed to

<sup>2</sup> 100 units is also often used in studies of this kind. I chose the smaller figure because many of my respondents were illiterate and I reasoned that 10 might be easier to manage than 100.

understand the procedure just as easily and indeed complied with more equanimity to my request than did the well educated students and faculty members in the University of Hawaii's School of Public Health to whom I'd administered a similar instrument in spring 1979. Woelfel, the originator of the Galileo method, reports similar observations from other researchers (personal communication 1979).

#### COGNITION - LONG SEGAR

The flashiest replication of Kenyah cognition is presented in Figures 2 and 3. These are 3-dimensional cognitive maps of adults and young people, respectively, and can provide a good sense of how Kenyah look at things. For serious study, it is also necessary to turn to Tables 1 and 2, the Galileo Means Matrices. These portray the actual average distances between each pair of concepts for each group of respondents. The means matrix has been conceptualized by Woelfel as analogous to a matrix showing distances between major American cities, often found on road maps. Galileo distances are in cognitive, rather than geographical, space.

The distortion in the maps derives from the fact that only 3 of the 11 dimensions can be portrayed graphically. For adults, 85.6% of the variance is explained by the first 3 dimensions; whereas for young people, the first 3 dimensions only account for 71.6% of the variance. Because of this variation in the first 3 dimensions of the 2 data sets (adults and young people), the 3 dimensional adult cognitive map is a more accurate portrayal of adult cognition than is the young people's cognitive map for their actual views. The young people's cognitive systems, according to these data, are more internally consistent than are the adults', as reflected in their respective "warp factors": 1.08 and 1.33 (to be discussed later).

Responses were divided into "adult" and "young people" in the hopes of shedding some light on change in Long Segar. It would also be possible to similarly break down these data by the sex of the respondent.

Since we are interested here in the Kenyah's perceptions of women as contrasted to men, I have broken out the concepts male and female for ease in examining relative cognitive distances, in Tables 3 and 4. I have also included the mean distances between me (or the collective self) and the other concepts. The relationship between belief or cognition and attitude as well as the Galileo computer program's treatment of group comparison, as these relate to Galileo findings, are of interest here. Woelfel and Fink (1981) say

"Within each domain lies a self-point, which gives the instantaneous definition of the self within the domain relative to the other objects in the domain. The perceived distance between any two points is called a belief, while the position vector from the self to any concept is defined as an attitude. Aggregate spaces representing the viewpoint of subcultures, groups, and cultures are constructed by superimposing the sets of individual spaces onto each other after suitable rotation and translation to Gaussian (least-squares) best fit on each other." (page 132)

In the pages to come, the responses of Long Segar and Long Ampung young people are superimposed onto the adult spaces in their respective communities, in an attempt to clarify and quantify the kinds of changes occurring in Long Segar.

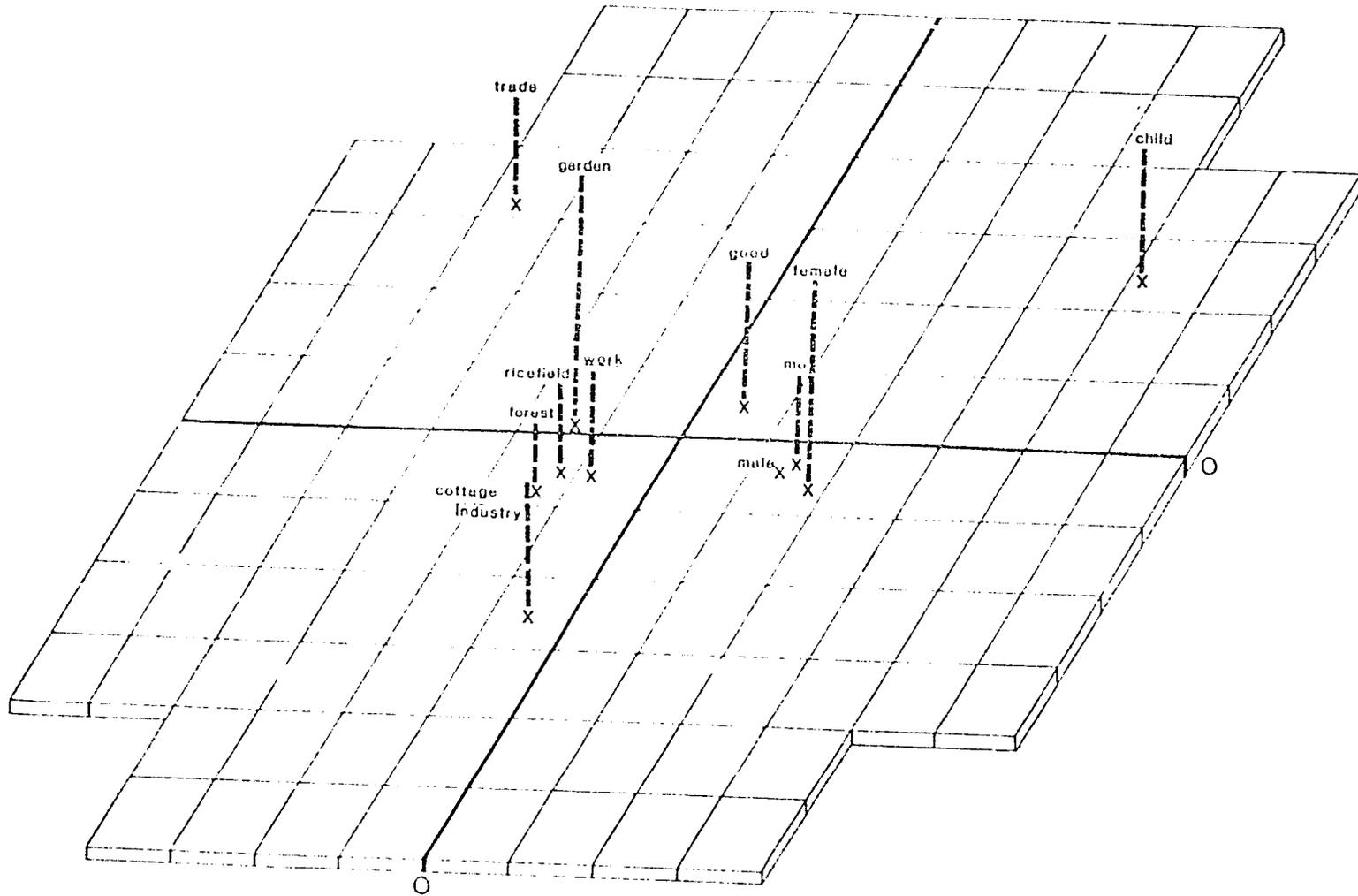


Figure 2. Three dimensional cognitive map: adults of Long Segar.

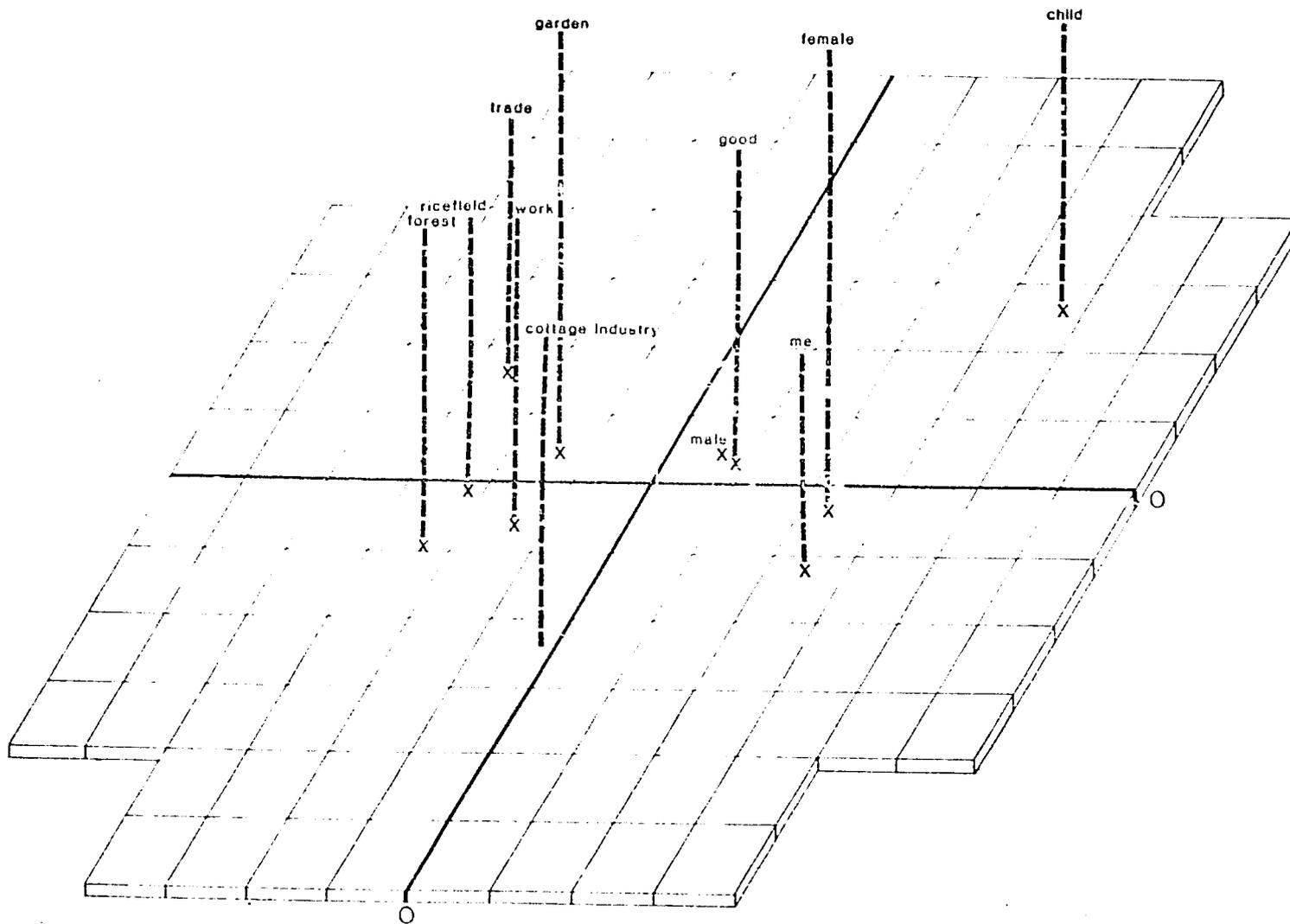


Figure 3. Three dimensional cognitive map: young people of Long Segar.

0	FOREST											
1.5	0	RICEFIELD										
1.7	2.2	0	GARDEN									
3.0	2.6	4.0	0	MALE								
3.7	2.0	1.7	2.0	0	FEMALE							
6.4	6.1	6.0	3.2	1.2	0	CHILD						
2.4	1.4	1.4	1.5	1.4	5.7	0	WORK					
3.0	2.1	3.0	1.9	1.8	2.0	1.4	0	ME				
2.4	1.8	2.2	2.2	1.8	2.4	1.4	3.1	0	GOOD			
5.1	4.3	4.2	6.3	6.8	7.4	4.3	6.4	5.1	0	TRADE		
3.1	2.6	3.7	3.2	1.4	7.0	1.2	2.7	1.9	5.4	0	COTTAGE INDUSTRY	

TABLE 1  
ADULTS - LONG SEGAR  
GALILEO MEANS MATRIX

0	FOREST										
3.5	0	RICEFIELD									
4.0	3.5	0	GARDEN								
6.7	6.1	6.8	0	MALE							
7.8	6.3	5.4	6.3	0	FEMALE						
7.7	7.1	6.4	5.7	4.2	0	CHILD					
4.2	3.2	2.6	4.6	4.9	6.3	0	WORK				
6.2	6.0	5.0	4.7	4.5	4.9	5.7	0	ME			
5.3	4.6	5.1	5.2	4.3	4.5	4.4	4.9	0	GOOD		
5.9	4.9	5.1	4.8	6.1	6.9	3.7	7.0	5.1	0	TRADE	
6.3	6.7	6.7	5.5	3.6	7.5	3.4	5.4	4.4	4.8	0	COTTAGE INDUSTRY

TABLE 2  
 YOUNG PEOPLE - LONG SEGAR  
 GALILEO MEANS MATRIX

One of the intriguing aspects of the Galileo method is its brief, but impressive, history of application in the "real world." The cornerstone of these applications is the use of the concept me (or self) as an indicator of human behaviour. Woelfel and Fink (1980) postulate, for instance, on page 163, that "the likelihood that a person or group will engage in a behaviour is an inverse function of the distance between that behaviour and the self." They then go on to provide numerous empirical examples of this (pp. 199-210). One of my own interests in this method is its potential applicability in the area of natural resource management. Woelfel and others have already had extensive experience using this method to develop effective communication strategies based on knowledge of the cognitive maps of consumers and client populations as derived from Galileo surveys. They maintain, and provide considerable evidence to demonstrate that

"...the observation that a particular behaviour as measured in the coordinate frame is converging on the self in that frame suffices to show that, on the average, the frequency of performance of the behaviour is or will be increasing. Similarly, this knowledge (gained from the Galileo method) can serve as a goal state, such that deliberate attempts to move a concept or object toward the self point can be expected to result in increased behaviour with respect to the object." (page 204)

The possibilities are thought-provoking, to say the least.

Returning to Long Segar, Table 3 presents adult mean responses, and applies to a wider segment of the population of Long Segar than do the young people's responses. For this reason, the comparison with ethnographic data will focus on Table 3. The following 6 points will be addressed:

#### Sex Role Flexibility

The distance between male (laki) and female (leto) is only 2.0, and the attitudinal indicator, me (ake'), is only 1.9 and 1.8 units away from male and female respectively. Galileo's conducted with American respondents suggest that male and female are viewed as near polar concepts (e.g., Woelfel and Fink 1981). A two-dimensional cognitive map of University of Hawaii students is provided for contrast (Newton 1977) in Figure 4. Note particularly actual man and actual woman. This comparison with Newton's maps should not be pushed too far however, since the domains of meaning are rather dissimilar.

#### Women and Agriculture

Consistent with ethnographic and time allocation study findings, women are considered more closely associated with ricefields (2.0, uma) and gardens (1.7, banit) than are men (2.6 and 4.0, respectively). This close connection between women and agriculture is particularly important because a number of governmental aid programs have focused on encouraging increased production of vegetables and rice. In keeping with most other development projects around the world, all training, seeds, and other inputs have been provided to male household heads (the population which is also most subject to taking leave of the village).

#### Women and Work

In America, we ask women if they work, and unthinkingly accept the response, "No, I'm just a housewife." A rather obvious implication of this lin-

TABLE 3

## ADULTS IN LONG SEGAR - 1980

	<u>FEMALE</u>	<u>MALE</u>	<u>ME</u>
FOREST	3.7	3.0	3.0
RICEFIELD	2.0	2.6	2.1
GARDEN	1.7	4.0	3.0
MALE	2.0	-	1.9
FEMALE	-	2.0	1.8
CHILD	1.2	3.2	2.0
WORK	1.4	1.5	1.4
ME	1.8	1.9	-
GOOD	1.8	2.2	3.1
TRADE	6.8	6.3	6.4
COTTAGE INDUSTRY	<u>1.4</u>	<u>3.2</u>	<u>2.7</u>
$\bar{x}$	2.4	3.0	2.7

TABLE 4

## YOUNG PEOPLE IN LONG SEGAR - 1980

	<u>FEMALE</u>	<u>MALE</u>	<u>ME</u>
FOREST	7.8	6.7	6.1
RICEFIELD	6.3	6.0	6.0
GARDEN	5.4	6.8	5.0
MALE	6.3	-	4.7
FEMALE	-	6.3	4.5
CHILD	4.2	5.7	4.9
WORK	4.9	4.6	5.7
ME	4.5	4.7	-
GOOD	4.3	5.2	4.9
TRADE	6.1	4.8	7.0
COTTAGE INDUSTRY	<u>3.6</u>	<u>5.5</u>	<u>5.4</u>
$\bar{x}$	5.3	5.6	5.4

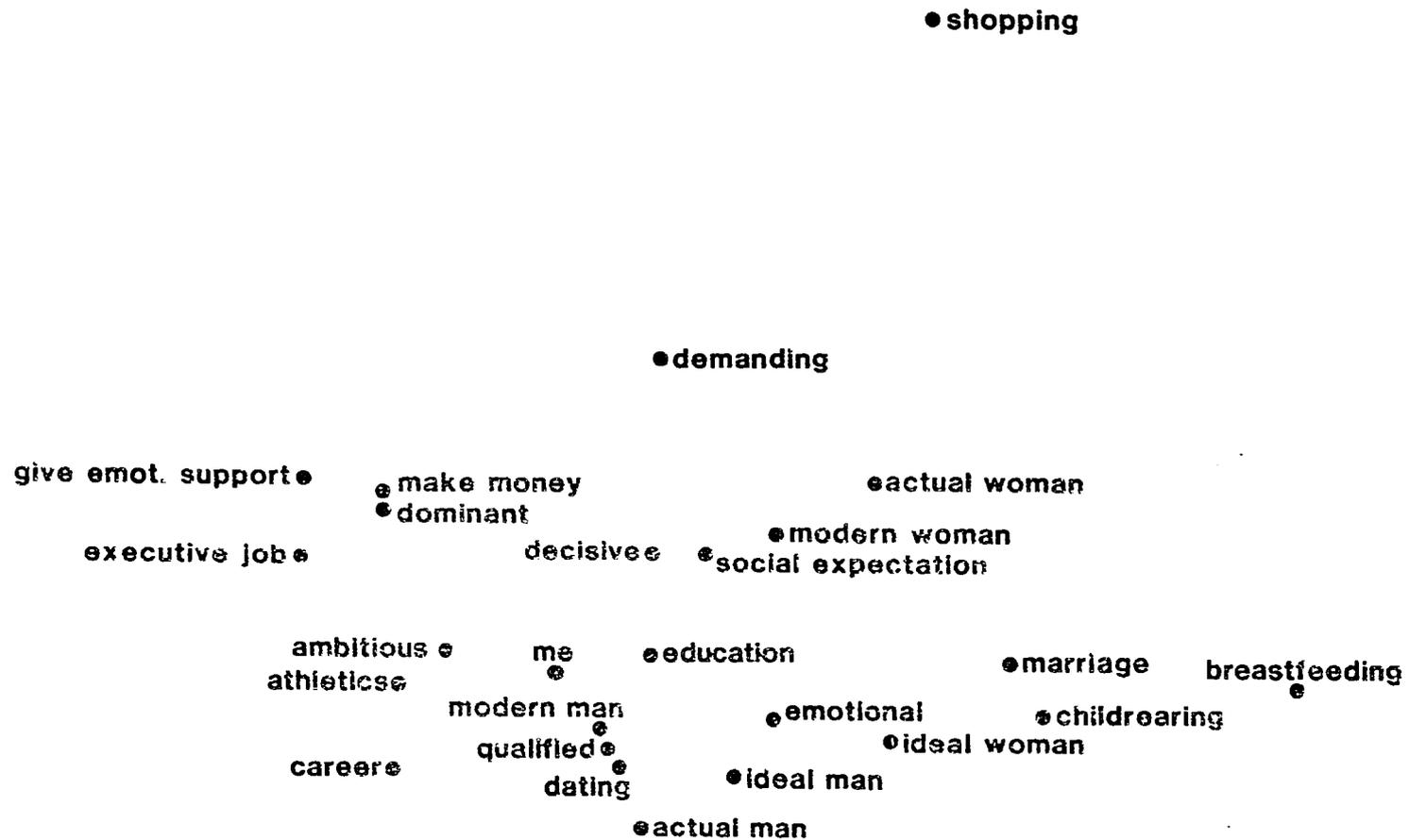


Figure 4. Sex role concepts of males and females, University of Hawaii (from Newton 1977).

guistic usage is the general view that unpaid household work is not "really work." Most work in Long Segar is unpaid, and recognition of the fact that women work is reflected in the Galileo distances. Women are 1.4 units from work (gayeng), and men are 1.5, consistent with the frequently expressed view that women work harder than men (though hardly dramatically so).

#### Women and the Forest

Interestingly, people place women further from the forest (ba'i) than from any other concept except trade (dageng). The fact that me (which of course includes all respondents) is 3.0--the same as the distance between male and forest--reflects women's involvement with the forest, while the greater distance of 3.7 for female and forest provides us data about sex role stereotypes. The greater cognitive distance conforms to my expectations based on ethnographic findings. Women's stereotyped fear of the spirits and killers who inhabit the forest suggest that cognitively, women are seen as more removed from the forest. Yet their active involvement in forest clearing and in gathering foods and minor forest products is reflected in the attitudinal measure (see Woelfel and Fink 1980, pp. 162-179, for an interesting discussion of the relations between attitude, belief, and behavior, as related to the Galileo method).

#### Women and Cottage Industry

I included cottage industry (man inu)--basket, hat and mat making, beadwork, etc.--in this study because of its potential for income generation and because of the predominance of products from the forest used in village handicrafts. The perception that female and cottage industry are closer (1.4) than are male and cottage industry (3.2) also diverges somewhat from the observable involvement of both sexes in making things. It suggests that attempts to influence people's involvement in cottage industry recognize that it is somewhat stereotyped for women.

#### Women and Trade

As mentioned earlier, trade is viewed with some antipathy by Kenyah, and that antipathy is clearly reflected in the Galileo. The female-trade distance of 6.8 and the male-trade distance of 6.3 are the greatest distances in the domain. Attitudinally, trade is also distant (6.4).

These findings, then, are consistent with findings based on other data-gathering techniques, and they allow us to quantify some important aspects of cognition.

### CHANGE AND WOMEN'S STATUS

My motivation for separating adults and young people's responses to the Galileo was to provide some indication of cognitive changes that might be accompanying the other kinds of changes that were so obvious in Long Segar. Long Segar has been part of a Governmental Resettlement program which provided a number of kinds of assistance to and pressure on the community to change. Several important technological innovations have been adopted (notably the chainsaw, the outboard motor, and the rice huller), 2 of which have negatively influenced women's position relative to men (Colfer 1980). Most children are now

in school, marketing of one's surplus is now a possibility, wage labor opportunities now exist in the area, and so on.

A number of factors seem to be operating to increase sex role stereotyping and to decrease women's status in the community. Wage labor opportunities are disproportionately available to men, both because of the inappropriateness of the chainsaw for women (and the predominance of income-earning opportunities in logging) and because of the disadvantages of women's interacting with outsiders. Outsiders speak Indonesian which Kenyah women usually do not; outsiders have negative stereotypes of Kenyah women (related to alleged promiscuity). And the facts that outsiders have higher status, more power, and more rigid sex role stereotyping, encourages Kenyah to follow their lead, insofar as interaction occurs. Women's autonomy in the context of local production is being undermined by the adoption of the outboard motor, another device that is too heavy for them to maneuver easily alone (at the same time that the device reduces overall human drudgery).

If we look at these kinds of changes going on in the community at large, the data presented in Table 4 on young people's perceptions, when compared with the adult perceptions provided in Table 3, seem to corroborate these changes. The whole domain appears to be less integrated than it is for adults, indicated by the general increase in distances. The distance between male and female is considerably greater. Female is farther from ricefield and from work than is male; both the reverse of adult perceptions. Trade has moved closer to both sexes, but far closer to male than to female.

Although the me concept is still farther from trade than from any other concept (suggesting that attitudes and behavior have not changed drastically), in the realm of belief, the most distant concepts are now female and forest. This could well be related to the pressures mentioned earlier on women to increase rice production--which currently requires removing more forest--as a form of insurance (both for prestige and for subsistence), given the increasing dependence on the money which is available only from men or from the sale of rice.

Even ignoring the increase in relative distances among young people, the fact that the relative position of forest vis-a-vis me has shifted from 7th most distant to 10th most distant may well be cause for some alarm. The forest is already under seige from the far more powerful and environmentally disruptive timber companies. The perceived distance between female and forest may also reflect some acceptance by Kenyah young people of the non-Kenyah stereotypes of women's roles (helpmate rather than provider, in economic terms).

#### COGNITION - LONG AMPUNG

Considering these differences in generational perspective to be reliable indicators of social change was seductive. But an equally plausible interpretation of these differences was simply that they reflect differences in the life experiences of adults and young people---under conditions of comparative stability as well as under conditions of change.

I was very fortunate to have the opportunity to test this alternative hypothesis in spring 1981. Lee Ndjau, my Long Segar collaborator on the initial Galileo, was able to administer this same instrument to adults and young people

in Long Ampung, the remote hinterland village from which the inhabitants of Long Segar had migrated, and where the forces of social change to which Long Segar is exposed are virtually non-existent.

The total number of available young people (from a population of approximately 500) was 25, with 16 females and 9 males ranging in age from 14 to 23. Many of the young men were away, as is customary, on expeditions to Malaysia and elsewhere. Seventy four adults, 43 male and 31 female, whose ages ranged from approximately 19 to 70 were interviewed. The overlap in age derives from our use of role rather than age to define group membership. All young, unmarried people referred to as teki'it and demanai (young marriageable girl and boy, respectively) comprised our "young people" sample, in Long Ampung. Adults were chosen nonrandomly, with an effort to provide broad representation.

Their cognitive maps are represented in Figures 5 and 6. Among the adult population, 84.30% of the variance is explained by the first 3 dimensions; and 80.46% of the variance in the young people's responses is explained. The interpretations that I can make of Table 7, the Galileo menas matrix for the adults in Long Ampung, are based on a one-month stay in the village in May-June 1980, supplemented by the two aforementioned women's surveys and one complete household survey which included a census and agricultural and health data. Examining the same topics as were addressed in Long Segar may be instructive.

#### Sex Role Flexibility

Male and female are believed to be farther apart among Long Ampung adults (3.4 units) than male and female are among the Long Segar adults, whereas me - male (2.6) and me - female (2.5) more closely approach the Long Segar distances of 1.9 and 1.8, respectively.<sup>3</sup> The fact that me, composed of both sexes, is .1 unit closer to male than to female in both communities is interesting in light of the fact that the samples are loaded for men in a ratio of approximately 4:3 in Long Ampung and 3:2 in Long Segar.

#### Women and Agriculture

Ricefield and garden are both 1.7 units away from female, and 2.0 and 6.3 units away from male, respectively. The fact that me is only 3.0 units away from garden in Long Segar and 4.9 units away in Long Ampung may have been influenced by the fact that training and agricultural inputs have been provided to men in Long Segar for increased horticultural activity. Again the male loading of me must be borne in mind.

#### Women and Work

The same figures surface as in Long Segar (1.9 for male and 1.8 for female).

<sup>3</sup> In Long Ampung, in contrast to Long Segar, a number of respondents exceeded the distance of the criterion pair, indicating that such an option was definitely perceived by the respondents. If Long Segar respondents did not perceive this option, that factor may have the effect of increasing all distances in Long Ampung as compared to Long Segar.

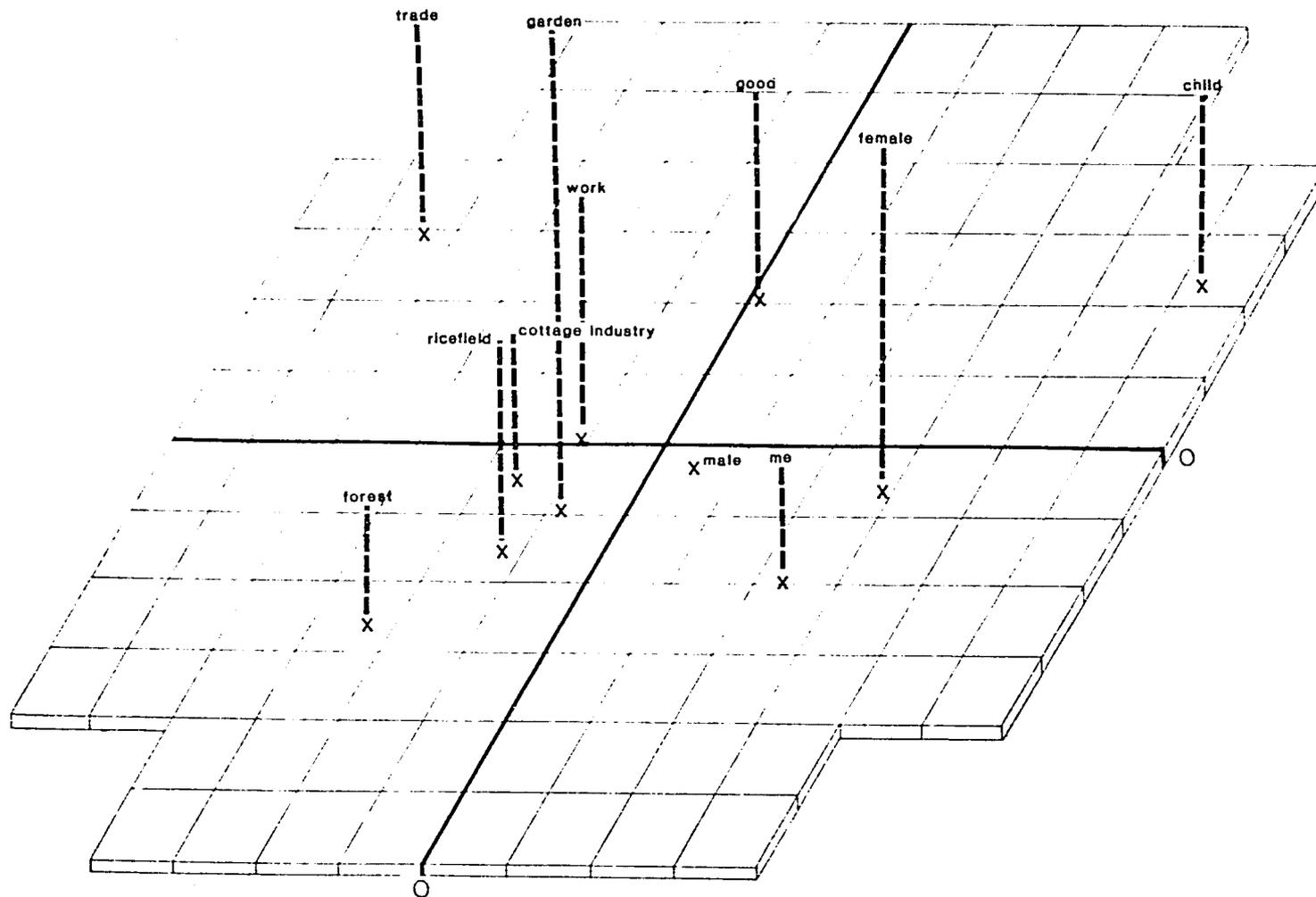


Figure 5. Three dimensional cognitive map: adults of Long Ampung.

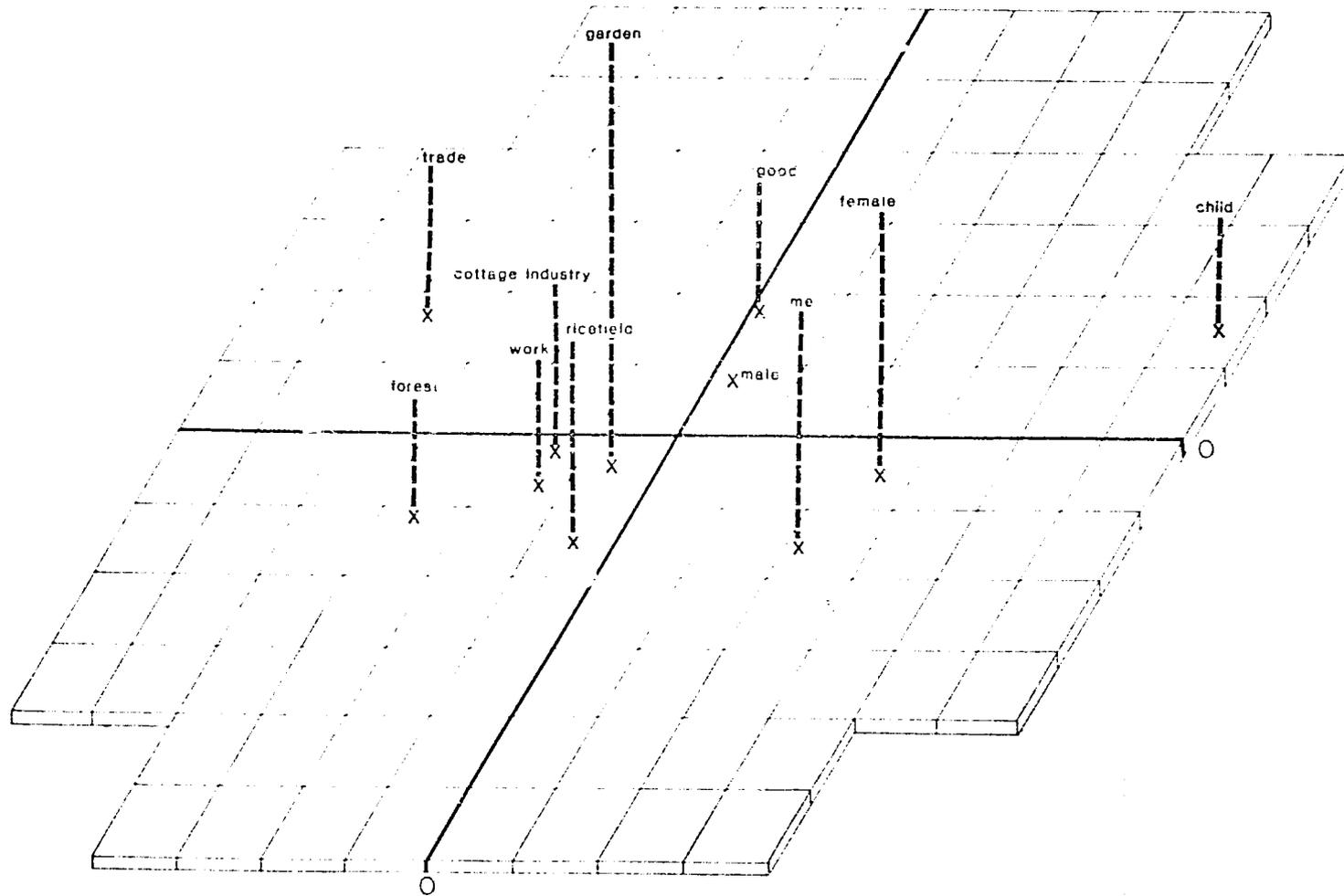


Figure 6. Three dimensional cognitive map: young people of Long Ampung.

0	FOREST											
2.6	0	RICEFIELD										
2.3	2.7	0	GARDEN									
2.1	2.0	6.3	0	MALE								
6.6	1.7	1.7	3.4	0	FEMALE							
8.3	7.7	7.2	5.2	1.3	0	CHILD						
1.9	1.1	1.3	1.9	1.8	6.2	0	WORK					
3.1	2.1	4.9	2.6	2.5	2.6	1.9	0	ME				
1.8	2.1	3.4	1.9	2.0	2.4	1.5	4.7	0	GOOD			
5.0	4.3	5.4	6.0	8.3	9.0	1.7	8.1	3.2	0	TRADE		
2.7	2.0	5.5	3.7	1.6	7.9	1.5	3.7	2.0	3.6	0	COTTAGE INDUSTRY	

TABLE 5  
ADULTS - LONG AMPUNG  
GALILEO MEANS MATRIX

0	FOREST										
3.2	0	RICEFIELD									
3.0	3.2	0	GARDEN								
3.4	2.7	5.9	0	MALE							
6.4	2.2	3.4	3.6	0	FEMALE						
8.7	7.0	6.3	4.9	1.9	0	CHILD					
1.9	1.8	4.0	3.5	3.6	7.4	0	WORK				
4.6	4.4	5.4	5.4	4.5	4.2	3.8	0	ME			
1.7	2.6	4.1	3.0	4.1	2.6	1.4	4.2	0	GOOD		
3.4	4.6	4.2	3.7	7.1	9.2	3.0	6.7	2.1	0	TRADE	
3.1	3.5	4.3	3.6	2.1	7.6	1.1	5.5	1.8	4.0	0	COTTAGE INDUSTRY

TABLE 6  
YOUNG PEOPLE - LONG AMPUNG  
GALILEO MEANS MATRIX

TABLE 7

## ADULTS IN LONG AMPUNG - 1981

	<u>FEMALE</u>	<u>MALE</u>	<u>ME</u>
FOREST	6.6	2.1	3.1
RICEFIELD	1.7	2.0	2.1
GARDEN	1.7	6.3	4.9
MALE	3.4	-	2.6
FEMALE	-	3.4	2.5
CHILD	1.3	5.2	2.6
WORK	1.8	1.9	1.9
ME	2.5	2.6	-
GOOD	2.0	1.9	4.7
TRADE	8.3	6.0	8.1
COTTAGE INDUSTRY	$\frac{1.6}{3.1}$	$\frac{3.7}{3.5}$	$\frac{3.7}{3.6}$
	$\bar{x}$		

TABLE 8

## YOUNG PEOPLE IN LONG AMPUNG - 1981

	<u>FEMALE</u>	<u>MALE</u>	<u>ME</u>
FOREST	6.4	3.4	4.6
RICEFIELD	2.2	2.7	4.4
GARDEN	3.4	5.9	5.4
MALE	3.6	-	5.4
FEMALE	-	3.6	4.5
CHILD	1.9	4.9	4.2
WORK	3.6	3.5	3.8
ME	4.5	5.4	-
GOOD	4.1	3.0	4.2
TRADE	7.1	3.7	6.7
COTTAGE INDUSTRY	$\frac{2.1}{3.9}$	$\frac{3.6}{4.0}$	$\frac{5.5}{4.9}$
	$\bar{x}$		

### Women and the Forest

The distance between female and forest (6.6) is much greater than the distance between male and forest (2.1), particularly when contrasted to Long Segar (3.7 and 3.0, respectively). On the other hand, the attitudinal indicator, me-forest, is almost the same (3.1) as the corresponding Long Segar value (3.0).

### Women and Cottage Industry

The fact that me is considered to be the same distance from cottage industry as is male (3.7) suggests that Long Ampung women consider themselves to be personally further removed from cottage industry than is the stereotypical woman (1.6). Cottage industry is generally perceived to be closer to me in Long Segar (3.2) than in Long Ampung (3.7).

### Women and Trade

As in Long Segar, female and trade represent the most distant concepts (8.3). Whereas in Long Segar trade is further from male (6.3), than any concept, in Long Ampung garden is the furthest from male (6.3), with trade taking a second most distant position (6.0). The difference may be partly related to the fact that in 1979 and 1980, men from the remote interior (including, to some extent, men from Long Ampung) were collecting incensewood in the forests, transporting it to and trading it for a good profit in Malaysia---a behaviour that emerged in response to a recent rise in the price of incensewood.

If we turn our attention to the responses of the young people in Long Ampung (Table 8), we find again that the kinds of differences are intuitively appropriate, given the differences in activities of adults and young people. If we look for instance, at garden, the comparative measurements suggest that adult women, adolescent women, adolescent men, and adult men represent a decreasing stereotyped involvement with gardening. That is entirely consistent with my expectations based on ethnographic fieldwork. The closer tie between male and trade, to take another example, among the young people, accurately reflects the greater likelihood that young men will leave on expeditions (the only consistent opportunity for real trade, in the remote interior). In the same vein, women rarely go on expeditions or have opportunities to trade (except in an informal sense not included in the Kenyah meaning of the term dageng, or trade). Perhaps, the most telling distance to look at in this regard is that between male and female. Whereas in Long Segar, the distance changed from 2.0 for adults to 6.3 for young people, in Long Ampung, the corresponding change was from 3.4 to 3.6.

The most important bits of information, derived from this comparison between Long Segar and Long Ampung, are contained in Table 9, which indicates the total movement across all dimensions of each concept within each community. The fact that Long Segar young people's cognitive maps are considerably more different from Long Segar adults' than are the Long Ampung young people's cognitive maps from their adult population is obvious, and provides further substantiating evidence that important changes are happening in Long Segar. That male is the most divergent concept (or manifests the greatest change, in Long Segar, with ricefield, trade, cottage industry, and female, close behind, is not unexpected. It is interesting to note, by way of contrast, that in Long Ampung, trade, cottage industry, and male are the least subject to change, with good, forest, fe-

TABLE 9

DISTANCES CONCEPTS HAVE MOVED OVER ALL DIMENSIONS  
FROM "ADULTS" TO "YOUNG PEOPLE" IN LONG SEGAR AND LONG AMPUNG

	<u>LONG SEGAR</u>	<u>LONG AMPUNG</u>
FOREST	1.7	0.7
RICEFIELD	2.4	-1.1
GARDEN	1.7	-1.4
MALE	2.7	0.4
FEMALE	2.1	-0.7
CHILD	-1.0	0.7
WORK	1.2	1.1
ME	0.9	1.0
GOOD	0.9	-0.6
TRADE	2.2	-0.2
COITAGE INDUSTRY	2.2	-0.2

male, and child representing intermediate concepts with respect to intergenerational differences.

Manipulating data of this kind is titillating. There is so much there, and new angles to investigate continually emerge. I mentioned my interest in looking at these data, broken down by sex of the respondent. I also would like to compare Long Ampung and Long Segar in the same way that "adults" and "young people" were compared in this analysis. Such a comparison would involve the computer's rotating the eigenvectors of the Long Segar sample to "fit" with the eigenvectors from Long Ampung. We would then have a set of figures, such as those presented in Table 9 for adults and young people, which indicate the differences across all dimensions in Long Ampung and Long Segar. This would be an interesting supplement to the comparison provided in the text, the simple comparison of adults' means matrices.

Before concluding, I would like to make 4 miscellaneous comments related to the Galileo in general, and this study in particular. First, the warp factor mentioned earlier in connection with the Long Segar study, measures the degree of deviation from Euclidian (or 3-dimensional) space. Most simply, where the distances that separate 3 related concepts do not yield a regular triangle,<sup>4</sup> the space in which these concepts exist is warped. For instance, the concepts female-work-forest among Long Ampung adults inhabit a warped space. Female-work is 1.8 units apart, work-forest is 1.9 units apart, but forest-female is 6.6 units apart. The only way to represent the 6.6 units is to curve the space in which that distance is measured.

An interesting point is the fact that the warp factor in each village is greater for adults than for young people, meaning that the young people have more internally consistent cognitive systems or world views than do the adults. In Long Segar, the warp factors were 1.3324 for adults and 1.0765 for young people. In Long Ampung, the corresponding values were 1.6316 and 1.3707. This may lead some to speculate on possible impacts of "modernization." It also seems inconsistent with Woelfel's (and others') suggestion that perhaps "the warp factor is related to the degree to which respondents are confused or ignorant of the domain being scaled..." (Woelfel and Fink 1981, page 160).

Interesting, also in light of the generational difference, is the difference in standard errors for adults and young people. The standard errors indicate the degree to which there is agreement among respondents as to the distance between any 2 concepts.<sup>5</sup> In both populations, there was considerably more agreement (smaller standard errors) among adults than among young people. Indeed, in the Long Ampung population, there were only 2 out of 55 paired comparisons, for which the young people's responses had lower standard errors than adults' (forest-good and work-cottage industry). In Long Segar, 13 of the 55 pairs yielded lower standard errors for young people than for adults. This suggests

<sup>4</sup> "...any 3 points can be said to form a euclidian triangle if and only if the sum of any 2 of the distances among them does not exceed the third." (Woelfel & Fink 1981 p. 160).

<sup>5</sup> Or they can indicate problems with the "rigidity" of the measuring rod (criterion pair).

that even though adult scores are less internally consistent, there is more agreement than among young people. Such agreement among adults is consistent with Kincaid's new "convergence theory" of human communication (Kincaid and Schramm 1975; Kincaid 1980, Rogers & Kincaid 1981) which holds among other things that people's views of the world will tend to converge as they continue to communicate over time.

This paper has several purposes. I wanted first to present a description of the ways that Kenyah women interact with the forest in East Kalimantan; and I wanted to present a quantitative method for substantiating some of these observations. My own bias is heavily toward qualitative research because I find qualitative methods preferable personally, but also because I consider a holistic understanding of the interactions among the parts of systems to be of critical importance in general efforts to improve the quality of life and to protect our natural resources (goals I do not consider at all at odds in the long run).

However, experience has convinced me that some degree of quantification is essential if one wants one's research results to be put to use. The global bias is toward numbers. I have, therefore, attempted to find and/or devise research methods that can supplement a qualitative approach and respond to that perceived need. The Galileo method has several particularly useful characteristics that make it suitable for this purpose: First, it is built out of a measurement theory that is rooted in the physical sciences (a high prestige source). Second, construction and administration of the survey does not require the ability to perform the sophisticated mathematical procedures. Third, asking respondents to estimate distances between concepts that have been chosen from the respondents' own speech avoids many of the problems that plague most questionnaire or survey studies. Fourth, the method has a proven track record in applied settings. Fifth, the results I have obtained and other results I have seen, have not, by and large, surprised me, given my ethnographic knowledge of the populations in questions.

From a substantive point of view, the Galileo results have provided corroborating evidence for women's active association with concepts like agriculture, work, and children; they have substantiated my expectation that women would be perceived as distant from trade and from the forest (despite their active involvement in it); they have provided a fairly straightforward indication of change consistent with the direction predicted by ethnographic research.

From an action, or policy, point of view, I now have quantification for some of the conclusions I have drawn. This is extremely helpful in persuading people of the accuracy of one's observations (though there are many reasons that it should not be). The Galileo computer program also provides a mechanism for developing messages to move any concept in the domain closer to any other concept in the space. Because of the active removal of forest going on at this time in East Kalimantan, I have been interested in finding ways to 1) intensify agricultural production on already cleared land or 2) explore the possibility of increasing production of alternate crops under the forest cover. Since a variety of agroforestry possibilities would be locally defined as garden (ba nit), I have obtained the Galileo computer output for constructing messages to move garden closer to me. Should I have the opportunity to make recommendations relating to horticultural or agroforestry development, I will draw on those data. I would think similar analyses, perhaps linking forest with good, would

be useful for other forest management purposes.

I would like to close by emphasizing the importance of our understanding such "fuzzy" phenomena as people's beliefs, perceptions, and attitudes. Certainly behavior is important, certainly people's answers to straightforward questions are important. But people's views and assumptions about their world and their environment, have important impacts on how they behave toward that world. And for those of us interested in facilitating humane and ecologically-sound change, it behooves us to attend to those perceptions.

#### REFERENCES

- Canan, Penelope and Michael Hennessy, et al. 1981. Moloka'i Data Book: Community Values and Energy Development. University of Hawaii Urban and Regional Planning Program, Honolulu.
- Colfer, C.J. Pierce. 1980. Change in an Indigenous Agroforestry System. Report, Indonesian-U.S. Man and Biosphere Project, "Interaction Between People and Forests in East Kalimantan."
- Colfer, C.J. Pierce. 1981. Women, Men and Time in the Forests of Kalimantan. Borneo Research Bulletin (September), reprinted by the Environment and Policy Institute of the East-West Center (February 1982).
- Colfer, C.J. Pierce. 1982. On Circular Migration: From the Distaff Side. Invited Paper prepared for the Tenth World Congress of Sociology, "Migration as Circulation: Cross-Cultural Comparisons." Mexico City (August).
- Kincaid, D.L. 1980. The Convergence Model of Communication. Paper No. 18. East-West Communication Institute, Honolulu.
- Kincaid, D.L. and W. Schramm. 1975. Fundamental Human Communication. East-West Communication Institute, Honolulu.
- Newton, B.J. 1977. Perceptions of sex roles at the University of Hawaii. Paper presented at Women In Communication Convention. (October). Honolulu.
- Rogers, E.R. and D.L. Kincaid. 1981. Communication Networks. Free Press, New York (esp. Chapter 2).
- Sanday, Peggy. 1974. Female Status in the Public Domain. In: Women, Culture and Society. Rosaldo and Lamphere, eds. pp. 189-206. Stanford University Press, Stanford.
- Vayda, A.P., C.J.P. Colfer, and M. Brotokusumo. 1980. Studying interactions between people and forests in East Kalimantan. The Impact of Science on Society. 30(#3):179-190. (EAPI reprint #13).
- Wolfe, J.D. and E.L. Fink. 1981. The Measurement of Communication Process: Galileo Theory and Method. Academic Press, New York.

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## WOMEN IN NATURAL RESOURCES: PERSPECTIVES FROM NEPAL

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## ABSTRACT

The rapid depletion of natural resources is threatening the future viability of hill agriculture in Nepal. To help restore ecological balance in this area, the Swiss Government initiated a pilot development project in Nepal's middle hills. As an anthropological consultant to this project, I conducted a 2-year cultural-ecological study of the project area. This study suggests that trained Nepalese women could make positive contributions to development projects concerned with natural resource conservation. However, a major obstacle to the involvement of Nepalese women in rural development is the notion among Nepalese elites that urban/educated Nepalese women could not adapt to the physical and social conditions of village life. My study challenged this notion. The study further indicates that, in the eyes of local villagers, an outsider's attribute of "female" is far less important than other status attributes related to the outsider's official position.

## NEPAL

The Himalayan kingdom of Nepal is renowned for its extraordinary beauty. But those who live and work in the area soon become aware that behind the snow-capped peaks and quaint rural charm is a country and people in trouble. Nepal faces devastating ecological problems and most of her farming population suffer serious economic hardship. The country as a whole is often categorized among the poorest of the less developed countries of the world (e.g. World Bank 1980).

Nepal is unique among developing countries in that it did not undergo a period of colonial rule by a European nation. Indeed, the country remained isolated from the outside world until the 1950's, when a revolution restored the monarchy to power and ended a century of rule by the Rana Family of prime ministers. Nepal's middle hill area, below the high Himalayan peaks, has been the focus of considerable attention from development agencies since this time. This is the area where the majority of the Nepalese people live as rural peasant farmers. The success (or failure) of development efforts in this important region will determine the fate of the nation in the decades ahead.

One important group of people in the middle hills are the descendants of Indian immigrants, the major migration occurring in the 12th century when Indian groups fled from the Muslim invasions. Most of the remaining population are descendants of Tibeto-Burman speaking tribal groups. The Indian immigrants brought with them a superior farming tradition, the Hindu religion and a social organization based on a caste hierarchy. Each of these traditions has survived and these people have become socially, politically and economically dominant group.

The majority of people in the Nepalese hills are wet rice cultivators. Other grains and legumes are also grown on unirrigated fields. Although landlessness is rare, landholdings are generally small--usually less than one hectare per household. Livestock, especially cattle, buffaloes, and goats, are kept by virtually all households that farm. Aside from their milk and meat products, livestock provide manure for crop land; and oxen are essential because they are used to plough the fields.

The middle hill area of Nepal is in a state of severe ecological imbalance. The issues here will be familiar to those who have worked with hill farming in many other areas of the developing world. The core of the problem is increasing population pressure amid scarce and rapidly depleting natural resources, such as cultivatable land, fodder trees, forests, thatch land and pastures (MacFarlane 1976, Poffenberger 1980).

#### THE TINAU WATERSHED PROJECT

To help restore ecological balance in the Nepalese hills, the Swiss Government in 1978 initiated a pilot development project in an area of West Central Nepal (His Majesty's Government of Nepal/Swiss Association for Technical Assistance 1980). This was named the Tinau Watershed Project,<sup>1</sup> after the Tinau River, which flows through this watershed. Project planning has been based on a consideration of a wide variety of interrelated factors,

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<sup>1</sup> The Tinau Watershed Project is the result of a cooperative agreement between the Swiss Federal Council, the Government of the Federal Republic of Germany and His Majesty's Government of Nepal (in 1978). In Nepal, implementation of the project is conducted through the Department of Soil and Water Conservation of the Ministry of Forests, in cooperation with the Swiss Association for Technical Assistance.

such as farming practices, livestock management, human fertility, and the exploitation of forests, pastures, and water sources. Project policy follows two central ideas--both of them currently popular in Nepalese rural development circles in general. One idea is that the project shall be a case of integrated rural development. Since the problems affecting the area are closely interwoven, the separate components of the project--livestock, agriculture, forests, etc.--are to be integrated with one another in terms of both planning and implementation. The second core idea is that, in so far as possible, the project will operate through "people's participation." Local people will be encouraged to organize themselves for participation in the planning, implementation, and evaluation of this project.

It was partly on account of this latter mandate for people's participation that the project planners wanted an in-depth view of the people in the project area--their way of life, beliefs and values, their awareness of ecological problems, their attitudes toward change, innovation, and risk as well as their attitudes toward government officials and outsiders generally. To provide this kind of information to the project, I was hired as an anthropological consultant and worked with the project for nearly 2 years. Before joining the project I had lived and worked in Nepal for over 4 years.

By the time I took this position, the project had already conducted a baseline survey of the area, acquiring statistics on literacy, land and livestock holdings, household income and expenditure. My job was to design and implement an in-depth, cultural-ecological study of the area. I was to analyse the broader interrelationships between natural resources, human behavior, social structure, and cultural ideologies. For this task, I recruited and trained 4 Nepalese graduate students (3 males and 1 female) to conduct one year of fieldwork in separate villages within the project area. I then selected another village for my own independent study. In the field, each researcher followed the same basic methodology and research plan. Field methodology was a combination of intensive, qualitative data collection with extensive, quantitative techniques such as survey research, mapping, and crop cutting tests. Aside from data collection, members of this research team were to serve as Tinau Watershed Project representatives in their respective villages.

The major findings of this study concerned 1) the key, ecologically pivotal role of oxen in the rural farming enterprise, 2) the importance of the social principles of status and hierarchy in the Nepalese approach to modern development and 3) the significance of the fact that rural villages' interpretations of crucial concepts like "development" and "peoples' participation" are in many ways at variance with the project's understanding of these same concepts. Another interesting finding of the study was that Nepalese villagers have some negative cultural attitudes toward the forest. The forest is wild; it is beyond the boundary of safe, civilized human life. It is a place where ghouls linger and witches congregate at night. Although appreciated as a source of firewood, fodder and herbs, the forest is not seen as an area that necessarily should be preserved or treated with respect. These and other findings were discussed in the form of specific recommendations to the project in the final report that emerged from this study (Stone 1980).

The Tinau Watershed Project does not specifically focus on women or on issues pertaining to "women in development." Nevertheless, given that it is an integrated project, and, as a result of the current emphasis on women in international development generally, this project would support attention to women in any appropriate sector of planning or implementation. The study I conducted more directly focused on differences between the sexes in the division of labor, household decision-making, social roles and participation in new socio-economic opportunities.

On the basis of this study, I was able to determine some interesting dimensions of women's roles in Nepal's new world of change and development. We were fortunate in that, somewhat by chance, we were in a position to look at three categories of women in relation to development. First, we could consider local women. Second, I could make observations on my own work as a foreign woman involved with the project. And third, since one of my students was a Nepalese woman, we could observe her experiences and compare them with mine.

#### WOMEN OF THE PROJECT AREA

Before proceeding to the results of this aspect of our study, and the implications for women in development, it is important to understand something of the status and role of women in rural West Central Nepal. It is difficult to make generalizations about women's status in Nepal since the country is so socially and culturally diverse. There are important differences between the separate caste groups on the one hand and between the different ethnic groups on the other. In the Tinau Watershed Project area there are 2 major ethnic groups, and rural society is divided into 3 broad caste divisions, each with sub-divisions.

Keeping this potential variation in mind, it is nevertheless possible to discuss the overall status of women in the project area along different dimensions. First, we can look at differences between men and women in terms of the criteria that development agencies generally use to evaluate a country's degree of development. These are criteria like literacy, education, employment, and income. By all of these criteria, the position of women in the project area is considerably inferior to that of men. For example, in this area, 68 percent of the males are literate whereas only 23 percent of the females are literate.<sup>2</sup>

Second, despite cultural and caste variation, all groups in this area share some features of social structure which carry implications for women. For instance, all people in this area form their important kinship groups through tracing descent in the male line. In addition, all groups follow a

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<sup>2</sup> These literacy rates exceed those for the nation as a whole. For 1975, male and female literacy were estimated at 33 and 5 percent respectively.

rule of residence where a bride and groom move in with the groom's family after marriage. As a result, women (who are normally married by age 15) enter adult domestic life as newcomers and outsiders to the household unit. Here a woman can only be under the authority of her husband but under that of his extended kin as well. These kin will consider that one of her prime purposes is to bear children (especially sons) for the perpetuation of the husband's lineage. There will be considerable pressure on the woman to demonstrate that she is fertile and the woman herself will know that having children is the only way she can win approval and raise her status in her new family (Bennett 1976a, Stone 1978). Thus, many crucial years in a young woman's life will be devoted to reproduction and child care. The rest of her time and energy will be quickly channeled into household and farm labor, following the dictates of her in-laws. In addition, although women receive dowry (in the form of movable property) at marriage, this property is largely managed by the husband's family; and the crucial economic resource--land--is transmitted from father to son.<sup>3</sup>

Along with these features of social structure (some of which are widespread throughout Asia) there are unique cultural ideas and practices that shape Nepalese women's lives. In this third dimension of female status, there is considerably more variation between castes and ethnic groups of the project area. There is, however, one dominant cultural model--the model of the high caste Hindu group--that is extremely important in any discussion of women in West Central Nepal. This model is emulated, to varying degrees, by low castes and by non-Aryan (or Tibeto-Burman) ethnic groups. The model specifies that an adult woman is inferior to men in a religious sense on account of the fact that she menstruates.<sup>4</sup> Menstruation is ritually polluting. This fundamental idea permeates social and religious life in rural Nepalese society. For example, when a woman is menstruating she becomes impure and untouchable. In this state, it would be sinful for her to touch, and thereby ritually contaminate, a male, even if touching were by accident. Once a year, there is a special women's festival, called tij rishi panchami, where women gather in groups to fast, bathe, and carry out other rituals to absolve themselves of the sin of having inadvertently touched a male during a menstrual cycle (Bennett 1976b).

Interwoven with this fundamental religious definition of womanhood, there are innumerable other cultural ideas and values that bear on women's status. In line with the high caste Hindu model, a woman is, for instance, praised for her shyness and scorned for boldness or self-assertiveness, particularly in contexts where her husband or other senior male kinsmen are present. The activities of a married woman are also largely restricted to

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<sup>3</sup> By law, a woman who remains unmarried to age 35 can claim a portion of her father's land.

<sup>4</sup> There is, however, one dimension of high caste Hindu life within which some women are ritually, or religiously, superior to some men. This is what Bennett (1977) calls the "filialfocal" dimension, where a man's sisters and daughters are sacred and ritually superior to himself.

the domestic domain and there are many public contexts from which women are excluded. This confinement of female activities is in part a social attempt to control female sexual behavior, since a married woman's act of adultery would threaten the purity of the caste and lineage she is to perpetuate.

#### WOMEN AND NATURAL RESOURCES

With this necessarily superficial background on rural women, we can address the question of how these women are involved in natural resources and the extent to which they can, or should, be drawn into development efforts aimed at resource conservation.

Earlier it was noted that there are heavy demands on a married woman's labor in the farming household unit. These demands become important in a discussion of ecological issues since so much of the daily household labor involves the exploitation of natural resources. Table 1 shows the relative extent to which female labor is used for the major daily tasks of farming households in the project area (Stone 1980).

Table 1. Summary of labor for major household tasks among households performing task<sup>5</sup>

Activity	Percentage Female labour	Average Amount per day	Average daily Person Minutes
Pasturing	62		294
Fodder Collecting	57	3 loads	216
Forest Firewood Collecting	63	1 load	180
Preparing and Serving Food	99	2 meals	180
Water Fetching	77	6 pots	150
Bringing Leaves for Compost	49	1 load	106
Piling Manure for Compost	56		50
Milking Livestock	49	2 liters	28

N = 198 households

Here we see that females perform the bulk of the labor for pasturing livestock, collecting fodder, collecting firewood, and fetching water. These tasks cover the key areas where the Tinau Watershed Project seeks to promote

<sup>5</sup> Data for this table were based on household interviews with sample households in the villages studies. The data were then cross-checked with data from observational studies.

major behavioral change.<sup>6</sup> To help restore ecological balance, livestock should be stall-fed rather than pastured; if pastured, this should be done through regulated rotational grazing. Firewood and fodder should only be collected from certain trees, in certain areas and at certain times of the year.

The question then arises: even if women are performing the bulk of these tasks, to what extent is it necessary, appropriate or possible to involve women in the new participatory development efforts to conserve natural resources? After all, women may be doing the work, but who is making the decisions about how these resources are to be exploited? Some perspective on this question can be offered by quoting a male farmer of the project area. I was interviewing the farmer to determine his level of awareness of the ecological problems of concern to the project. At one point he said:

Yes, we (men) know that you shouldn't cut fodder from the new young trees. We know you shouldn't take firewood from the depleted forest area. We know all of these things, but, you see, it's the women who do all that work. They do not understand things, and we can't control them when they are out there on their own. They will just cut fodder and wood wherever they like, wherever it is easy.<sup>7</sup>

To be sure, there may be some curious implications of this statement that have to do with male perceptions of women and labor, or with this person's eagerness to "pass the buck" of ecologically incorrect behavior on to women. Nevertheless, another key point emerges: men are not necessarily in control of how female labor is carried out.<sup>8</sup> Unless men were extraordinarily motivated to modify ecologically relevant female labor (which is not the case), development efforts to educate villagers and change behavior must address women as well as men.

#### WOMEN IN DEVELOPMENT

Is it, then, appropriate or possible for development agents to address rural Nepalese women? Our study suggests that it is, but given the social and cultural position of women, it will, of course, be more appropriate and

<sup>6</sup> Another key area concerns agricultural tasks on cropland. Here, labor is more equally divided between men and women.

<sup>7</sup> This particular informant was more aware of the ecological relationships of interest to the project than were most of the people of his village. He was a local leader and had been involved with government development projects such as forest protection.

<sup>8</sup> As a general rule, husbands have authority over wives and male household heads have authority over other household members. However, the allocation of labor for daily tasks like water fetching and fodder collecting may well be under the direction of a senior female who commands her own children and daughters-in-law.

effective for rural women to be approached and drawn into natural resource conservation by female development workers. However the recruitment of Nepalese female development agents poses particular problems which will be addressed below.

Another very significant finding of our study that carries implications for women in development concerns villagers' perceptions of outsiders, especially "officials." This finding was covered in 2 summary statements of the study report (Stone 1980):

1. Although most villagers are friendly and hospitable to outsiders, they are initially highly suspicious of them.
2. Many rural people feel that they lack the necessary social and economic status to approach outside officials or development agencies. Even when they are approached on their own ground by outside agents, many of the poorer, low status people will be initially intimidated.

Needless to say, these local reactions to outsiders are based on villagers' past experiences with tax collectors, other government officials and, in some cases, development agents.

Our study offered a number of recommendations about how project staff should approach villagers in order to minimize problems of suspicion and intimidation. Both the Nepalese female student and I, however, found that as female members of the Project team, we were able to assume relatively non-threatening roles as project representatives in our relationships with villagers. In this respect, it was not only easier for us to approach local women, but to contact local men as well. Compared to the male members of the research team, it was initially easier for us to build rapport, gain the confidence of villagers, develop local interest in the project, and lay the groundwork for genuine cooperation.

The tasks of building rapport and diffusing suspicion at the village level are extremely important in development work. But it should also be pointed out that neither sex has a total advantage over the other in all aspects of the development process. In Nepal at least, development workers of each sex will have both advantages and disadvantages. If, for example, the role of the development agent is to include the exercise of authority, female development workers may well be at a disadvantage. Tasks such as organizing a village meeting or mobilizing local work groups might in general be more difficult for females to carry through.

Both Nepalese and foreign females working in rural development are able to capitalize on the fact that villagers will view them as relatively unthreatening. But in other respects, the position of an urban, educated Nepalese woman in rural development is quite different from that of a foreign woman. It is, in the first place, far more difficult to get an educated Nepalese woman into the field, into the rural hinterland. It often amused me that members of the urban Nepalese elite society thought nothing of my going into the field to reside alone in a remote village, but were aghast that I was taking along a female Nepalese student and would place her in a village

of her own. Indeed, she and I both learned that a major obstacle to the involvement of trained Nepalese women in rural development in general is the widespread notion among Nepalese elites that urban/educated Nepalese women could not possibly withstand the physical rigors of village life and that a single Nepalese woman in this setting would encounter social problems, particularly a mistrust of her virtue.

This particular student faced a number of obstacles before our research even began. Many of her kinsmen were in an uproar at the prospect of her venturing into the rugged wilderness. It took innumerable conversations and assurances before they were placated and finally gave their permission for her to go. Her peers told her flatly that she was crazy. They warned her that in the field she would grow thin and get sick. They told her that local villagers would think that she was low caste or even an Untouchable and say that she was only trying to pass as a Brahman female. They warned that men would suspect her to be loose and improper since she would be living in the village on her own without a male protector.

I assured this student that none of these or other alleged horrors of village life need become a problem. Yet I must admit that with the strength of others' fears about her plight, I was beginning to have doubts myself. Although I had previously lived in a Nepalese village, I worried that perhaps the experience could be quite different for a Nepalese woman.

In comparing our experiences at the village level, this student and I concluded that a Nepalese woman will have some special problems. Naturally enough, foreigners (whether male or female) will be given more social leeway in their behavior in rural Nepal. Their deviation from proper Nepalese behavior will be more tolerated, or excused. In rural Nepal, local people do not expect very much of foreigners, and in any case foreigners tend to be impermanent. They go home and usually do not return. For my Nepalese student, of course, the situation was quite different. There was pressure on her to quickly establish herself as a proper Nepalese woman and to strongly sever her identity from improper categories. This she was able to accomplish with time. She not only survived rural fieldwork, but she found that by following a few important behavioral rules, she was well accepted among villagers. These rules covered type of dress and general demeanor, avoidance of certain situations in which a woman's presence would be inappropriate, etc. Far from encountering severe suspicion or hostility, she found that villagers assumed a sympathetic, protective, and cooperative stance toward her. It is also true that, in the beginning, villagers did suspect that this student was of Untouchable caste. But gradually as she was accepted personally in the community, rumors of her low caste origins ceased.

This student stated her conclusion about her fieldwork experience in a simple, straightforward way. In her final report, she wrote:

"I realized that living in a village as an outsider Nepali woman is not as great a problem as many others think" (Acharya 1980).

I regard it as a major accomplishment of the Tinau Watershed study that it effectively countered the widespread notion in Nepal that Nepalese women are unsuited to rural development work.<sup>9</sup>

A final point about female status and women in development concerns the Nepalese notion of hierarchy. Foreigners who work in Nepal are often struck by the extreme importance of status and rank in Nepalese society. Whereas Nepal's hierarchical social organization is important and carries implications for all aspects of development, it is equally important to understand how the system really works and how people can or cannot work through it. Some people have assumed that fixed statuses such as caste or sex are overriding and dominant, that they encompass a person's other statuses or attributes. Therefore, the argument goes, a low caste person or a female could not assume important positions as development agents within village society. To do so would appear as a social contradiction to villagers, it would violate their expectations of what low caste status and female status are all about. I suggest that this view is based on a misunderstanding of how status and rank operate in Nepal. In many ways the system is far more flexible than one might initially suppose. For one thing, the Nepalese social hierarchies are not, and have never been, rigid, fixed structures that only serve to confine and limit individuals or groups. On the contrary, Nepal's hierarchical social organization can be seen as a social mechanism which individuals use and manipulate to their own advantage.

Status attributes such as caste or sex can be emphasized socially or ignored as suits an occasion or a social context. This is nothing new. It is how Nepalese have traditionally operated their own system. In many development contexts, Nepalese villagers will be far more interested in a person's official position than in his or her caste or sex. Our research report concludes that for women in development (both Nepalese and foreign) attributes such as "education" and "official position" can quite easily override the attribute of "female" in rural development work.

#### CONCLUSION

We can conclude from the Tinau Watershed study that educated Nepalese women could make positive contributions to rural resource conservation projects in Nepal. First, a female outsider is far less threatening to rural villagers than is a male outsider. This is important in areas where villagers are already suspicious and mistrustful of outside officials. Second, a female development worker can more easily approach local women (who perform

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<sup>9</sup> However, the problem of motivating urban/educated Nepalese to work in rural development remains. Both male and female elites are reluctant to leave the comforts and opportunities of urban centers, even for brief periods. In my experience, high financial rewards or clear opportunities for career advancement are needed to attract high quality personnel and to inspire enthusiasm for work in rural development among Nepalese elites.

the bulk of the labor in forest and pasture exploitation), at the same time that it is acceptable for her to contact local men in an official or professional capacity. Finally, female development workers can serve as linkages between local village women and the new world of modernization and change that is reshaping Nepal. If educated women are excluded from rural development, it is more likely that local village women will remain alienated, detached from, or simply confused by the development problems and processes affecting their own way of life.

There are important social and ideological obstacles to involving urban, educated women in rural development in Nepal. But the view that educated Nepalese women are unable to adapt to rural life and assume an acceptable development role has been seriously challenged by the Tinau Watershed Project study.

## REFERENCES

- Acharya, Romila. 1980. Bandi Pokhara: Tinau Watershed Project, Phase 2 Survey, Volume 4. Center for Nepal and Asian Studies, Tribhuvan University, Nepal.
- Bennett, Lynn. 1976a. Sex and Motherhood among the Brahmans and Chetris of East-Central Nepal. *Contributions to Nepalese Studies* 3:1-52.
- Bennett, Lynn. 1976b. The wives of the rishis: an analysis of the tij-rishi panchami. *Kailash* 4:185-207.
- Bennett, Lynn. 1977. Mother's Milk and Mother's Blood: The Social and Symbolic Roles of Women Among the Brahmans and Chetris of Nepal. Unpublished Ph.D. dissertation, Columbia University.
- His Majesty's Government of Nepal/Swiss Association for Technical Assistance. 1980. Tinau Watershed Project Management Plan. Kathmandu/Tansen, Nepal.
- MacFarlane, A. 1976. Resources and Population: A Study of the Gurungs of Nepal. Cambridge University Press, Cambridge, England.
- Poffenberger, Mark. 1980. Patterns of Change in the Nepal Himalaya. Westview Press, Boulder, Colorado.
- Stone, Linda. 1978. Cultural repercussions of childlessness and low fertility in Nepal. *Contributions to Nepalese Studies* 5:8-36.
- Stone, Linda. 1980. Case Studies of 5 Villages: Tinau Watershed Project, Phase 2 Survey, Volume 5 (Summary). Center for Nepal and Asian Studies, Tribhuvan University, Nepal.
- World Bank. 1980. World Development Report. Washington, D.C.

BASOTHO WOMEN IN AGRICULTURE:  
A LOOK AT THE THABA-TSEKA INTEGRATED  
RURAL DEVELOPMENT PROGRAM

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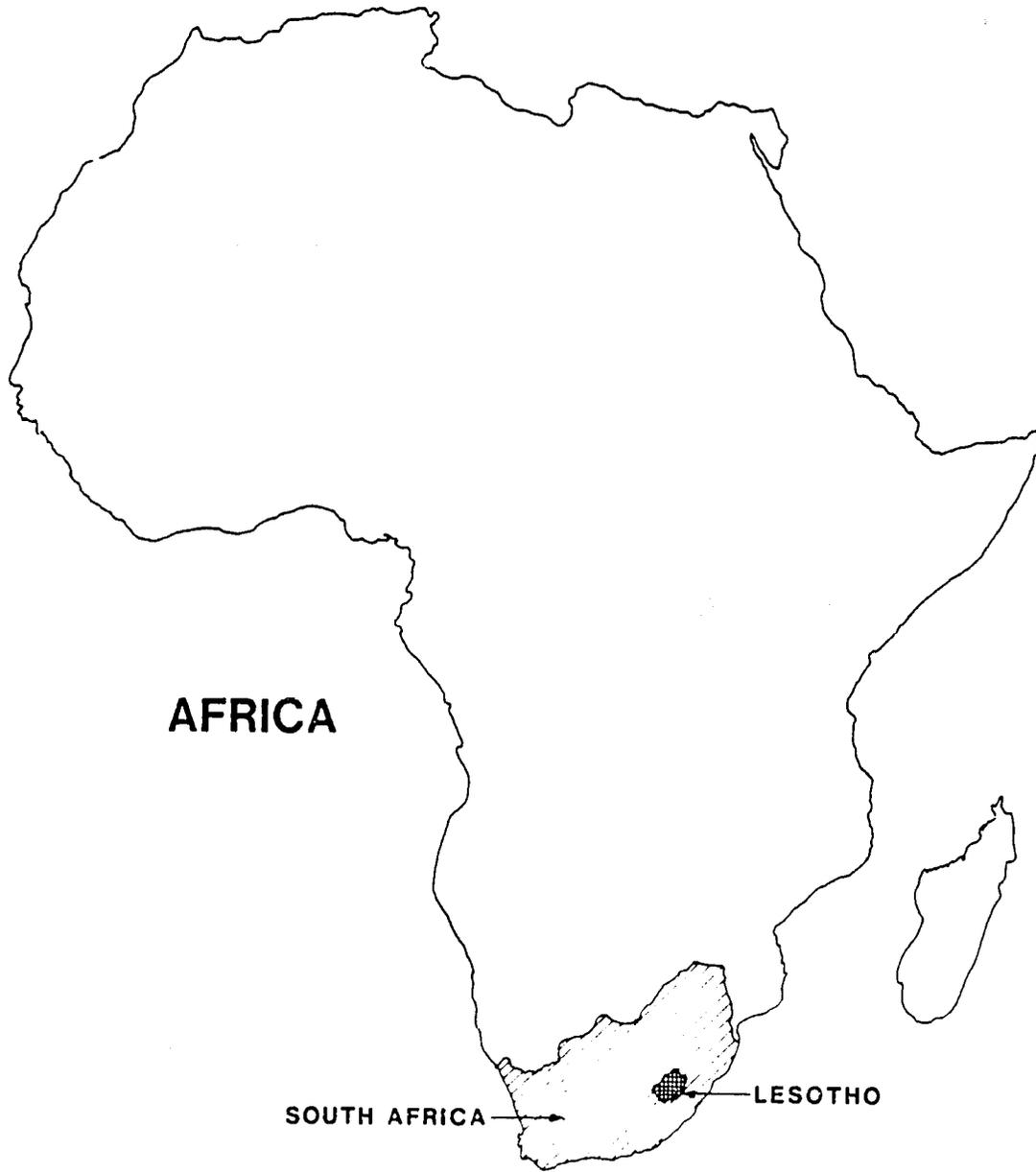
ABSTRACT

A former Peace Corps Volunteer examines an agricultural development project in Lesotho and analyzes its involvement and integration of women. Most of the project activities showed a favorable impact on women, with the notable exceptions of crops extension and income-generation, which were geared almost exclusively toward men. A major shortcoming was the lack of women involved in project planning and design.

INTRODUCTION

Lesotho is a tiny mountainous country of 1.3 million people, totally surrounded by the Republic of South Africa. At any one time over half of the male work force is absent to the South African mines, leaving the women to assume a dual role of food producer and homemaker. Because most of the land area is covered with rock out-croppings and the rugged mountains used for highlands grazing, only 900,000 acres (13%) of the land is arable.

Problems of low agricultural productivity in Lesotho result from a wide range of interrelated factors that include not only the geographical and climatic variables, but also an array of political, social and economic forces. Thus, an agronomist or soil scientist may evaluate production in terms of availability of farm inputs, condition of soil, and length of growing season, while an agricultural economist may be more concerned with incentives for agriculture, availability of skilled manpower and extension services, or governmental long-term strategy and policy analysis. Moreover, a social scientist will consider the social and cultural aspects of agricultural development, and will seek to integrate the knowledge of technical agriculturists, economists, and political scientists into an acceptable societal framework.



The purpose of this paper is to review the operations of one agriculture development project in Lesotho, the Thaba-Tseka Integrated Rural Development Program, and examine its successes and shortcomings in relation to the involvement of Basotho women and resulting benefits.<sup>1</sup>

### Participation of Women in Lesotho's Agriculture

In southern Africa, race is more powerful than sex in the determination of social relationships. Rural Lesotho has strong political and economic links to both Maseru, the capital and main urban center, and the Republic of South Africa, which surrounds Lesotho and provides employment for 60% of Basotho wage earners, almost entirely males of working age (International Labor Office 1979). The concepts of labor force and of economically active population have little relevance in Lesotho as most housewives in rural areas, where 94% of the population live, work in agriculture in the absence of male workers. A more relevant concept would be the population of working age either 15-64 or 10-64, since a large number of male children below age 15 work as herd boys. The population available for work also includes housewives and disabled persons (Table I).

Table I: Likely Employment Status of Lesotho Population, 1976

	10-64 yrs.			15-64 yrs.		
	M	F	T	M	F	T
Working-age population in Lesotho	260	394	654	185	316	501
<u>Less</u> in school	59	84	143	18	36	54
<u>Less</u> disabled and not economically active females, etc.	11	30	40	10	25	36
<u>Less</u> employed for wages (60:40) male and female	21	14	35	18	12	30
<u>Less</u> employed in handicrafts and informal sector	12	13	25	12	13	25
Available for work as self-employed, unpaid family workers and economically active housewives mostly in agriculture	157 <sup>a/</sup>	253	411	127 <sup>a/</sup>	230	356

Source: International Labor Office. 1979. Options for a Dependent Economy.

<sup>a/</sup>This number should include about 30,000 miners resting in the country in between their contracts.

<sup>1</sup>Basotho (singular: Masotho) are the people of Lesotho; their language is Sesotho.

The ILO Report (International Labor Office 1979) admits that these figures are rough estimates and that it is likely that the number of "not-economically active" females, those employed for wages or engaged in informal activities, may be larger and thus the number females available for agricultural activities may be less than indicated above. There is some controversy as to whether the shortage of male labor in the agriculture is a direct cause or rather a symptom of low agricultural productivity in Lesotho (Wykstra 1978); however, this issue is not addressed herein. Nonetheless the fact remains that women perform a large portion of the agricultural duties, making up 60% of the workforce and devoting 3.3 hours per day to such work (Guma 1979).

Given this obvious participation of women in agriculture, it follows that any plans for rural development would naturally consider women. Or so one would expect. Because of Lesotho's relationship with South Africa, any analysis of male-female roles in Lesotho must be conducted in the context of Lesotho's extreme dependence—economic, social and political—on South Africa and the ramifications for rural women's power. In this broader framework, the black-white distinction is a more powerful determinant of social relations than the male-female, since roles, choices, and status are defined and delimited from outside Lesotho. Furthermore, any indigenous patterns of female subordination can be more thoroughly understood with reference to the overall picture of powerlessness among the Basotho. While rural women in Lesotho are fully integrated into the public life of the village, they still perceive their roles as wives to be far more important than their role as village members or Lesotho citizens (Mueller 1977). This perception stems from the realization that:

....public participation offers few means by which a woman can change her life. Her husband's income is her primary vehicle for change. Her strategies, then, revolve around control of her immediate family. She is not excluded from a male-dominated public sphere; rather, she turns from it (Mueller 1977, p. 154).

Clearly, the underlying social and economic situation is important when addressing issues in agricultural and rural development. Evaluation of the effects of development on women, or the integration of women is never complete without these considerations.

#### Overview of the Thaba-Tseka Integrated Rural Development Program

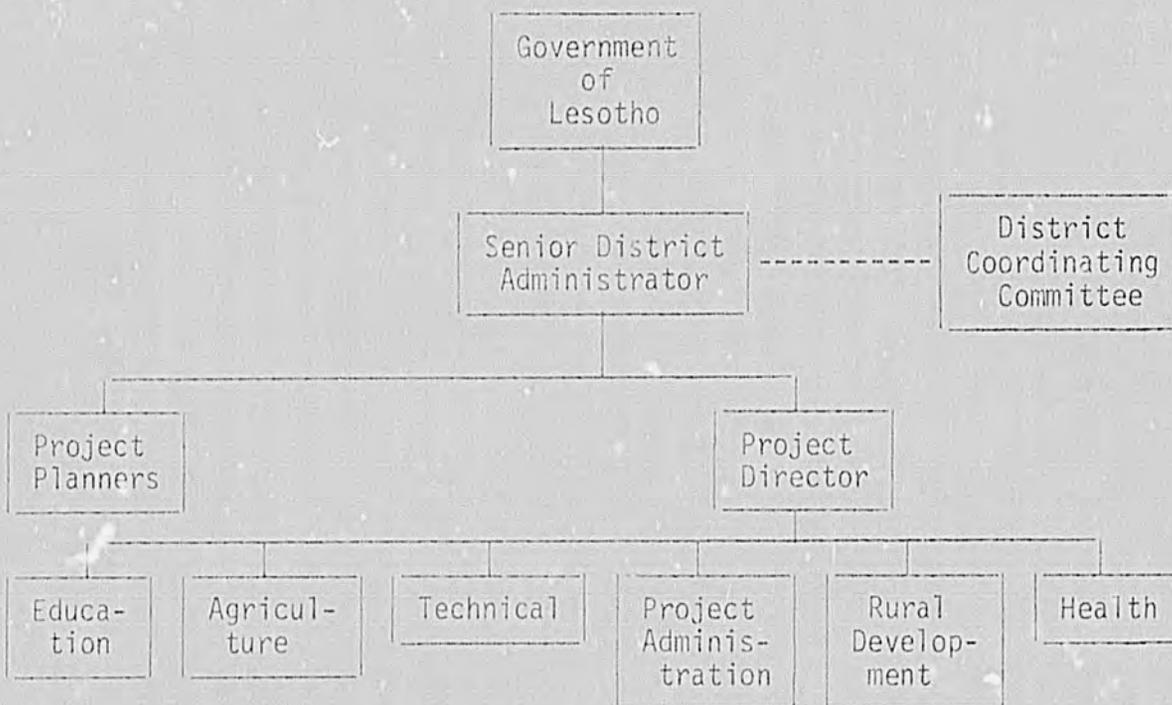
The Thaba-Tseka Project originated in 1975 as a Canadian-funded agricultural development project focusing on range management, crop production, and livestock marketing. By 1980, the project had grown into an official government district encompassing 100,000 people and became the Thaba-Tseka Integrated Rural Development Program with funding expanded to over 50 smaller projects, such as village water supply, construction of roads, infrastructures or systems of communication and transportation, village technology, health services, and resource development (i.e., a rock quarry, a mohair industry, and solar energy).

As a Horticulture Extension Officer jointly assigned by the Peace Corps and Lesotho Ministry of Agriculture to the program from January 1979 to December 1980, my role in the fledgling District Agriculture Division was diverse. Besides implementing the regular horticulture extension and research activities, I was called upon to settle labor disputes, organize district agriculture shows, teach courses in nutrition and food preservation, and assist in

developing a cooperative extension service through staff training in areas of planning, budgeting, and program management. Our staff was 90% male, yet farmers were 60% female. This project review is based on my own perception and involvement with the Thaba-Tseka Project during the two year period 1979-1981, and not on empirical data concerning population or agricultural productivity. I will examine the participation and effects of the Project on rural women in the Thaba-Tseka District and draw implications for future efforts in rural development, from the standpoint of both host country women and women serving as technical experts.

Phase I of the Thaba-Tseka Project (1975-80) covered some 53,000 hectares and included range development, livestock improvement, supply of improved seed and fertilizer, crop and fodder production, conservation, small scale irrigation, village water supply, sanitation, woodlots, penetration roads, extension, training and surveying in preparation for a comprehensive mountain zone development program. Although the major emphasis was on agricultural production, the project included the genesis of both physical and social infrastructure, encouragement of rural industry, and the creation of government machinery to administer a new tenth geographical district. The mountain program was aimed at generating income in the mountains primarily through range and livestock development (Kingdom of Lesotho 2nd 5-Year Development Plan). The cost of the First Phase was R5,831,800 (US \$6,881,500).

The organizational structure of the Project consisted of six Divisions that were overseen by a District Coordinating Committee or policy-making body (see chart below). The Committee consisted of representatives (2 of 18 were women) from various governmental ministries and acted as a liaison between the government and the Project. During Phase I (1975-80) none of the Project Planners were women, but currently there is one woman included on the Planning team.



Source: Plan of Operation for the Thaba-Tseka Project Phase II. 1980. Ministry of Agriculture, Kingdom of Lesotho.

The Committee appeared to wholly support the idea of grassroots participation and agreed that "local people's involvement in decision-making, planning, and implementation of projects was of vital importance ...and should be geared to satisfying people's stated needs" (Thaba-Tseka Quarterly Report 1980). If "people" is understood to include "women," who make up a majority of the rural population, then there is evidence that some of the four Divisions were more responsive than others to the expressed needs of women. The Agriculture Division and its predominantly male staff, in which I was most closely associated, was the most blatantly unaware of female needs and potential, especially in the area of crops extension, which included both field crops and vegetable gardens. Nonetheless, both types of agriculture are done by women. Male extension officers often expressed puzzlement concerning the lack of farmer response to extension efforts, such as educational campaigns, agricultural shows, adoption of new cultural practices, and willingness to participate in Project activities such as the credit program or the village distribution points (VDP's) that sold farm inputs. Moreover, they were frustrated when the farmers who attended extension talks did not seem overly inquisitive or enthusiastic. I perceived this apparent disinterest to be more a product of male/female role relations, and the women's reluctance to communicate with a male stranger, or to test his superiority, especially if he was a representative of the Ministry of Agriculture. However, crops extension in the rural mountain areas is a very recent phenomena and people were understandably cautious about accepting new ideas. This is not to say that the overall response was negative. My point is that the Project extension staff was not totally aware of the implicit responses in the farmers' behavior.

From time to time, the Farming Training Center would offer courses for farmers concerning various aspects of agriculture. Again, because of the predominantly male staff, the courses were male-oriented and largely attended by males. This large male attendance may also have been affected by the fact that women were less likely to leave their villages for days at a time, due to familial and housekeeping responsibilities. When there were special events for women (e.g., a vegetable gardening course, a town meeting by the Women's Bureau), the attendance by women was very good.

In areas other than Extension, the Agriculture Division showed favorable integration of women. The Crops and Vegetable Research Station employed dozens of women to tend research plots and sought to train them as well. The Woodlots and Livestock Sections also employed and trained women, some on a Food-for-Work basis. Another training plan, the Agricultural Apprenticeship program, consisted of both male and female students, and was a direct result of expressed needs to better prepare young agriculturists who planned to enter the national Agriculture College. The Nutrition Section was another area that dealt specifically with village women and assisted them in forming women's groups for purposes of nutrition education, food preservation and handicraft cooperatives. We found that by forming committees in various villages, the women felt more commitment, both financially and philosophically, to the idea of acquiring new skills. This was not the case with an unsuccessful method called the "Lead Woman Program" that focused on training one elected woman per village, who would then relay her skills to other women. One organizer of this program attributed its failure to low commitment on the part of the "lead woman" to relay her skills to her village because there was no formal women's organization in the village with a solid group of members and a stated constitution.

The Technical Division was also involved with projects affecting the lives of the mountain women. Besides providing basic infrastructures for the Project area, this division was concerned with village water supply, trade skill training, and an innovative scheme called the Rural Technology Unit (RTU). Since fuel gathering is a major household chore for women of all ages, the RTU gave high priority to developing fuel-saving devices through the use of solar energy. This included such products as solar water heaters, solar ovens and food dryers, hay boxes, and cold frames. In addition, they trained three women to be demonstrators and extension agents for the products. The ramifications for women of the adoption of these products were potentially quite positive, as the villagers' interest was and continues to be very high. In other areas, the Technical Division employed dozens of women for purposes of menial labor (supervised by male Project employees), some hired under the Food-for-Work programs that pay with food donated by various Western countries, instead of cash. Jobs in this program were usually in road-building, trench-digging for water supply, or transporting heavy loads and were considered to be very low status. They were only assumed as a last resort by women who were desperate for food—those with several children and the elderly.

A couple of smaller programs arose during 1979-1980 as a direct response to expressed needs of women. These were the tutor program for candidates of the Cambridge Overseas Certificate (COSC) and the Sewing and Knitting Brigades. The former was originated to assist adults with high school education (usually schoolteachers or Project employees) in preparing for the COSC Examination. The latter was a brainchild of two Canadian women who saw a need to train village women in knitting (by machine) and sewing (mostly school uniforms) for purposes of income-generation. The Brigades were so successful that they met project costs in less than one year and had trained 20 women and allocated a dozen machines. In spite of their success and popularity, it is ironic that both the Tutor program and Sewing programs did not receive renewed funding, for various unrelated reasons, and they were eventually phased out. This indicates a clear failure on the part of the Thaba-Tseka Project policymakers to recognize the value of higher education and income-generation for women as essential to rural development.

Elsewhere around the grounds of the Thaba-Tseka Project women occupied the stereotyped western female jobs of typist, bookkeeper, clerk, maid, cook and babysitter. On the other hand, the Project offered training to several women in the fields of drafting, radio-operating, accounting, and land surveying.

### CONCLUSIONS

The shortfalls of this integrated rural development program are not so much in the lack of involvement of women as in the lack of planning for women, by women. Few decisions were made with the effects they would have upon the women in mind. Few projects were designed with the aim of enhancing the position of women. Female participation was more a product of circumstance than one of design. The need for income-generation by women is evident all over Lesotho. Yet only a few small projects within the Thaba-Tseka Program addressed this need.

Generally, the intergration of women into the development of Lesotho is in a state of transition. Their function within the family has changed but their traditional positions remain. Their increased responsibilities in agriculture

and the cash economy are not matched with an increased command over the resources needed to meet them.

Any further development plans must consider whether the present situation of high male absenteeism, which has mushroomed over the past decade, is to continue. If so, projects should seek to develop the earning capacity of the family through programs which require the complementary efforts of both sexes.

#### REFERENCES

- Guma, Tesfa. 1979. Background Paper. Monitoring and Evaluation of the Basic Agricultural Services Program (BASP)—Lesotho. p. 6. Ministry of Agriculture, Kingdom of Lesotho.
- International Labor Office. 1979. Options for a Dependent Economy. p. 22. Saint George Printing Press, Addis Ababa.
- Kingdom of Lesotho Second Five Year Development Plan. 1975. p. 103. Government of Lesotho, Maseru.
- Mueller, M. 1977. Women and Men, Power and Powerless in Lesotho. In: Women and National Development. The Wellesley Editorial Committee. pp. 154-166. The University of Chicago Press, Chicago.
- Plan of Operation for the Thaba-Tseka Project Phase II. 1980. Ministry of Agriculture, Kingdom of Lesotho.
- Thaba-Tseka District Rural Development Program Quarterly Report for April-June 1980. p. 6. Unpublished document.
- Wystra, R. 1978. Farm Labor in Lesotho, Scarcity or Surplus. In: LASA Discussion Paper No. 5. Ministry of Agriculture, Kingdom of Lesotho.

A RESPONSE TO THE FIREWOOD CRISIS:  
WOMEN AND FUEL-CONSERVING COOKSTOVES

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ABSTRACT

Another approach to the fuelwood crisis is discussed in this paper: the development and dissemination of fuel conserving cookstoves. Two cookstove programs, one in Guatemala and the other in Senegal, are discussed. These two case studies are used to illustrate the issues surrounding women's involvement in cookstove design development, promotion and use.

Introduction

There is no need to introduce the problem of the fuelwood crisis in Third World countries. A number of speakers in the last two days have alluded to the problem, including Marilyn Hoskins and Martha Avery. These speakers have proposed changes in forest management practices and strategies so as to include production of fast growing species for firewood. They have also discussed the inclusion of women in planning as well as management of forest resources. There is much that needs to be done in increasing fuelwood supplies, especially in such countries as Nepal, Upper Volta and Senegal, where by far the largest proportion of the national energy budget is for fuelwood for cooking.

We will talk about another approach to the fuelwood crisis, that of decreasing consumption of wood for cooking by means of the development and dissemination of fuel conserving cookstoves. Aprovecho is one of the few groups worldwide developing and promoting fuel conserving cookstoves. It is a new field, a growing field, and one in which there is room for creative people willing to deal with the real limitations under which the very poor of this world live. It is a field which presently is dominated at the technical level

by men who, while they may have an excellent understanding of combustion and how to make a fuel-efficient stove, as a general rule are little concerned with cooking food and dealing with the variety of cultural practices involved in cooking. Aprovecho especially encourages women to get involved at the technical level.

Our discussion of this topic will be in two parts: Margaret will first discuss how we started working with fuel-conserving cookstoves in Guatemala with Choqui-ICADA experimental station. Gina will then discuss a more recent US AID program that we have worked with in Senegal, West Africa. These case examples from Guatemala and Senegal will serve to bring out most of the important issues concerning the role of women in the development and use of cookstoves as a response to the fuelwood crisis. We will look at the involvement of women in cookstove projects at four levels: local level work, extension, work with aid organizations, and in research and development.

Please remember that fuel conserving cookstoves are only a partial solution to the fuelwood crisis. They alone cannot solve the problem. At most they can buy a bit more time. Cookstoves must form part of an integrated strategy of natural resource management to insure that in the future people will be able to cook their food. Reforestation and fuelwood plantations must be rapidly increased and, where possible, other fuels for cooking must be developed. But it is important to note that other fuels cannot replace wood if they are too expensive for the very poor to buy.

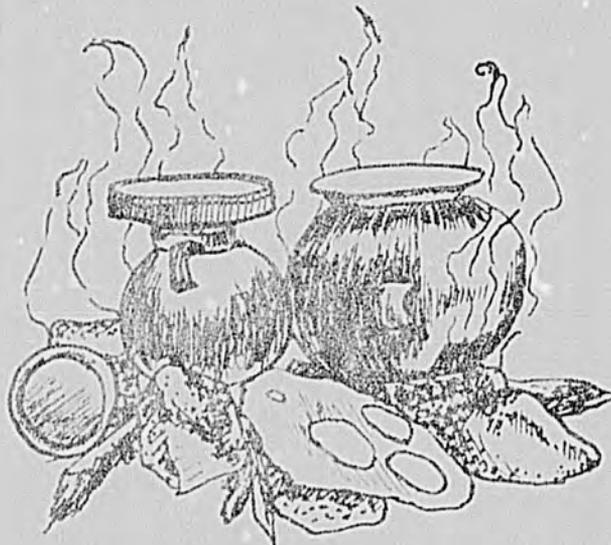
### Guatemala

Guatemala is a beautiful country divided by two mountain chains into highlands and tropical lowlands. The population is about 60 percent Indian, over 90 percent in some areas. Corn and beans are the staples in the diet. Deforestation and erosion are acute in some areas and increasing in others. This became especially noticeable in the months following the 1976 earthquake when a lot of wood was cut for reconstruction purposes.

The majority of the population, both rural and urban, cooks with wood, or with charcoal which is more common in the urban areas. Firewood is collected by women, children and men for use in homes and also for commercial sale in the towns.

Most wood is burned in open fire cooking. Clay or metal pots are propped up on three rocks or bricks and a separate fire is made under each pot, or pots are clustered together as close to one fire as possible.

In Indian areas women cook on the floor. In non-Indian, or ladino, areas they build a table out of wood, cover it with dirt and put their fire on top of the dirt so that they have a waist-high stove. But it is still an open fire, with rocks or bricks propping up the



pots. It is wasteful of heat; the heat is not directed to the bottom of the pot, especially if there is wind.

Elida Escobar, a peasant friend, is the woman who got us started on cook-stove work. She had helped me while I was collecting mothers' milk for pesticide residue analysis by introducing me to the women in her area and convincing them to give me milk samples. One day while I was visiting she came running out of her kitchen, tears streaming down her face, coughing, and upset. She asked my companion, Ianto Evans, what could be done about it; could he make her a stove to get the smoke and heat out of her kitchen.

We talked with other women later and found that this was a serious problem. In Guatemala, especially in the highlands, houses are fairly well enclosed and smoke fills the kitchen, often clear down to floor level. It is a significant health hazard. Women get eye infections, they cough a lot and the smoke increases lung problems among them. In the tropical lowlands cooks also suffer from the excessive heat. Burns are another serious problem with open fires, both for the women and for their children, especially in areas where people cook on the floor. Children can get into the fire or fall into large pots and get burned. I knew a little four year old boy who ran into the kitchen backwards and fell into a big pot of boiling water and was burned over most of his body. He died a few days later in the hospital. (We have seen cases like this in Africa also.) So women are concerned. They know fires are unsafe. They are not happy with them, but they cannot afford anything better.

At present firewood savings is one of the secondary reasons cookstoves are adopted in Guatemala. The cost of fuelwood doubled while I was in Guatemala in the years 1976-77 and peoples' incomes are not keeping up with the cost of fuel. We believe that firewood savings will become a higher priority for women as this trend continues.

Ianto Evans worked at Estacion Experimental Choqui-ICADA. This station carries out agricultural extension programs as well as research on solar cooking, solar hot water heating, and solar food drying. Ianto arranged for half of his time to be devoted to developing cookstoves for Guatemala.

The first stoves made at the station were based on a clay stove design from India; but there were several problems with the clay stoves in the Guatemalan context. Guatemalan cooks need space for more pots as well as space for a large clay or metal griddle to cook tortillas. Also the original clay stoves cracked very easily. So Ianto and the masons at the station began to experiment with adding more sand to the clay and came up with a sand/clay mixture called 'lorena', for 'lodo' which means mud in Spanish and 'arena' which means sand.

The original stoves were built on the ground because the people at the station made the assumption that as long as women were cooking on the ground in that area they would like stoves at ground level. But when they invited local women to see these first stoves, the women would come, show polite interest, and walk away.

This went on for months. Meanwhile, the masons and Ianto improved the quality of the stoves. They developed a better sand/clay mix and made the stoves more efficient, yet the women were still ignoring them. Finally one day a woman who was more outspoken than most said, "What do you take us for? Do

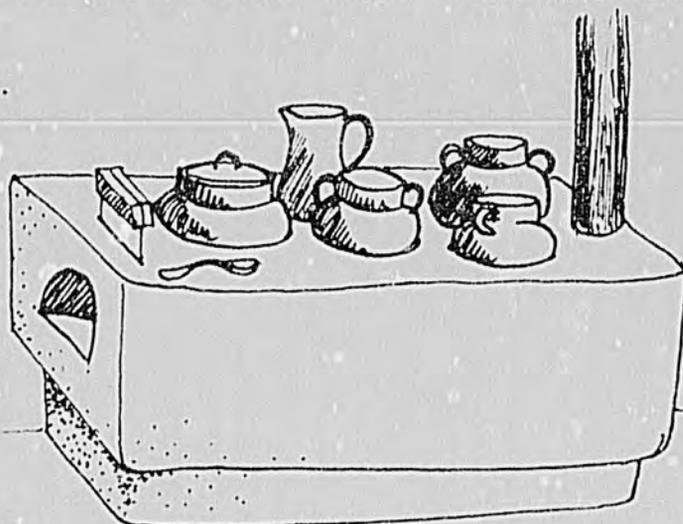
you take us for fools? We all know that stoves are waist high. These are not stoves. I don't know what they are, but they're not stoves."

The masons at Choqui were finally brought to the realization that the women had a different cultural conception of stoves. So they raised them to waist height on bases, and immediately the women showed real interest.

Over a period of six months a number of stove models were designed. Their cost was kept relatively low. The main expense was for the metal chimneys, which in Guatemala are imported, and, at the time that the stoves were developed in 1976, cost about five dollars.

The total project cost for developing the stoves at Choqui-ICADA experimental station over six months was one thousand dollars. That includes salaries.

Briefly this is how the stoves are made: Sand and clay are collected. They are screened and mixed together; water is added to make a 'masa', that is a firm mud of clay/sand mix. This mix is pounded onto a base to form a large block. Once the block dries a little, the cook can decide which pots she needs in what positions. The pot-holes, tunnels and the firebox are then carved out of the solid block of lorena mix while it is still damp. A metal chimney and dampers are then added to complete the stove.



Once the stoves were developed and had achieved acceptance locally, the people at Choqui decided to start outreach programs. Visitors were invited to the station and encouraged to use the display stoves and talk about them. The station began a series of training courses at which they taught anyone who wanted to learn how to make the stoves. This included villagers, both men and women, extension agents, both Guatemalan ones and Peace Corps volunteers, and members of other aid organizations.

In addition to giving courses at the station the Choqui masons began to build and exhibit stoves at fairs. Through the fairs they made contacts with people who wanted to be trained in their villages. There was an additional spin-off from the fairs; some people who saw stoves at them went home and built stoves for themselves.

The masons also developed little scale models to help explain to people how stoves work and Choqui-ICADA also produced and disseminated instruction booklets on how to build the stoves.

The Choqui masons also began teaching courses in village after village. They would go to a village and over a couple of days teach both men and women how to make stoves. They had expectations that both men and women would continue to build stoves in their areas.

A new profession has developed in Guatemala, that of stove mason. People who have taken courses at the station and others who have worked there have set

themselves up as stove masons and for a daily wage plus the cost of materials will build stoves for people in their homes. So far as we know all of these people have been men.

In conclusion, there are several points I would like to make concerning the involvement of women with fuel conserving cookstoves in Guatemala to date. At the local level some women assisted with the project at Choqui by cooking on the prototype stoves and giving criticisms of them during the development stage. Also many women were trained to make cookstoves both at Choqui and in village workshops. Some of these women have made stoves for themselves in their own kitchens.

At the extension level, Choqui has hired women to teach people how to use the stoves, but not to teach stove construction. This may be due to the fact that in Guatemala working with adobe and being a mason is considered men's work; it is the men's domain. Even though Choqui has trained women to build stoves there has been no continuing support for women to go out and work as extension agents or to set themselves up as independent stove builders. So it is the men who have become stove builders and extension agents.

The only outside organization involved in the Choqui stove project was CUSO (Canadian University Student Organization) which provided the funding for development of the stoves. The CUSO volunteer couple at the station backed the project and spent what time they could on it among their many other duties. The CUSO woman and another foreigner from the United States spent time developing instruction booklets on a small grant from Volunteers in Technical Assistance. Another United States couple worked with stove dissemination through Choqui for an extended period as independent volunteers.

Women were not hired to do research at Choqui. Their only involvement at this level was to use the experimental stoves and give criticisms.

The stove project in Guatemala did respond to immediate local need; it was a small-scale project, and the stoves developed in it have slowly spread. I think part of the reason stoves have spread so slowly in Guatemala is that while most of the people who use stoves are women, it is the men who have become stove builders. This often necessitates man to man communication to get them built; some women may have to get their husband's agreement to have a stove built. Since men are not faced with the day to day problems of open fire cooking they may not be as motivated to obtain cookstoves.

### Senegal

The Senegal stove project was started through US AID in the winter of 1980. A team from the Aprovecho Institute has consulted on this stove project twice. Initially three of our members went to Senegal in February 1980 to evaluate cooking and to give consultation on design prototypes and diffusion strategies. The project began on a very optimistic note; there was much anticipation that cookstoves would spread rapidly through the country and dramatically reduce firewood consumption. In January of 1981 consultants from Aprovecho returned to Senegal to evaluate the project. At this time this project was considered a success; there were 1,000 stoves in the country and just about everybody we met had heard of 'ban ak suuf' (the project's name in Wolof, the national language).

Recent reports estimate there are now about 3,000 cookstoves in the country and field surveys suggest a significant fuel savings. During our 1981 visit we found some important problems, particularly with the involvement of women in all phases of the program. These will be discussed further after a bit of background.

To date the project has focussed its efforts in the northern region of Senegal. It is these Sahel-Savannah areas that suffer most from deforestation and desertification while in the more tropical Casamance region, south of the Gambia, the situation is as yet less acute. Deforestation in the program's 'target' areas is a multi-faceted problem. The intensive cultivation of peanuts, introduced by the French and now Senegal's largest export, has contributed greatly to soil degradation in these areas. Peanut farming has also forced herders into smaller areas, intensifying the pressure on the land by sheep, goats, and cattle. In pre-colonial times these regions were not in such a state of deterioration; more balanced and ecologically sound methods of cultivation and pasturing were practiced (Chasin and Franke 1980). The drought of 1968-1974 has also taken its toll. Since this time natural regeneration of forests has been poor (Burril and Steedman 1979).

The bulk of the wood taken from standing forests goes under cookpots. Thus the rate of deforestation should increase almost directly with population growth which is estimated at 2.6 percent per annum (Burril and Steedman 1979). In Senegal the forests are actually disappearing. However, the population pressures on the land must be appreciated in terms of the factors mentioned above.

Additionally it appears that expanding urban populations, rather than rural, have a greater impact on the forests. Why? Because urban dwellers use charcoal to cook their food. In Dakar, the country's capital, 93 percent of the 2000 households surveyed in 1974 depended solely on charcoal for cooking fuel (Burril and Steedman 1979). As the cities expand, surrounding forests recede. The point has been reached where it is more economical to turn wood into charcoal and then transport this lighter fuel to urban consumers. Unfortunately, up to 80 percent of the potential energy is lost when wood is converted to charcoal in traditional kilns. Improving methods of charcoal production is another component of this same US AID funded renewable energy project.

An understanding of what foods are eaten, how they are cooked, what fuels are available and how they are used is essential before proceeding with a discussion of Senegal's cookstove program.

Cast aluminum pots are used everywhere in Senegal; often the pots have three legs or they are set on metal tripods over the fire. Most of the firewood comes from Acacia trees or from other tropical hardwood trees which are very dense and difficult to cut. Therefore pieces of firewood for cooking are often very long. One of the advantages of an open fire is that women can control their fires simply by moving the large pieces of firewood in and out. Stoves can severely restrict this kind of control.



However, most of the heat from an open fire goes not to the cookpot, but instead to the atmosphere and the cook.

In parts of Senegal where millet is the staple grain, the millet is cooked in a steamer that sits on top of a large pot. A sauce made with peanuts, vegetables and meat or fish when available cooks in the lower pot. This cooking style, one pot with a steamer, is very typical of the area, but some two-pot meals are also cooked.

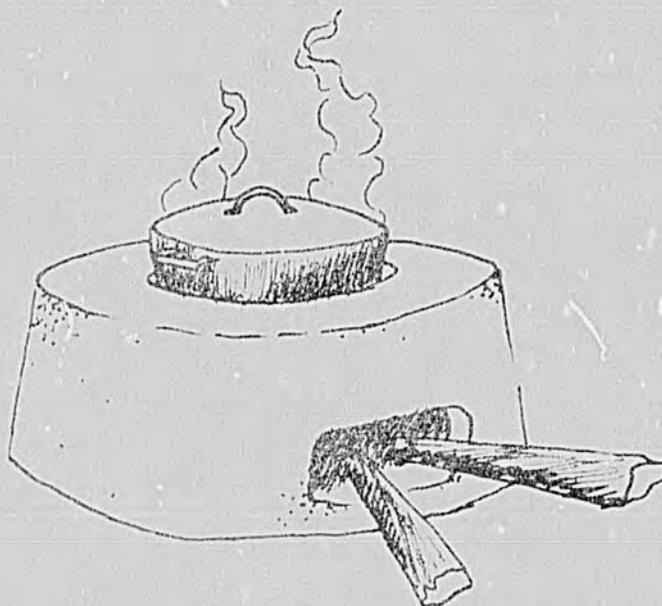


In urban areas all over West Africa a typical charcoal stove is made out of riveted metal. The charcoal is burned in a fuel bed and the pot is set up on top of the stove. This charcoal burner is also fairly inefficient; it radiates heat away from the pot. With very few modifications this stove can be made much more efficient.

It is clear that the primary reason for introducing cookstoves is to decrease the amount of fuel used in cooking. However, it must be remembered and continually emphasized that in the very real context of the household, cookstoves are for cooking food, hopefully saving some energy in the process. This seems obvious, but it has been a most difficult concept to address in cookstove work around the world.

For Senegal the prototype stove was developed by an Aprovecho consultant and some villagers in the Louga region during February of 1980. Our consultant spent most of his time working in rural areas with the help of Peace Corps volunteers. He spent an evening with villagers and volunteers discussing the fuel problem. Men and women were very concerned about it; they understood that their fires were wasteful. They talked about fires and heat using the example of a lantern radiating light in all directions. From this discussion evolved the idea of a windbreak, analogous to a lantern shade, made of sand and clay, both available locally.

The stove they built together works like this: the pot is elevated about a hand span above the floor of the stove, either on a tripod or on its own feet. The smoke and flames exit around the sides of the pot which is sunken into the stove thereby directing the heat of the fire as well as the exhaust gases to the pot. Fuel is loaded through a side entrance. This 'Louga' stove is now the most common design used in Senegal.

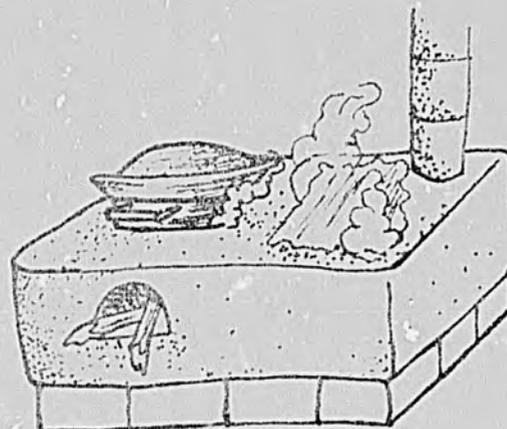


The Center for the Study and Research of Renewable Energies (CERER) is the Senegalese agency responsible for this project. This agency is part of the University of Dakar and located on the outskirts of the city. The cookstove program is under the direction of a French engineer who has

worked with renewable energy projects in Senegal for many years. CERER's primary role in the program was originally identified as a technical one, research and design. However, in the project's first year they concentrated their efforts in extension. This center's primary means of extension is through mobile mason teams. The teams go to villages, towns and schools throughout the country to teach owner-builders, other masons and some trainers. The masons have also gone to some of the centers operated by relief and welfare agencies and have taught people there how to build stoves. This method of extension has gotten many stoves built. In some areas the masons have trained other craftsmen who have become professional stove builders charging customers for their work. We hear they have more orders than they can begin to fill.

The mason teams, and masons in general, are men. In terms of cookstove promotion there are advantages to this. They can work through the traditional male dominated governing hierarchies to encourage the acceptance of this new technology, something that women in this predominantly Muslim country cannot do. The disadvantage of this is that promotion and training through this method have tended to go from man to man, with women playing a peripheral role. This doesn't make sense with cookstoves; they are used exclusively by women.

A specific problem that has arisen from this extension method is the promotion of an inappropriate two-pot stove design. The design was developed very early in the project with no intention of promoting it where the Louga model better suited cooking styles. The two-pot design, however, seems more acceptable to village chiefs and offers more artistic challenge to the masons than the single pot cookers. We visited many kitchens where women were cooking single pot meals over the firebox while the second pot hole was covered with scrap metal or a water pot.



In addition to being unsuited to cooking in many areas, two-pot designs are more difficult to construct so that they work efficiently. In areas where the masons had trained owner-builders (usually men) we found some second generation stoves that were total disasters. The masons are artisans first, teachers second.

In other areas Peace Corps and other volunteers are promoting cookstoves in villages with varying degrees of success. They are very interested in helping villagers learn to work with stoves and are also concerned about introducing appropriate models. They have found women in their villages to be quite interested in stoves. However in some places where materials have to be brought in by horse cart the women must wait until the men find time to do this. Men often do not have direct contact with the firewood problem and unsafe cooking conditions and therefore do not make stoves a priority.

A woman volunteer is responsible for Peace Corps extension and follow up throughout Senegal. Together we have outlined new roles for additional volunteers in the program. These are: technical research, training, follow up and organizing the participation of women.

Another woman working on cookstoves is a potter from a village in the Kebemer region, northeast of Dakar. She was introduced to cookstoves through a workshop presented by a Peace Corps volunteer living in her village. Since that time she has dedicated her energies to extension, promotion and training in cookstoves. She is an older woman and hence free of many family responsibilities. As a potter, traditionally women's work in Senegal, she is experienced with clay and sand. Her intention is for every woman in her region to have a stove and know how to build it. The stoves are easy to build and the women can have control over this technology.

This potter goes to villages and stages stove building workshops for women. In one village where she held a workshop a Peace Corps volunteer returned a week later and found over 100 new stoves. These stoves were a slight mutation of the original Louga design, known as 'volcano' stoves because of their conical shape. Many stoves did not work properly because of this design modification. However, the potter has done follow-up work to help these women repair their faulty stoves and better understand the principles of design. What is really outstanding is the level of commitment displayed by these women and the willingness of the potter to help them rectify their mistakes.

During our consultants' follow-up visit in 1981 we talked with many village women who were using cookstoves. From our conversations we compiled a list of advantages and disadvantages of stoves. Fuel savings, safety, less smoke and faster cooking time were the most commonly cited advantages. Rapid deterioration of the stoves was the disadvantage mentioned by just about everyone. Many women had ideas about how to improve their stoves; some had actually altered their original cookers in various ways. What is important here is that this information cannot be ignored but must be incorporated into the project's planning and research. Up to now it has been very difficult for the project to implement a program of systematic follow up. The program's success has been measured in terms of numbers of stoves in the country, but this does not really mean very much. The real success of the program can only be measured in the kitchens of the users. In Senegal these places are most accessible to women; therefore, women will have to be employed to carry out follow up, something which is just beginning to happen in Senegal.

We have seen that on a local level involvement of women varies and that it tends to vary directly with the extension approach used. The potter from Kebemer obviously thinks that cookstoves are in the domain of women, and she is very energetically promoting this idea throughout northeastern Senegal. While from CERER in Dakar, the male mason teams are going out into the countryside and, at times, promoting inappropriate stoves; but they are getting to the local level nonetheless, which is important.

There are some women from Senegalese agencies and foreign volunteer groups who are working with cookstoves in the country. However, at the time of our consultancy it was difficult to assess the scope of their involvement. Aprovecho's team recommended that the project increase the participation of women in an organized fashion. CERER has since employed two monitrices from Promotion Humaine (a government social welfare agency) to do extension and follow up. They have done good work but were only available for a limited time. CERER has added to its training and extension program a team of female masons, including the potter from Kebemer region. The Peace Corps volunteer in charge of stoves has confronted many obstacles working in this country where the

status of women is not very high. But she has persevered and stayed with the program.

On the program level, until recently there were no women involved in the US AID program other than the short term consultants. Last year a woman was named project director for US AID and we think we will begin to see some positive changes involving women in the cookstove program. Her initial report is the first official US AID acknowledgement of the work of the Kebemer potter/mason. This is really nice to see, especially since she was either directly or indirectly responsible for about a third of the thousand stoves in Senegal a year ago.

In technical research and development we once again must credit this remarkable village woman who has done some of her own research. The CERER monitrices have conducted small field surveys to assess fuel consumption. I have been the only woman in Senegal officially involved in technical stove research. We have recommended involving women in the testing at CERER which has occurred to a minor degree.

Until recently the involvement of women in Senegal's stove program has been haphazard. What is heartening to see is that those involved in running the program are now making an honest effort to formally integrate women into the program on all levels.

#### Conclusion

When talking about a new technology, like cookstoves, we must ask, "In whose domain does this technology belong?" For stoves the first answer is "The women's domain." Women are the cooks. But it is obviously a more complicated question. In Guatemala it is apparent that stove construction falls within the domain of masons, who are men. As we have seen in Senegal the gender roles associated with promotion and construction of stoves are not so clear cut. What is clear is that women have successfully involved themselves in some areas. Overall it appears that a balance must be struck through organized cooperation of men and women in ways that will vary from place to place. However, it must be understood by all who are involved in promoting improved cookstoves throughout the world that projects cannot succeed without the involvement of women in planning, research, design, extension and follow up.

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## References

- Amalfitano, G., I. Evans, and E. Gern. 1981. Ban ak Suuf Cookstoves in Senegal. Report to US AID, Dakar, Senegal.
- Aprovecho Institute. 1980. Helping People in Poor Countries Develop Fuel-Saving Cookstoves. German Appropriate Technology Exchange, Frankfurt, Germany.
- Burnil, G. and C. Steedman. 1979. A.I.P., Renewable Energy Project. For: US AID, Senegal.
- Chasin, B. H., and R. W. Franke. 1980. Seeds of Famine. Allenhead, Osmun, and Co. Publishers, Inc., New Jersey.
- CILSS/Club du Sahel. 1978. Energy in the Development Strategy of the Sahel. Cookstove News, quarterly journal, published by Aprovecho Institute.
- Evans, I., and M. Boutette. 1981. Lorena Stoves. Volunteers in Asia, Palo Alto, California.
- Evans, I., E. Gern, and L. Jacobs. 1980. Improved Cookstoves for Rural Senegal. Report to VITA/US AID, Senegal.
- Madon, G. 1981. Programme de Diffusion des Cuisinieres 'Ban ak Suuf', Rapport d'activite' No. 3. CERER, Dakar, Senegal.
- Shaller, D. V. 1981. A Sociocultural Assessment of the Lorena Stove and its Diffusion in Highland Guatemala. In: Lorena Stoves. I. Evans and M. Boutette. Volunteers in Asia, Palo Alto, California.
- Ulinski, C. 1981. Senegal's Ban ak Suuf Cookstoves. Report prepared for the Conference on Energy, Forestry and the Environment. Nairobi, Kenya.

MANAGEMENT AND THE ROLE OF WOMEN  
IN DEVELOPMENT

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ABSTRACT

I was one of two instructors at a management training workshop for French-speaking African women conducted in Gisenyi, Rwanda during April 1981. The participants were 25 women in mid- to upper-level management positions from Burundi, Rwanda, and Zaire. Our objectives were to teach management theory and techniques to help the participants in their work situations, to sensitize them to the problems of rural women, and to encourage the development of a women's network between the three countries. Problems arose during the workshop that were barriers to networking and effective interaction between the women. In dealing with these problems, I learned some lessons that could be applied to international assistance work.

INTRODUCTION

When I left Zaire in 1976 after three years as a Peace Corps Volunteer, I knew I would return to Africa some day as an agricultural expert to help combat poverty by increasing agricultural production. At that time I had a traditional view of the role of expatriates in development activities. I felt that the function of an expatriate technician was solely to solve technical problems which were barriers to productivity. After starting my doctoral program at Utah State University, I had the good fortune to meet two rural sociologists who played a significant role in my conversion to the philosophy that human resource development is the key to any development effort. Using increased agricultural production as the means not the end, projects should upgrade the skills of individual farmers and local technicians while enhancing their problem-solving capabilities and feelings of self-worth.

Without this human element, projects will fail when the expatriate technician leaves. Therefore, I believe that training of host country personnel at all levels of society is essential to successful international assistance programs.

Training in management skills is becoming increasingly important in developing countries. Many individuals in these countries who have degrees in natural resources are quickly elevated to administrative and managerial positions after working in their areas of specialization for only a short time. Often scientific training does not prepare them for their new roles. An increasing number of women now find themselves in this situation.

I was one of two instructors at a workshop for women in mid- and upper-level management positions entitled "Management and the Role of Women in Development." This short course was conducted in Gisenyi, Rwanda, in April 1981 for 25 participants from Burundi, Rwanda, and Zaire. I had been contacted by the U.S. Department of Agriculture (USDA) at the suggestion of Kathleen Cloud, Director of Women and Food Communication Network, who knew of my Peace Corps experience in Zaire. I was hired as a member of the training team because of my previous international experience, knowledge of women and development issues, fluency in French, and ability to work cooperatively as a team member. The USDA had wanted to send a training team composed of two women but they were unable to locate a woman with African experience, fluency in French and management experience. They selected as my co-trainer Ron Grosz who was trained in agricultural economics, had experience in management training, and had worked in Zaire at a rural development project for two years. Together, with our complementary areas of expertise, Ron and I formed a strong team to develop and conduct the management training workshop in Rwanda. In this paper I will share with you the background of the participants, my perceptions of the workshop activities, problems encountered and lessons I learned from the experience.

#### GEOGRAPHICAL SETTING

Burundi, Rwanda, and Zaire are located in central Africa in the region of the Great Lakes of Africa. Prior to World War I, Burundi and Rwanda were under German control but became a Belgian mandated territory in 1919, eventually becoming a Belgian trusteeship in 1946. Zaire, formerly the Belgian Congo, had been a Belgian colony since the early 1900's. Today Burundi, Rwanda, and Zaire are independent republics loosely linked for economic reasons as the Economic Community of the Great Lakes States (CEPGL).

Zaire, the largest and most diverse of the three countries, has an area of 2,345,000 km<sup>2</sup>. Its population of 27,900,000 (12 people/km<sup>2</sup>) is divided among at least 250 tribes living in villages. The official language is French but there are four predominant African languages used in primary school education. Kikongo, Lingala, Kiswahili, and Tshiluba. The famed Congo River (Zaire River) with all its tributaries drains the central basin which covers about two-thirds of Zaire. There are 14,000 kilometers of navigable waterways in this river system and the average altitude of this area is 400 meters above sea level. Vegetation ranges from equatorial forest to savanna to high montane forests at the edge of the Great Rift Valley where the mountains reach

up to 5000 meters. Zaire is rich in natural resources. It contains 70% of the world's known reserves of cobalt and is the largest producer of industrial diamonds in the world. The important agricultural exports of Zaire include rubber, palm oil, coffee, and tea.

Burundi is a small country about the size of Maryland (28,000 km<sup>2</sup>). Living in isolated homesteads called "rugos", its population of 4,512,000 (162 people/km<sup>2</sup>) is predominantly rural. There are two major groups of people in Burundi, the Tutsis who comprise 14% of the population and the Hutu who are in the majority, 85%. A third group, the Twa (1%), are related to the pygmies of the central African forests. The Tutsis are a Nilotic group of people who were traditionally cattle owners and pastoralists. When they arrived in the area, they subjugated the Hutus, a Bantu people, who were cultivators. At independence, Burundi became an independent kingdom ruled by a Tutsi king, but became a republic in 1966. There have been several attempted uprisings of the Hutu since independence resulting in much bloodshed, but to date the Tutsis remain in power. The official language is French and the predominant African language is Kirundi. Burundi ranges from 700 meters above sea level in the east to 2680 meters in the northwest volcanic area that borders the Rift Valley. Agriculture is the most important industry in Burundi with bananas, pyrethrum (a plant used in the production of pesticides), and tea being the most important crops.

Rwanda (26,338 km<sup>2</sup>) is similar geographically to Burundi with the land ranging from 700 meters above sea level to some 4500 meters in the north where there is a chain of nine volcanoes, some of which are currently active. The predominantly rural population live in "rugos" and practice mixed agriculture with the dominant crops being beans, manioc, sorghum, sweet potatoes, and bananas, depending on the elevation. Coffee, tea, and pyrethrum are the principal cash crops. Rwanda is one of the most densely populated countries in Africa with approximately 182 people per km<sup>2</sup>. The same three groups of people present in Burundi are present in Rwanda in the same proportions. The Hutus, however, managed to abolish the Tutsi Kingdom at independence and are in control of the republic. The official language is French and the predominant African language is Kinyarwanda. The linked history of Burundi and Rwanda has left them scarred by conflict that continued until the mid 1970s. There is still tension there today.

#### WORKSHOP

The workshop was organized under the auspices of USDA, MULPOC<sup>1</sup> and CEPGL<sup>2</sup>

<sup>1</sup> MULPOC - Multinational Programming and Operational Center of the United Nation's Economic Commission in Africa (ECA). There are 5 MULPOCs in Africa. The Gisenyi-MULPOC acts as a liaison between CEPGL and ECA. Its function is to promote economic and development activities on a regional basis.

<sup>2</sup> CEPGL - Economic Community of the Great Lake States. CEPGL is an organization linking Burundi, Rwanda, and Zaire to promote regional development of resources and to expedite trade between the three countries.

with funding from USAID/Rwanda. USDA provided the instructors and course materials while MULPOC and CEPGL provided facilities and on-site<sup>3</sup> logistic support coordinated by the MULPOC WID (Women in International Development) coordinator.

There were 25 participants from Burundi, Rwanda, and Zaire ranging from 25 to 40 years old. These women had been employed in their current positions from one month to several years. Their educational backgrounds varied from two years of post-secondary training to university degrees in biology, limnology, social science, education, art, and medicine. Some of the women had previously participated in short courses in the United States and/or in Europe. Several had participated in international meetings and only one young woman had never traveled internationally prior to the workshop.

The objectives of the workshop were:

1. To teach the participants, through experiential exercises, management techniques that they could use to be more efficient in their jobs.
2. To sensitize them to the problems of rural women so that in planning projects themselves or in interacting with other planners, the impacts of these projects on women would be considered.
3. To develop a support group or network of women in these three countries.

During the workshop, we used a mixture of teaching techniques. We gave lectures on management theory including Maslow's hierarchy of needs, Theory X, Theory Y, styles of leadership, and the five functions of a manager. We used experiential (hands on) exercises to practice skills such as the systematic approach to problem solving, the how-why network, critical path analysis, force field analysis, and Gantt charting.

We divided the participants into small groups for exercises on group dynamics which included 2-person interviews, group decision making, and group organization to accomplish a task. The results of the latter exercise proved to be a textbook example of what happens when a group fails to organize to get a job done. One group organized themselves into a mini-corporation complete with administrators, technical staff, and personnel to keep up morale. They succeeded in designing and producing an imaginative, functional lunar vehicle made of Lego blocks. The second group had only partially organized, but maintained good morale and comradery. They produced a functional, though not very imaginative, lunar vehicle. The third group complained constantly that they were being treated like children and that even their children had instructions on how to construct objects using Lego blocks. Needless to say, they neither designed nor produced a lunar vehicle.

In addition to learning specific management skills, experts from the three countries were invited to Gisenyi to discuss certain relevant topics

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<sup>3</sup> Both MULPOC and CEPGL have their offices in Gisenyi.

such as integrated rural development and its effects on women, nutrition, demography, and the legal status of women in the CEPGL countries. After each presentation, the women divided into work groups and either practiced using their new management skills to address these problems or drew up a series of recommendations concerning these issues to be submitted to their respective governments.

During the final week of the workshop, the participants, after visiting functioning development projects in small groups, used their new skills to analyze the projects for their impact on women, offered recommendations for project improvement, or planned a women's component where none existed. Each group presented its findings to all the participants for a final discussion after which written copies of their analyses were submitted to each project visited.

### PROBLEMS ENCOUNTERED

A major problem encountered during the workshop was that although the organizing agencies ostensibly considered it to be an important activity, in reality the workshop was relegated by these same agencies and regional administrators to the category "Women's Project" and not taken seriously.

We first became aware of this attitude when looking for development projects that the women might visit during the final week of the workshop. Before the workshop began, Ron and I received from the regional governor a list of ten projects in the area. He assigned a guide to help us locate these projects and talk with the project managers. At one location we were told by the Belgian manager that he didn't want a bunch of middle class, city women disrupting his operations since it had taken him a long time and much hard work to establish confidence with the villagers. We then went to an area high in the hills to look at a German agricultural project. We met with the sub-regional governor who showed us a partially constructed medical center and prison instead of the agricultural project we had come to see. He assured us over lunch that in the area there was no such agricultural project that involved women and furthermore he did not understand the necessity of conducting a management training workshop specifically for women. It was a week later that I met the German manager of the project in question, a project which had about 40 women actively involved in agricultural production. Despite this attitude, we succeeded in arranging visits to four development projects.

One indication of the apparent importance of the workshop was the emphasis placed on elaborate opening and closing ceremonies. About one-half of the operating budget of the workshop, under the control of the MULPOC and CEPGL administrators, was allocated to these festivities which included catered receptions. In attendance were all the MULPOC and CEPL staffs as well as local Rwandan and Zairian officials. Representatives of USAID and the newly appointed Rwandan Minister of Social Affairs came to Gisenyi from the capital to represent their respective governments. There were many official speeches expressing concern over women's issues and the importance of the workshop to all the countries involved.

When problems arose during the workshop, however, these same administrators did not respond positively to resolving them.

Very early in the workshop, the women expressed displeasure with the financial arrangements that had been made. They sent several letters expressing their grievances to the MULPOC, CEPGL, and USAID authorities. They maintained that they were being discriminated against since men sent for training in a similar situation would have received more per diem. The authorities either ignored the letters or sent perfunctory replies all the while complaining that only women would act this way. They felt that once the workshop ended and the women dispersed, the conflict would be resolved and it did not need to be addressed directly. The situation deteriorated until a group of women threatened to leave the workshop. At that point a general meeting was called by the administrators of CEPGL and MULPOC, not to discuss the legitimacy of their grievances but to chastise them for disrupting the workshop. I don't think that grievances expressed by a group of men would have been so summarily dismissed nor would men have been treated in such a paternalistic manner.

The conflict over money was also a serious barrier to network formation because it divided the women into two groups, those who wanted to boycott the workshop and those who wanted to continue working. I was never sure whether the group of women who remained outside the conflict did so voluntarily or if they were coerced either subtly or overtly by a senior official from their country who was actively involved in the dispute. Either way, this lack of solidarity among the women had a negative effect on networking. The women themselves recognized this and made an effort to reconcile their differences before the workshop closed.

For me, networking was the most important objective of the management training workshop. When individuals are trained in new techniques and return to their places of employment, they may meet resistance in trying to implement this new knowledge, sometimes due to the jealousy of co-workers left behind, but more often due to the fact that they need the support of others who are knowledgeable in these techniques. Without this support one can become very discouraged. One of the objectives of the seminar was to provide such long-term support.

There were, however, barriers to interaction among the women which inhibited effective networking. Leisure time interaction was decreased because the hotel selected for the seminar was not large enough to accommodate all the participants under one roof. Some of the women moved to a hotel a fair distance away while others agreed to share double beds so that most of the women could stay in one location.

The other barrier to social interaction was, in my opinion, the politicization of the seminar. From the opening day, the women were referred to as the Delegations from Burundi, Rwanda, and Zaire. When Ron and I arrived the first morning ready to start work we found three tables prepared and labeled Burundi Delegation, Rwanda Delegation, and Zaire Delegation. We quickly dismantled the tables and when the participants arrived in the room they mixed without regard for national status.

By being treated as "delegations" from their countries rather than as a group of women brought together to undergo training, the participants were often entertained by their compatriots who worked with MULPOC and CEPGL. This, in itself, was not bad but combined with the lodging factor significantly diminished the social interaction of the group as a whole.

For networking and mentoring to be effective, it must be both horizontal and vertical, and should include a whole spectrum of women. A mid-level woman would be in a position to encourage and support the development of women below her while at the same time receiving support from her peers. She would also learn from and be supported by women in more powerful positions. The participants were really willing to encourage and support the less experienced members of the group. One young woman, Maggi, the least experienced participant at the workshop, was initially very shy and lacked self-confidence. It was heartwarming to watch her development during the five weeks since every woman encouraged her participation and made her feel that her contributions to the group were valuable.

On the other hand, the participants were not supportive of the MULPOC WID coordinator who was in at least a peer position, if not a more powerful position than most of the participants. Some of the women seemed to be jealous of her position and acted as though they needed to prove that they were as powerful and important as she was. Many factors could be responsible for this behavior. Women from these countries have historically held power within their households but are relatively inexperienced in positions of authority in the work force. Feelings of insecurity due to this inexperience could result in competition between women in these new roles rather than support and cooperation.

Ethnic differences, if strongly felt, may potentially be a barrier to supportive, cooperative action. In this case, some of the women who reacted most negatively to the WID coordinator were from an ethnic group that was traditionally in conflict with her ethnic group.

All the problems discussed above are very complex. There was no one cause nor was there an easy solution. They all affected the workshop to varying degrees and had to be dealt with during the shortcourse.

#### LESSONS LEARNED

Being a trainer at this workshop was a valuable experience for me. From my travels in eastern Zaire, I was somewhat familiar with the geographic setting in which we would be working. I read the information sent to me by USDA that described briefly the cultural and historical setting of the area and I had met Rwandans and Burundians while in Zaire. I had also taken several anthropology courses which along with my own experience had sensitized me, I thought, to be open and capable of dealing effectively with situations as they arose.

The problems that arose during the workshop emphasize the importance of knowing as well as possible the historical and cultural background of the area

in which one works. For example, the existence of tribal or ethnic differences is a sensitive issue in some parts of Africa, particularly where post-independence conflict occurred. An outsider cannot ask about tribal affiliation directly, but through other knowledge, it can be inferred. This knowledge can help explain or at least provide insight into complex situations.

In accepting an international assistance assignment, it is important to talk to people who have worked in the country, and to meet international students from the area as well as to read scholarly and popular works about it. All these sources of information will not totally prepare one, but they are helpful.

I found that it is extremely important also to understand the sociology and power structure of the organizations with which one works. Who has the power? What can and cannot be done within the organization? Who communicates with whom? What are the proper channels to work through to accomplish a given task? It's important to recognize that management and leadership styles are culturally dependent and that bureaucracies don't function the same way in different areas of the world.

During the workshop, I met several talented, well educated professionals who have real insight into the problems facing their countries. They have published some very interesting work that is only available locally. I learned that there is an ever-increasing number of these people who, along with their published works, are a valuable resource that should be utilized more fully by donor agencies.

I became aware of the large network of African women that is developing, particularly under the auspices of MULPOC. More links between American women and those women need to be forged. During our discussions of women's problems in developing countries, I found that they and we are concerned about the same issues: pre-natal care for mothers, infant health, legal rights for women, and day-care facilities for working mothers, to name a few.

The women were also concerned about the "brain drain" that is occurring. Large numbers of educated Africans are staying outside their countries to work rather than returning to help in the development process. At several times during the workshop, I felt that some of the women were to an extent part of the "brain drain." As urban educated women, they had lost touch with the realities of rural life and could, therefore, not offer realistic solutions to the problems of their rural counterparts. Some felt that they knew what was best for rural women rather than listening and searching together for solutions.

#### CONCLUSIONS

Upon our return to the United States, the most commonly asked question was "Would you do it again?" My answer has always been, "Yes, if ...". For example, I felt that for a workshop of this nature to be really successful, we needed to be isolated with the participants so that a real group cohesiveness could have been established. Mixing our experiential methods

with the presentations of subject matter experts had real potential but in this case was not coordinated as well as it could have been, because we did not have enough control over the workshop schedule.

We were also asked about having a male and female instructor working together. I felt that depending on the personalities of the individuals, it could be either positive or negative. For us, it turned out to be positive since we worked well together and complemented each other in our abilities. The women were used to being in male-dominated situations so it didn't seem to affect them one way or the other, although we did try to present a positive role model for them to follow.

Management training is becoming increasingly important in developing countries, especially for women. I think a management training workshop of the nature we conducted with the additional objectives of sensitization to rural problems and network formation is a good integrated approach.

THE ROLE OF THE NATURAL RESOURCE PROFESSIONAL  
IN HER NATIVE COUNTRY

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ABSTRACT

Women in third world and developing countries are viewing a profession in natural resources as an alternative to the roles traditionally filled by women in those countries. Five women, from the countries of Australia, Jamaica, Kenya, Morocco, and Portugal were interviewed and related their experiences concerning employment in these countries. All agreed, with the exception of the interviewee from Morocco, that the opportunities for women in natural resources in their countries were increasing.

## INTRODUCTION

The employment of women in natural resource professions in third world and developing countries, is an increasing reality. Positions for which a woman would not have been considered, as recently as fifteen years ago, are now within the grasp of those women who choose to pursue them. Reaping the benefits of opportunities for higher educations they have now emerged as some of the first women to hold these positions in their native lands.

A series of interviews, conducted at Colorado State University, focused on several women professionals who were on leave from their native countries and attending the university to receive advanced training. The individuals interviewed were from the countries of Australia, Jamaica, Kenya, Morocco, and Portugal and were employed in the disciplines of architecture, animal husbandry, range science, wildlife biology, and remote sensing. The topics they discussed and the views they presented centered on the professional aspects of their career choices.

The main objectives of this study were to examine and promote an awareness with regard to the emerging roles of women employed in natural resource professions in developing countries; secondly, to interview women who have these new roles and present their responses in an individual interview format. This paper was not intended to be an exhaustive research project delving into the socioeconomic, cultural, and psychological aspects of women as natural resource professionals. It does, however, describe the contemporary viewpoints and insights of five women who share two traits: they have chosen careers in natural resources and are one of the very few women employed in this capacity in their native countries.

The five women who were interviewed were highly educated and highly motivated as individuals to pursue careers which were beyond the grasp of most of their countrywomen. Obviously, these women have been presented with unique opportunities and are not necessarily representative of the women of their countries, nor was this ever the intent of this paper. They are, however, five women who have elected careers very different from those of their "foremothers." This paper is an attempt to bring to light their feelings, thoughts, experiences, and aspirations, and to share them with American women engaged in the natural resource professions. It is the hope of the author that these interviews will provide the reader with enlightening aspects of cultural exchange, as well as moments of inspiration.

## METHODOLOGY

The departments of agronomy, forestry, earth resources, animal science, fisheries and wildlife, range science, landscape architecture, and agricultural economics at Colorado State University were contacted, and listings of female foreign graduate students were obtained. These listings were subsequently confirmed by the Office of Foreign Student Services on campus. The final list was compiled on the basis of country and included women from Argentina, Australia, Botswana, Iran, Israel, Jamaica, Kenya, Mexico, Morocco, Nepal, Portugal, Sudan, Tanzania, and Venezuela. A criteria for selection was then developed and employed, whereby certain individuals would be contacted as potential subjects to be interviewed. The ten criteria for selection are listed in Figure 1.

1. At least 25 years of age, but not older than 50; so as to establish a time frame of reference.
2. Primary, secondary, and preferably university educations received in her native country.
3. Possession of the equivalent of a Bachelor of Science degree at the time of employment.
4. Employed for at least one year in her native country.
5. Employed in a professional capacity in a natural resource field.
6. Position held emphasized field work rather than laboratory, teaching, or clerical duties.
7. Position held was unique, in that the incumbent was employed as one of a very few women in that profession.
8. Had lived in the United States for at least 6 months prior to the time of the interview.
9. Anticipated a return to her native country upon completion of graduate studies, or soon thereafter.
10. Expressed an interest in participating in an interview and answering questions concerning her country, her profession, and herself.

Figure 1. Criteria for Selection

1. Name (i.e. name used as a professional)
2. Native country
3. Age
4. Educational background
  - a) schools attended
  - b) degrees received
5. Reason for pursuing advanced course work
6. Position held in native country
7. Job description
8. Describe a specific instance in which you were involved; i.e., describe how your decisions influenced the outcome of a specific project.
9. Discuss some of the problems encountered in your professional life.
10. Discuss the role of women in your country
  - a) traditional
  - b) contemporary
11. Describe how the traditional role of women in your country has influenced your career choice and career opportunities, as you perceive them.
12. Describe a situation, where you have worked with American women in your own country.
13. Compare your view of career opportunities for women in your own country with your views of career opportunities for women in the United States, as you perceive them.
14. Discuss the future for women in natural resource oriented professions in your own country, as you perceive it.

Figure 2. Interview Questions

Eight individuals were shown to best meet the criteria, and preliminary interviews were conducted. The preliminary interviews consisted of reviewing the purpose of this paper as well as outlining subject areas which would be covered during the actual interview. The interviews which were subsequently conducted, ranged from 45 minutes to 90 minutes in length. All of the interviews were tape recorded and were later transcribed and edited for specific content. All of the subjects interviewed were asked the same series of questions, as listed in Figure 2. The original tapes have been put on file and will be available for review until August of 1982. The women who participated in the interviews may be contacted by writing the author and submitting a current mailing address and a brief description of the request. The address and request will be forwarded to the interviewee indicated.

## INTERVIEWS

### Australia

"The traits, desires, capabilities, interests and social potential of the modern woman are treated as if she were leading the life her grandmother led."

Quote from:  
Women and Society: An Australian Study

Annemarie Harrison is a 29 year old Australian, who at the time of the interview, was attending Colorado State University and working toward a Master of Science degree in architecture. She was born in Adelaide, South Australia where she attended private primary and secondary schools. She earned her Bachelor of Science degree at the South Australian Institute of Technology where she studied in the School of Architecture.

Her most recent position in Australia was as program manager for a national company, where she directed sign placement and design. The importance of the use of outdoor signs for natural resource education in recreation areas is an important aspect of a well planned park system. "I derived a great deal of satisfaction from this job," she said, "because I was able to act as a liaison between the public's needs and the artist's creativity."

She indicated that while the ranks of interior designers are filled primarily by women, most architects are still men. "I was the first woman executive one company had ever hired. When I arrived at the interview the first sentence the General Manager uttered was, "I've never spoken with a woman architect before!" She further indicated that women involved in natural resource professions comprise only a small portion of the working population. "The women who are professionals, however, are generally in high level positions," she said.

An American range scientist, who is an acquaintance of the author, recently attended a series of range meetings which were held in Australia. She reported that the president of the range society was a woman. She also indicated, however, that of the approximately 300 people in attendance at the conference, she counted only three women.

Annemarie responded to questions concerning the role of women in Australia by saying, "Changing! More women are entering non-traditional fields all the time. And along this line of thought I might add that I am not in favor of "Women Only" professional organizations; there must be dialogue."

### Jamaica

"Jamaican society is to a great extent controlled by women."

Quote from:  
Women of Jamaica

Brenda Cuthbert is a 34 year old Jamaican, born in the city of Ocho Rios in Jamaica's north coastal region. She attended the University of the West Indies at Kingston, where she was the first woman to receive a degree in Agriculture.

After graduating, she worked for the government in the Ministry of Agriculture, as an agricultural officer in the area of livestock development. In this position, she promoted and developed a system for establishing and registering cattle breeds, and recording the movement of these animals to different ranches on the island.

"I was the only woman working in agriculture in 1969, and I can't deny that I had problems. However, once one recognizes that certain problems will exist by virtue of the line of work one has chosen, they become challenges rather than problems. And, I like a challenge!"

In 1971 she moved into the area of livestock research where she continued with a project until 1978. Her job entailed working with Jamaican Red Poll cattle and upgrading the breed. She was involved with both the laboratory and farm aspects of the program, and described this situation as the most delightful of her career. "... especially the hired help," she said, "ten old farm hands, just as set in their ways as they could be. After a while we became friends, and then we were able to learn a lot from each other."

A special project which she initiated and developed concerned the performance testing of Jamaica Red Poll bulls. "This program eventually became very popular among the farmers, who never failed to purchase the available calves. This particular project provided me with a great deal of personal satisfaction," she said, "because it changed the manner of doing things, and the change benefited everyone involved."

When asked why she chose an agricultural career, she responded, "When I started university, the main need was for doctors and nurses, but I wanted to do something different." Her original plan was to become a veterinarian, but the difficulty of being accepted to a veterinary college made her decide to follow a course in animal science.

She is presently attending Colorado State University on a Hubert H. Humphrey Fellowship; a program which is offered as a mid-career award. Students accepting the award take a leave of absence from their jobs and study at an American

University for a period of one year. She decided to accept the scholarship, because "I evaluate myself every year, and I find that every 3 or 4 years I need additional training to keep up with the changing aspects of my profession."

Her present course of study involves commercial banking and agricultural finance. "An acute need exists for credit in the Jamaican agricultural system. Most of the available credit is given to large farms. I would like to be instrumental in developing a system of credit to help smaller farms."

When asked to present her views of American women she said, "I have a great deal of respect for American women in that they are unafraid to exercise choice, and in this regard we are the same. When a Jamaican or an American woman chooses to become a housewife, a scientist, or both she just goes ahead and does it."

Concerning the future of natural resource related professions for Jamaican women she saw it as being, "...a whole world of opportunity! There is one area of natural resource development that women have not as yet even entered, and that area is bauxite mining. Pockets of bauxite are located throughout the island. Bauxite is one of our main industries, and many opportunities exist here for mining engineers."

Her response to an inquiry concerning where she saw herself in 10 years was, "Most people make resolutions, I set objectives and embark upon plans of action. Ten years from now, I see myself as almost having reached my goal ...on my growth curve, maybe 4 or 5 years from the pinnacle. And then, I will feel that I have achieved all which I have set out to achieve."

### Kenya

"In western Kenya it was found that farms managed by women had considerably less access to services than farms jointly managed by men and women. Despite these inequalities, women farm managers adopted new crops and husbandry practices at the same rate as male operated farms."

Quote from:  
African Women, Their Struggle for  
Independence

Betty Migongo was born in Nakuru, Kenya and attended the University of Nairobi where she took her Bachelor of Science degree in zoology and her Master of Science degree in zoology and ornithology. She is presently engaged in field research in Kenya and is a doctoral student in the Range Science Department at Colorado State University. Upon completion of her degree program, she will be the first woman Ph.D. in Kenya to specialize in range science.

After receiving her Master of Science degree, she took a position with a consulting firm in Nairobi, where she specialized in range, wildlife, and livestock. Her job consisted of evaluating habitats and making species recommendations. An instance which she cited concerned the purchase of a ranch in Bolivia. "The purchaser was interested in introducing wildlife for commercial purposes. Since that particular area of Bolivia is similar to arid and semi-arid areas of Kenya, our firm was asked to evaluate the area and suggest appropriate species."

Her job consisted of gathering and evaluating all available data concerning the area with regard to climate, vegetation, and native wildlife species. Following that, she searched the globe, via the literature, for an ecologically similar area supporting a potentially commercial species. Her eventual species recommendation for the Bolivian ranch, was a species of deer from India.

In another instance, her work involved the proposed site of a tourist park in Kenya. "The client wanted to turn an area of land he owned into a tourist attraction that would support a population of wild species. He was particularly interested in introducing several species of colorful birds as well as some antelope." Again, her job was to analyze the area habitat and make recommendations for the introduction of appropriate species.

Her response concerning what she enjoyed most and least about her job was, "I liked the position very much, because every job always offered a fresh challenge. What I disliked, was never being given as much work as I felt I was capable of doing." She attributed this occurrence to the 'feast or famine' nature of the consulting business.

She saw the role of women in Kenya as undergoing a tremendous change. "There are a great number of women working now; it was not that way before. There are even a few women at higher levels of employment, but none have reached the highest positions as yet. For example, there are no permanent secretaries of the ministry who are women."

Her comments on career opportunities indicated that she felt one had more career choices and opportunities for pursuing those choices in the United States. "In fields such as engineering, Kenyan women are just recently being graduated, and are finding it very difficult to obtain good positions in Kenya."

She cited certain restrictions which were placed on professional women after they married, concerning job-related travel. "If a married woman worked for a company which suddenly had an important job in another city, she would not be sent. Even if she were the most qualified she would not even be considered as a candidate for the position. It is simply assumed that her first obligation is to her husband and children. A professional woman loses a lot of opportunities as soon as she gets married."

When asked a question concerning the future for women in natural resources in Kenya she responded, "I really can't say, because as far as I am concerned, it hasn't even begun."

#### Morocco

"A society which has difficulty providing enough jobs for its men will tend to define a woman as having no economic function outside the family..."

"Since the system holds as a law that the woman's place is in the home and that her access to offices and factories is subordinated to her husband's authorization, the woman is reminded whenever she gets a job

that it is a privilege and not a right."

Quote from:

Beyond the Veil: Male-Female Dynamics  
in a Modern Muslim Society

Maya Hamady is a 29 year old graduate student at Colorado State University and will be receiving a Master of Science degree in wildlife ecology in May 1982. She was born in Beirut, Lebanon, where she attended both French and American schools. She received Bachelor of Science degrees in wildlife biology and animal husbandry from Michigan State University. After graduating, she accepted a position in Morocco.

Her job classification in Morocco was that of fisheries biologist. Her work took her to several ports where she collected data on the species and numbers of fish comprising the daily catches. The study was an effort to determine the population levels of sardines at various locations. "Our main attempt here," she said, "was to estimate the stock and prevent the waters from being over-fished."

She also worked at a Moroccan zoo where her time was divided between writing a guidebook about the animals at the Moroccan zoo, and taming a litter of baby cheetahs. "Cheetahs are rarely born in captivity," she said. "I saw this as a unique opportunity for observing their behavior. I enjoyed working with the cheetahs, but compiling the zoo guidebook brought me the most satisfaction. At the time, Moroccan highschools did not offer many biology courses, and I felt that an informative guidebook about the zoo animals would be useful as an educational tool." She discussed the guidebook further and indicated that it was actually a biological outline of the specimens on exhibit at the Moroccan zoo, and not simply a list of common and scientific names. The guidebook included family descriptions and descriptions of similarities between species, as well as information on animal nutrition and the problems with caged animals, such as an absence of reproduction in captivity.

She also commented on the formality with which people treated each other in the working environment at the zoo. "For example," she said, "my co-workers, who were always men, never addressed me by my first name. There seemed to be a barrier between men and women who worked together. A secretary, for example, would never raise her eyes to speak directly to her boss."

When asked to comment on the role of women in Morocco she replied, "One must first make a distinction between those women who live in rural areas and those who live in the city. I found the country women to be more independent. They would work in the fields, tend the stock, and gather wood; these village women played a vital role in the agricultural economy of these areas.

"The city women, however, stay home. They have much more invested in their marriage because they have no other means of financial support. An urban dwelling Moroccan wife would not usually work outside her home

"Younger Moroccan women who have been educated in France, however, are employed in the professions but are not necessarily recognized as professionals.

For example, I was acquainted with a woman architect who told me that her designs would not be accepted if they bore her signature. Her boss would have to submit the designs as being his own work rather than hers."

She responded to a question concerning future opportunities in natural resources for Moroccan women by saying, "Most of the scientists and other professional people I met in Morocco were European. It was my impression that not very many Moroccan women or men, were involved in the professions. And more specifically agriculture, I think most Moroccan women would consider it too unfeminine to be employed in an agricultural profession, especially those women who were urban dwellers.

"Things are changing, however. I have a Moroccan friend who is studying veterinary medicine. Her major problem is trying to get the farmers to believe her because most of the men have no confidence in a woman's opinion."

### Portugal

"Basically, society was patriarchal with the wife and children confined to the farmhouse and, later, the two story urban house, and allowed to go out only to attend Mass on the four annual holidays."

Quote on the traditional Portuguese  
from:  
Women in the Modern World

Manuela Loureiro is from Lisbon, Portugal and is 45 years of age. She presently holds the position of Technical Secretary of the Outer Space Portuguese Committee. More specifically, she supervises projects in remote sensing of natural resources of Portugal. Her position places her with one of the most powerful departments of the Portuguese Government, i.e., the Department of Scientific and Technical Research.

"My job consists mainly of working in science policy. I must have a thorough understanding of the current economic, sociological, and political positions of Portugal. I then am able to design programs for applied and pure research in natural resources.

"Since the revolution in 1974, however, we have had several different governments. It has been difficult to work under these circumstances, because I would receive government authorization for a program, and then the government would change, forcing me to redesign the entire plan."

Her response to a question regarding the role of women in natural resources in Portugal was, "Women have many high level jobs in Portugal. There are many women in natural resources, especially in the area of agriculture. This, of course, is a recent trend of only the last 15-20 years. The law profession, for example, was closed to women until 5 years ago when women were first allowed to complete the final step toward becoming a lawyer.

Her comments on American professional women were directed more toward Americans in general. "In a professional capacity, I would without hesitation hire an American. Americans are highly capable in terms of technical aspects, but I find them to be poor in general knowledge. When discussing literature or art, for example, they know only about America ...when they know about America! Such naivete makes a very poor impression upon Europeans. Another characteristic which makes a very poor impression is the American tendency to 'talk down' to people who are from another country. If an American were to come to Portugal to work, he or she would be best advised to understand the culture of Portugal. Unlike America, Portugal is a very old country and this must be understood and appreciated."

#### DISCUSSION

As was indicated previously, the five women who were interviewed were highly educated and highly motivated as individuals to pursue non-traditional careers. The significance of their choices becomes apparent when it is recognized that Brenda Cuthbert was the first Jamaican woman to receive a bachelor of science degree in Agriculture; Manuela Loureiro is the only woman to hold such a high position in Natural Resources in the Portuguese Government; and, Elizabeth Migongo will be the first Kenyan woman to receive a doctorate in Range Science.

Five women who had been separated by the vastness of oceans and cultures participated in interviews which could not have been conducted a generation ago. They portrayed an ideal which did not exist when they were young girls. They had had no role models after whom to fashion themselves; they became those role models.

Each of them possessed to varying degrees, all those characteristics one observes in people of accomplishment: i.e., intelligence, perseverance, and self-confidence to cite a few. In addition, they all shared one quality more than any other. This quality, in a word, was courage: the courage to acknowledge their failures, and the courage to garner their achievements with grace.

#### LITERATURE CITED

- Encel, Sol, Norman Mackenzie, Margaret Tebbutt. 1974. Women and Society an Australian Study. Cheshire Publishing Pty. Ltd.: Melbourne, Aust.
- Mennisi, Fatima. 1975. Beyond the Veil: Male-Female Dynamics in a Modern Muslim Society. Schenkman Publishing Co.: New York.
- Obbo, Christine. 1980. African Women, Their Struggle for Independence. Zed Press: London.
- Patai, Raphael. 1967. Women in the Modern World. The Free Press: New York.
- Roberts, George W. and Sonja Sinclair. 1983. Women in Jamaica. KTO Press: New York.

NETWORKING - - - MENTORING  
NEITHER HAPPEN MAGICALLY!

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ABSTRACT

Networking - - - Mentoring, Neither Happen Magically! Addresses the philosophy and practicality of people working at creating structures which reflect interdependence, tolerance for others, and adaptability. This workshop setting involves participants and workshop planners in structured exercises to begin the networking process.

NETWORKING/MENTORING

A recent MS editorial by Gloria Steinem (February, 1982) began with the statement: "If you travel around this country, you can't miss it: Networking is becoming to this decade what conscious-raising was to the last." What Gloria does not state is the obvious but unhailed hard work that goes along with networking - and so I am led to my favorite story right now (I have those, you know, favorite jokes you tell again and again and which you mold to fit all kinds of situational analogies!) -- the story goes:

"a woman goes into a hardware/lumber store and asks the proprietor for a '4 x 2' - - the proprietor responds by saying 'don't you mean a 2 x 4?' to which she says - - 'I don't know; I'll have to ask my sister.' She leaves and returns quickly to say 'yes, you're right, I want a 2 x 4' - - 'How long?' says the proprietor. "Well,' - - she says, 'for a fairly long time; we're building a garage!'"

So -- what does this have to say about networking? Well -- we know we don't want a 4 x 2. In networking we don't want just another thing to do an that's what networking can appear to be; can feel like to many of us at the

beginning and when someone says it takes time and energy, we are inclined to run it through our life/mind computers and come up on "Tilt or Overload!"

We also, however, discover what we want (the 2 x 4). We have discovered there are other women, other individuals utilizing each other as resources and accomplishing together a task tremendously difficult, or unfulfilling, when performed alone. In fact, we hear that primary skills for surviving in the eighties are interdependence, tolerance for others, and adaptability (James 1980), all wonderful networking realities. And for years we have mumbled and complained about the "ole boys network," perhaps without clearly understanding what it took to maintain or create such a structure.

Now, here I would pause briefly, because we are all women here today, and state that networks are different for men and women. Consequently, they serve different purposes. Men in our society and others have utilized networks to assume power -- women currently are utilizing networks to empower themselves and other women. The end result is striking. Gloria Steinem cites one example of this in her article: "At the Women's Media Group in New York, for the 'bulletin board,'" to announce jobs they need filled or tout the talents of junior colleagues. Since many women executives started out as secretaries themselves, they may have a better understanding of that job's importance, and see women in it as both promotable and sources of advice.

And, finally, we know we need it, networking -- the 2 x 4 -- for a very long time because we're building a structure (a garage!). Structures do not raise themselves, so here's where the work appears. A conference such as this one is the place to begin: interview people, seek out new people, and should you be a part of planning such events be deliberate about creating interactive sessions -- structure sessions like the one included here which place individuals in a position of making contact, personal as well as professional, and of addressing how they could be resources to each other. The exercises offered here do a variety of tasks:

- 1.) Identifies possible mentors, that is, individuals who have been in the discipline or field for awhile and who you might ask to assist you or who might decide to assist.
- 2.) Allows for personal interaction as an opener -- a neutral zone for both to step into and share.
- 3.) And, last, it allows professional resourcing to take place as a beginning step.

Which leads each of us to a choice point of continuing the contact -- by phone, by letter, through reference, through a directory, whatever we choose to continue the development of the structure, the garage into which each of us has placed at least one 2 x 4.

NETWORK/MENTORING EXERCISE AND DESIGN  
FOR A CONFERENCE SETTING

(1) Interview Guidelines and Forms -

Used simply as a way of meeting new people - instruction for use should be given in the beginning and periodically throughout the conference.

One simple networking conference ending is to use the interview documents as conversation stimulants at roundtables the last day and then do a verbal report from each table about "what they learned from the interview exercise about the conference participants" (generalization statement).

(2) One Hour Design - Networking

- A.) Have people locate themselves in groups by age range - over 50, 40-50, 30-40, 20-30. At each table of 10 (approximate) position a pre-trained conference facilitator, (this group spends about forty-five minutes prior to this practicing facilitation skills for the exercise).

Each group is to have conversation around the task; "Identify a significant person in your life who has encouraged you and describe how, plus the personal qualities they possess(ed)".

Spend fifteen minutes at this task - be sure all get a chance to participate.

At the end of the time have the facilitator at each table report out the composite qualities of the significant others discussed.

Leader records these as spoken. (15 minutes)  
(These are mentoring skills/qualities identified and up for all to affirm.) any additions?

- B.) Have people relocate themselves in groups by discipline, major, profession, (whatever) to begin the conversation (again, 10 at a table, one facilitator) around - "How we can/will be resources to each other." And then set some action steps for continuing the work.

Spend 15 minutes at this task -  
be sure all get a chance to participate.

At end have facilitator summarize and report out. (15 minutes)

End with action steps -- next!?