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9. ABSTRACT

Appropriate technologies for people in developing countries should be inexpensive, simple, sparing in the use of imported resources, and well adapted to local social contexts. The subject of this bibliography is the last of those criteria--the consistency of a technology with its social environment. The "social" impact of a project usually refers only to changes in employment and income distribution. But to understand the concept of appropriate technology, a broader conception of the "social context" is needed. It means the whole set of shared values, beliefs, and institutions that join people in common endeavor. Evidence shows that implanting a socially "inappropriate" technology in a village can have two results: either the technology is rejected or the village may "die" as a social organism. The material included in this bibliography gives a unified impression of how to approach the problem of matching technology and society. It is drawn from four sources: development agencies, the applied social sciences, village-based programs, and sources of technical information. The 180 references include abstracts.

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APPROPRIATE TECHNOLOGY IN SOCIAL CONTEXT:

An Annotated Bibliography

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INTRODUCTION

Interest in "appropriate technologies" for people in developing countries springs from a desire to meet specific needs of the poor. By rough definition, such technologies should therefore be

- inexpensive enough for the poor to buy,
- simple enough for them to use and maintain,
- sparing in the use of scarce or imported resources, and
- well adapted to local social contexts.

The last of these criteria, the consistency of a technology with its social environment, is the subject of this bibliography.

In the language of development agencies, a project's "social" impact generally refers only to changes in employment and income distribution. These effects are important, and they are dealt with in a number of the publications cited. Fully to understand the transfer of "appropriate technology, however, we need a broader conception of social reality. Here, "social context" therefore refers to the whole set of shared values, beliefs, and institutions that join people in common endeavor.

Harmony between technology and social context is important. Abundant evidence shows that implanting a socially "inappropriate" technology in a village has the same result as implanting a foreign object in a person: either the technology is rejected or the village may "die" as a social organism. Any aid practitioner, for example, can tell tales of windmills and pumps scattered rusting and unwanted through the Third World. Similarly, novelists and anthropologists have long recorded the disruption of traditional societies by new technologies, a process more recently seen to feed political disorder as well. Whether from empathy or from self-interest, we should give strict attention to the social context of technology transfer.

If there is clear need to match technology and society, it is less clear how this is to be done. Taken together, the material included in this bibliography conveys a surprisingly unified impression of how to approach the problem (see Section I, below). Unfortunately, however, this material is normally not taken together. Instead, it grows from the separate experiences, perceptions, and preoccupations of at least four distinct sets of professionals, a degree of fragmentation that raises serious obstacles to effective action (Section II).

I. Appropriate Technology in Social Context

Together, the readings listed below tell the following tale:

In practice, "development" is a quality both too subtle and too dynamic

to be measured in such crude and static terms as "GNP," "personal income," or "productivity." Lasting development takes place when groups of people gain the capacity to build, little by little, on their immediate economic, technological, and social realities. The crucial measure of social health is a strong self-reliance of spirit, expressed through locally-based development institutions. This is an inherently decentralized process, details of which will vary greatly from place to place.¹

Technologies will be "appropriate" only if they fit comfortably in such dynamic social contexts. This requires us to consider the specific effects of specific technological interventions in the lives of specific people in their specific social environments. We could ignore these effects, but the many case studies in this bibliography warn vigorously against it. People have been trying to transfer appropriate technologies for decades, as often as not unsuccessfully. Almost invariably, failure has followed inattention to social context.²

To take full account of context implies involving the community itself in the mechanics of technological choice, even if new procedures and institutions have to be created for the purpose. There is a happy convergence of two objectives here. Participation in decision-making leads to an increased capacity for subsequent development, as well as working in the short run toward selection of technologies appropriate to the community's needs.³

From the aid donor's point of view, this suggests a requirement in appropriate technology programs for

- a general sense of "vicariousness," or interest in how development looks through the eyes of those affected,
- information about existing technical and social patterns, group by group, in areas where technological change is sought,
- close collaboration between local users of new technologies and outside "change agents" in project design, implementation, and evaluation,
- institutional capacity at the village level to make technology choices and carry out technology activities, and
- long-term assignment of aid personnel, or of people with whom aid personnel can maintain regular contact, within the local areas where projects are to be carried out.

1. See, for example, entries 10, 32, 34, 99, 120, 123, 130, 143, 151, 176.

2. Entries 3, 53, 54, 63, 80, 92, 112, 134, 136, 137, 165.

3. Entries 40, 45, 68, 82, 86, 97, 115, 124, 129, 145, 167.

II. The Problem of Professional Fragmentation

As drawn from the materials in this bibliography, the argument above has a certain conceptual unity. Such coherence is deceptive, however, since it is abstracted from four separate literatures, those of development agencies, the applied social sciences, village-oriented programs, and sources of technical information. Publications emerging from each of these groups have distinct concerns and strengths, all of which need somehow to be combined if appropriate technology programs are to be effective:

A. Development Agencies (e.g., AID, World Bank, U.N. specialized agencies, Intermediate Technology Development Group, A.T. International): Particular attention is given here to policy issues and the economic, technical, and administrative aspects of project design.⁴ In terms of appropriate technology needs, however, the literature is conspicuously short on social analysis and field-level observation.

B. The Applied Social Sciences: Excellent case studies of the relationship between technology and social context, especially in terms of social constraints on the acceptance of given devices and techniques.⁵ Inevitably, this literature is less helpful when it comes to technical matters and to specific guidelines for administering development projects.

C. Village-Based Programs (e.g., Peace Corps, Church World Service, Mennonite Central Committee, Save the Children Federation): Strong arguments for help to village-based development efforts, along with descriptions of some of these in practice.⁶ There is considerably less concern here with technical research or with organized systems for project development and evaluation.

D. Sources of Technical Information: Careful descriptions of existing technologies and of village-scale or "intermediate" devices to improve on these.⁷ Since such publications usually lack analysis of social context, however, the impression is sometimes left that "appropriateness" is a matter of technical feasibility alone.

To encompass all essential skills and understandings, it would seem that appropriate technology should be pursued by machine-shop workers having social science degrees, acting through village-based programs supported with development agency funds! The reality, of course, is different. As the material in this bibliography suggests, a given expert on these issues is likely to be working inside just one of the four categories listed,

4. Entries 11, 18, 44, 64, 85, 150, 158, 160, 163, 175, 178, 179.

5. Entries 9, 16, 30, 58, 72, 102, 106, 110, 116, 140, 144, 156, 173.

6. Entries 34, 51, 93, 99, 100, 127, 130, 133.

7. Entries 1, 8, 12, 56, 67, 95, 101, 119, 121, 164.

with few excursions and limited collaboration across professional walls.

There is need to break down the walls if appropriate technology is to be kept in social context. If this is not done, the burden of the evidence is that money will be wasted, societies disrupted, and inequalities accentuated, with human pain and social disorder the result. Perhaps the first job here should be design of an appropriate institutional "technology" for technology transfer. It would be an effort well worth making.

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1. ACTION/PEACE CORPS. 1976. Peace Corps Intermediate Technology for 15 Years. Program & Training Journal Reprint Series No. A. Washington, D.C.: ACTION/Peace Corps. May.

A start at making technology developed through the Peace Corps more widely available, to be followed by a series of technical manuals. Included are plans for a \$2 centrifuge, a Braille letter block, a 50¢ crop duster, a \$300 grain drying and storage system, and concrete roof tiles.
2. AHMED, Raisuddin. 1975. "Appropriate Technology in Agriculture." In Bangladesh Agricultural Research Council, 1975.

Assumes that creation of appropriate technologies will require close collaboration between rural users and central innovators. Development agencies, however, are accustomed to transferring modern solutions intact and have no capacity for involving users in project design and implementation. In addition, disciplinary specializations in education and government service prevent the sort of applied, multi-disciplinary view that design of appropriate technology requires. Creation in Bangladesh of a new agency with a fresh perspective may be called for.
3. ALEXANDER, Paul. 1975. "Innovation in a Cultural Vacuum: The Mechanization of Sri Lanka Fisheries." Human Organization 34 (4): 333-344. Winter.

Although a government program to provide mechanized boats led to a rise in total income, employment fell and disparities between rich and poor increased. Concentration of ownership followed the forced sale of boats by people unable to adjust to requirements of the program, central provisions of which (credit and accounting systems) were inconsistent with local attitudes and management skills.
4. ALLEN, Harold B. 1953. Rural Reconstruction in Action: Experiences in the Near and Middle East. Ithaca: Cornell University Press.
5. ALMY, Susan. 1977. "Anthropologists and Development Agencies." American Anthropologist (79). June.

Many anthropologists bear prejudices against power, social manipulation, and bureaucracy which make it difficult for them to function within development agencies. This is unfortunate, since current experiments with integrated rural development programs raise issues that anthropologists are well prepared to address. Discusses the kinds of accommodations anthropologists need to make to work in development agencies, the reasons such compromises may be worth making, and ways of finding jobs.
6. AMERICAN ETHNOLOGIST. 1975. "Special Issue: Sex-Roles in Cross-Cultural Perspectives." Vol. 2 (4).

7. APTHORPE, Raymond (ed.). 1970. Rural Cooperatives and Planned Change in Africa: Case Materials. Rural Institutions and Planned Change, Vol. 4. Geneva: U.N. Research Institute for Social Development.

Case studies of cooperatives as agents of rural change in seven African countries.

8. ARBOLEDA, J.R. 1975. Improvement of the Kiskisan Mill. International Rice Research Institute. Mimeo.

Describes how improvements can be made in this widely-used, "traditional" mill.

9. ARENSBERG, Conrad M. and Arthur H. Niehoff. 1971. Introducing Social Change: A Manual for Community Development (second edition). Chicago & New York: Aldine/Atherton.

As change has become more consciously and more urgently pursued, the need has grown to understand the crosscultural processes through which this often takes place. To further such understanding, this book discusses the concept of culture; "the change process," in which outsiders interact with prospective recipients of a new idea until this is integrated into local cultural patterns; motivations for change; ways of adapting an innovation to existing ideas and customs, where this is needed to make the innovation acceptable; "such secondary strategies as obtaining participation..."; primary characteristics of developing nations and the United States; and field problems of the change agent.

10. ARIYARATNE, A.T. 1976. "The Sarvodaya Shramadana Movement: Mobilizing Human Resources for Development." Peace Corps Program and Training Journal 4 (3): 1-8.

Describes a Sri Lankan volunteer organization dedicated to social and economic transformation based on the "awakening" of individuals, families and villages to their own potential. A basic technique is the village-level work camp where problems are identified, projects carried out, and social infrastructure developed to continue the movement after the camp itself disbands. Foreign volunteers wishing to participate are cautioned that they should plan to learn and change through such contact, rather than carrying the "messianic attitude" that they are simply the agents for change in other people's lives.

11. ASKIN, Peter W. 1976. Intermediate Technology: An Informal Survey. Washington, D.C.: Department of State, Senior Seminar in Foreign Policy. (Reprinted in U.S./AID, 1977.)

A compact introduction to the field. Discusses definitional problems; criteria; economic measures; attitudes and applications in developing countries, especially the Philippines, Indonesia, and Sri Lanka; and possibilities for international assistance. The author notes that intermediate technologies are not culturally neutral, and that real danger therefore exists of second and third generation effects that can wipe out

initial gains or compound the problems to which the technologies were directed. These effects are highly location-specific, meaning that "research, planning, participation and decision making must take place in or near the problem area." Agencies such as AID are poorly staffed to function at this level, raising serious questions as to how their appropriate technology programs might be implemented.

12. AUCIELLO, Kay Ellen. 1976. Bibliography of Intermediate Technology Materials Held at the International Development Data Center. Atlanta: Engineering Experiment Station, Georgia Institute of Technology. February.

Primarily material with an engineering or economic point of view, divided into sections covering background information, bibliographies, agricultural equipment, construction, food, natural resources, power, and a wide range of technical reports.

13. BANGLADESH AGRICULTURAL RESEARCH COUNCIL. 1975. Proceedings of the Workshop on Appropriate Agricultural Technology (Feb. 6-8, 1975). Dacca: Bangladesh Agricultural Research Council.

Mostly working papers by scientists and planners on such topics as wells and irrigation, agricultural implements, credit and extension systems, and storage facilities. Also included are results of a survey of existing agricultural technologies in Bangladesh. Generally endorses the idea of labor-intensive, low-cost agricultural technologies. See also, R. Ahmed, 1975.

14. BELL, Cline. 1972. "The Acquisition of Agricultural Technology: Its Determinants and Effects." Journal of Development Studies 9: 123-160. Oct.
15. BELSHAW, C.S. 1974. "The Contribution of Anthropology to Development." Current Anthropology 15 (4): 520-536. December.
16. BENNETT, John W. 1974. "Anthropological Contributions to the Cultural Ecology and Management of Water Resources." In L. Douglas James (ed.), Man & Water: The Social Sciences in Management of Water Resources. Lexington: University Press of Kentucky.

Discusses several pertinent topics: First, archeological studies of pre-historic waterworks, which provide evidence on the long-run effects of alternative designs. Second, large-scale tropical water projects, many of which have had negative, unanticipated effects on agriculture, physical and mental health, and social organization. Third, anthropological studies of small-scale water projects. Fourth, competition and cooperation in water development.

17. BERNARD, H. Russell and Pertti J. Pelto. 1972. Technology and Cultural Change. New York: Macmillan.

18. BERNSTEIN, Herbert. Undated. An Exploration of the World Bank's Treatment of Water Resources Projects. Washington, D.C.: World Bank. Draft.

Cites Bank activities where inadequate attention to social factors during the project design process may have led to difficulties. Over the long run, all those involved in this process should develop greater "vicariousness" to ensure that projects respond well to local conditions and needs. More immediately, experts in applied social science may help by such means as drawing up guidelines and working on project design. One likely result of such attention to "psycho-social" forces in development would be greater use of appropriate technologies.

19. BHATTASALI, B.N. 1972. Transfer of Technology Among the Developing Countries. Tokyo: Asian Productivity Organization.

Covers traditional issues of technology transfer: institutional arrangements, research, information services, training, finance, etc. Emphasis, however, is on the "organic" place of technological change within a country's social, economic and cultural environment. In particular, there is need to fit new technologies to the sense of work as creative activity that characterizes developing areas. The historical experiences of Japan, China and India with technological change are given special attention.

20. BLOEM, Kenneth et al. (eds.). 1977. Appropriate Technology in Health in Developing Countries: Proceedings of a Conference Sponsored by the National Council for International Health (Washington, D.C., December 16-17, 1976). Washington, D.C.: National Council for International Health.

21. BOLNICK, Bruce R. 1976. "Collective Goods Provision Through Community Development." Economic Development and Cultural Change 25 (1): 137-150. October.

22. BOULDING, Elise. 1975. Women, Bread and Babies: Directing Aid for Fifth World Farmers. International Women's Year Studies on Women, Paper No. 4. Boulder: University of Colorado, Institute of Behavioral Sciences, Program of Research on General Social and Economic Dynamics.

Women's labor, which is actually increased by many development schemes, is often unmeasured by planners and unremunerated by society. Discusses ways in which the overall situation could be improved, including transfer of intermediate technologies for daily tasks.

23. BRODE, J. 1969. The Process of Modernization: An Annotated Bibliography on the Sociocultural Aspects of Development. Cambridge, Mass.: Harvard University Press.

24. BROKENSHA, David and Charles Erasmus. 1969. "African Peasants' and Community Development." In David Brokensha (ed.), The Anthropology of Development in Sub-Saharan Africa. Society for Applied Anthropology Monograph

Number 10. Lexington: University Press of Kentucky.

Based on observations in Ghana and Uganda, concludes that community development is consistent with traditional forms of community activity.

25. BURCH, D. 1975. The Politics of Technological Choice: Agricultural Mechanization in Sri Lanka. Science Policy Research Unit. Mimeo.

Any analysis of technology selection must consider the benefits that different choices confer on various social groups. Analyzes factors leading to adoption of capital-intensive methods in Sri Lanka.

26. BUVJNIC, Mayra. 1976. Women and World Development: An Annotated Bibliography. Prepared under the auspices of the American Association for the Advancement of Science. Washington, D.C.: Overseas Development Council.

An introductory essay suggests (among other points) that development processes have tended historically to increase sexual inequality, at least until industrialization has become well established. Case studies in support of this conclusion are scattered through the bibliography itself, along with works on such other topics as law and politics, informal and formal associations, family planning, education, and behavior patterns.

27. BYERLEE, Derek et al. 1977. Rural Employment in Tropical Africa: Summary of Findings. African Rural Economy Program Working Paper No. 20. East Lansing: Michigan State University. February.

Based on a five-year study financed by AID. Concludes that labor-intensive, "appropriate" technologies would be more widely used if factor price distortions were corrected and small-scale activities promoted by governments. To replace current, capital-intensive approaches with such a policy would lead to greater employment in agriculture and rural industry with little or no sacrifice in national output. In a brief section, the authors report on family labor allocations associated with various projects in Sierra Leone: given the sex-specific nature of many farm tasks, an approach requiring substantial land development increased men's work, while a mechanization project led to sharp increases only in labor supplied by women.

28. CANADIAN HUNGER FOUNDATION and Brace Research Institute. 1976. A Handbook on Appropriate Technology. Ottawa: Canadian Hunger Foundation. April.

Theory and practice, including: basic concepts and issues; a dozen case studies covering experiments in nine countries; glossary; catalog of tools; bibliography; listings of groups and people working on appropriate technology questions. The case studies largely deal with technical aspects of specific equipment and processes, although two consider cooperatives as a means of access to new technologies. Summary sections give considerable attention to the role of outside "Appropriate Technology catalysts," who are cautioned to gain a thorough knowledge of the community

in which they work and to involve community members throughout the process of articulating needs, exploring solutions, and introducing new techniques.

29. CANADIAN JOURNAL OF AFRICAN STUDIES. 1972. "Special Issue: African Women." Vol. 6 (2).

30. CANCIAN, Frank. 1972. Change and Uncertainty in a Peasant Economy: The Maya Corn Farmers of Zinacantan. Stanford, Calif.: Stanford University Press.

Technical, social and economic factors in decisions to expand maize production and adopt new technologies.

31. CANCIAN, Frank. 1977. "Can Anthropology Help Agricultural Development?" Culture and Agriculture (2). March.

The social component of development projects has generally been subordinated to technical concerns, with social scientists primarily employed to ensure that given technologies are adopted. If development of rural areas is considered to imply a measure of equity, however, social research into goals and methods of change should be put on a par with scientific research into agronomic techniques. Anthropologists have an advantage here in terms of their insight into cross-cultural universals, their tradition of open-ended exchange with people in the field, and the holistic nature of their discipline.

32. CARR, Marilyn. 1976. Economically Appropriate Technologies for Developing Countries: An Annotated Bibliography. London: Intermediate Technology Publications Ltd.

About 300 entries covering technologies for agriculture, housing, manufacturing, power, water, health, roads, etc. An introductory essay notes the difficulty of generalizing from these selections. Small-scale production is generally "appropriate" and labor-intensive, for example, but there are case studies showing contrary results. If intermediate solutions are desired, they may be found by modifications in either traditional or modern technologies. Resistance to adopting such techniques may have roots in local economic conditions or simply in habit patterns of aid administrators. In sum, although the evidence generally supports an intermediate approach to development, specific issues and appropriate responses will vary greatly depending on place, technology, stage of development, government policies, and other factors.

33. CARRUTHERS, I.D. 1973. Impact and Economics of Community Water Supply: A Study of Rural Water Investments in Kenya. Wye College Agrarian Development Unit.

Includes discussion of individual vs. communal systems. An economist's approach.

34. CHURCH WORLD SERVICE. 1976. The Role of Church World Service in Development. CWS Working Paper. April. (Reprinted in J. Wilkes, 1977.)

Defines a "truly human" development process as one that emphasizes self-reliance, participation, and social justice. Ultimately, development can be sustained only through indigenous institutions springing from the needs of specific communities, with control in the hands of local leadership. Since outside agencies can only be "enablers" in this process, the role of Church World Service will be to provide minimal amounts of encouragement and assistance in response to local initiatives.

35. CLINTON, Charles A. 1975. "The Anthropologist as Hired Hand." Human Organization 34: 197-204.

36. COHEN, John M. 1975. "Effects of Green Revolution Strategies on Tenants and Small-Scale Landowners in the Chilalo Region of Ethiopia." Journal of Developing Areas 9 (3): 335-358.

37. CONGDON, R.J. (ed.). 1975. Lectures on Socially Appropriate Technology. Eindhoven, Netherlands: Technische Hogeschool.

Twelve lectures, mostly by members of the Intermediate Technology Development Group, given at two Dutch universities in late 1974. Topics include education systems, social criteria, and technologies for water, agriculture, energy, chemicals, and industry. See also G. McRobie, 1975; A. de Wilde, 1975.

38. CURRENS, Gerald E. 1976. "Women, Men, and Rice: Agricultural Innovation in Northwestern Liberia." Human Organization 35 (4): 355-365. Winter.

39. DALTON, George. 1971. Economic Development and Social Change: The Modernization of Village Communities. Garden City, N.Y.: Natural History Press.

40. DARROW, Ken and Rick Pam. 1976. Appropriate Technology Sourcebook. Stanford, Calif.: Volunteers in Asia. November.

Extensive practical information on appropriate technologies for the Third World, covering devices, publications, groups, and key ideas in a number of areas: agriculture, food preservation and storage, energy (wind, water, solar, wood, methane, pedal-power), water supply, housing, health care, village industries. In their introduction, the authors emphasize that the heart of "appropriate technology" lies less in gadgetry than in the process through which new techniques are found and applied. This process must be community-based and participatory, leaving room for outsiders primarily as catalysts and as sources of limited, short-term technical support.

41. DEJENE, Tekola and Scott E. Smith. 1973. Experiences in Rural Development: A Selected, Annotated Bibliography of Planning, Implementing, and Evaluating Rural Development in Africa. OLC Paper No. 1. Washington, D.C.: Overseas

Liaison Committee, American Council on Education. August.

Mostly publications by authors from North America, Africa, and Europe, written in both English and French. Covers theory and practice of rural development programs, including supporting activities in extension, education and training. A brief final section deals with experiences in other developing areas, with particular attention to the Comilla Academy (Bangladesh) and the Puebla Project (Mexico).

42. DEVELOPMENT ALTERNATIVES, Inc. 1974. A Seven-Country Survey on the Roles of Women in Rural Development. Report to U.S./AID. Washington, D.C.: D.A.I. December.

In most of the countries surveyed, women take part equally with men in basic agricultural production, predominate in petty trading and handicrafts, and supply much of the labor for community self-help activities. Despite this, women are generally ignored in development projects. Assuming that women should be integrated more fully into the rural economy, the report outlines information requirements for design and implementation of projects to achieve this. Such information is highly location-specific, and much of it can be found only in the field.

43. DEVELOPMENT ALTERNATIVES, Inc. 1975. Strategies for Small Farmer Development: An Empirical Study of Rural Development Projects. Report to U.S./AID in three volumes: Final Report, Case Studies, and Executive Summary. Washington, D.C.: D.A.I. May.

The purpose of rural projects is assumed to be promotion of self-sustaining growth in the small farmer's income, agricultural knowledge, and self-help capability. Success appears to depend largely on whether farmers (a) are involved in decision-making during project implementation, and (b) commit their own labor or cash to the activity. To design projects responsive to these criteria takes more time and knowledge of local conditions than aid agencies normally assume is necessary. Such agencies need either to adopt a more locally-based, "organic" development approach or to support smaller institutions able to operate on this basis in developing countries.

44. DEVELOPMENT ALTERNATIVES, Inc. 1976. Data Requirements for the Design of Area Development Projects. Washington, D.C.: D.A.I. October 11.

Assumes that area development projects will seek an equitable, self-sustaining growth process to increase income, production, levels of health and nutrition, and individual or group ability to solve development problems. To design such projects requires information on: government policies and decision-making processes; production trends; ecological and demographic factors; research, extension, credit, and marketing systems; transport, power, and communications facilities; education; health, water, and nutrition services, socio-political systems; etc. To collect these data within an area of 30,000-50,000 square kilometers containing diverse farming and social systems should take two rural development specialists three to five weeks.

45. DICKSON, David. 1975. The Politics of Alternative Technology. New York: Universe Books.

In theory, intermediate technologies seem well suited to the need of the Third World's poor for self-help approaches to development. In practice, however, the choice of these technologies and the ways in which they are used will depend on the interests of people doing the choosing, and these are generally Westerners or members of Western-oriented elites. Until political action is taken to allow the poor to articulate their own demands and make their own choices, intermediate technologies will have little real impact on underdevelopment. Much of this argument grows out of the author's analysis of problems in the industrialized world, which is the book's major area of concern.

46. DIMA, S.A.J. and V.F. Amann. 1975. "Small Holder Farm Development Through Intermediate Technology." East African Journal of Rural Development 8 (1&2).

Looks at the failure of mechanization policies in East Africa and argues for more appropriate approaches, including small improvements in such existing technologies as ox-drawn equipment.

47. DOMMEN, A.J. 1975. "The Bamboo Tube Well: A Note on an Example of Indigenous Technology." Economic Development and Cultural Change 23 (3). April.

48. DORNER, Peter (ed.). 1977. Cooperative and Commune: Group Farming in the Economic Development of Agriculture. Madison: University of Wisconsin Press.

49. DRUMMOND, Therese. 1975. Using the Method of Paulo Freire in Nutrition Education: An Experimental Plan for Community Action in Northeast Brazil. International Nutrition Monograph Series No. 3. Ithaca, N.Y. Cornell University.

50. DUBE, S.C. 1958. India's Changing Villages--Human Factors in Community Development. Ithaca: Cornell University Press.

51. DULANSEY, Maryanne. 1977. Water Resource Development--The Experience of U.S. Non-Profit Organizations: Programs, Issues and Recommendations. New York: American Council of Voluntary Agencies for Foreign Service, Technical Assistance Information Clearing House. March.

Stresses the importance of small-scale water projects which local communities can themselves develop, finance and maintain. In pursuing such activities, U.S. non-profit organizations (e.g., CARE, Catholic Relief Services) have notable advantages: they are oriented to basic human needs, especially those of the poor; since they operate at the village level, they can find and work with the most appropriate individuals and institutions; they are relatively flexible and non-bureaucratic in their operations. Lists water projects now being carried out by 70 organizations in 42 countries.

52. ECKAUS, Richard S. 1977. Appropriate Technologies for Developing Countries. Washington, D.C.: National Academy of Sciences.

"Appropriate" should mean "efficient," as defined within neoclassical economic theory. For the author, the implications of this assumption are such that intermediate technology is more or less dismissed out of hand.

53. EMMERSON, Donald K. 1977. "Introducing Technology: The Need to Consider Local Culture" (interview). International Development Review (1).

Describes a 1974 riot in eastern Java where fishermen destroyed nets and motorized boats loaned to poor members of the community by the central government. The author hypothesizes that the new boats were viewed as a threat to social security mechanisms based on existing patron-client relationships, that they seemed to give unfair advantages to a limited number of people, and that their nature as a "daytime" technology replacing nighttime fishing represented "defeat" of the moon as a spiritually-charged body governing the rhythm of the catch. Concludes that no technological solution can be effective unless based on respect for local cultures.

54. EPSTEIN, T. Scarlett. 1975. "The Ideal Marriage Between the Economist's Macroapproach and the Social Anthropologist's Microapproach to Development Studies." Economic Development and Cultural Change 24 (1): 29-45. October.

Macroplans without microknowledge have a tendency not to work. Effective study at the micro level, however, requires an unusual combination of economic and anthropological skills. In case studies involving rural wages in South India and cocoa sales in New Guinea, the author shows that apparently economic problems could only be understood and solved through knowledge of local social conditions. Students within development studies programs should therefore be trained in at least two disciplines, while professionals in economics and anthropology should work more closely together.

55. ERASMUS, Charles. 1961. Man Takes Control: Cultural Development and American Aid. Minneapolis: University of Minnesota Press.

56. ELLERMAN, Roger. 1975. The Mochudi Toolbar (Makgonatsotlhe: The Machine Which Can Do Everything). Gaborone, Botswana: Agricultural Information Service, Ministry of Agriculture. August.

A technical description of the design and applications of an animal-drawn implement developed by the expatriate manager of the Mochudi Farmers Brigade in Botswana. Features of the design were gathered from suggestions by tillage experts from a number of North American universities. The implement can be used for such purposes as planting, fertilizing, cultivating, soil preparation, and hauling of water, although manufacturing requirements are such that local production may not be consistent with adequate performance.

57. FITZSIMMONS, Stephen J. 1975. "The Anthropologist in a Strange Land." Human Organization 34: 183-196.
58. FOSTER, George M. 1962. Traditional Cultures and the Impact of Technological Change. New York: Harper & Row. (Revised edition 1973.)

Suggests that we think of development as a "sociotechnical" process, in order to make explicit the social factors conditioning the results of aid projects. Among these factors must be included the technician's own professional background, a rich source of culture-based assumptions often inconsistent with local realities. Discusses the role of applied social scientists, who can predict a project's effects, suggest ways to neutralize cultural barriers to its acceptance, or propose changes in its design to bring it more into line with traditional social patterns. In all of this, development personnel should see themselves principally as advisers, leaving ultimate decisions to the people they are trying to help.

59. FOSTER, George M. 1969. Applied Anthropology. Boston: Little, Brown & Co.

A basic text. An interesting set of underlying assumptions is scattered through the book: Most peasants are highly "individualistic." Preferred innovations are those that people can individually decide about and adopt. Real progress will come when such people can feel free to ignore public opinion and individually enjoy the fruits of their labor. Ideally, "authority" (as legitimized through "the democratic process") would concentrate on maximizing individual freedom.

60. FOSTER, George M. 1974. "Technical Assistance Methodology: An Anthropologist's View." Development Digest 12 (3): 87-94.

61. FOSTER, George M. 1976. "Medical Anthropology and International Health Planning." Medical Anthropology Newsletter 7 (3): 12-18. May.

People in developing areas will accept modern medicine when this is seen to be better than traditional methods and to be available on acceptable terms. If such people are less tradition-bound than generally believed, however, Western health personnel may be more so. Practitioners of "scientific" medicine invest great energy in the preservation of their bureaucracies and routines, leaving them unresponsive to such developing country requirements as those for greater reliance on sub-professionals, more flexible hours for providing clinical services, or endorsement of certain activities of traditional healers. In transferring health technologies, therefore, to understand the implicit assumptions of project administrators and professionals is at least as important as understanding the assumptions of local villagers.

62. FOSTER, Robert J. 1965. Examples of Cross-Cultural Problems Encountered by Americans Working Overseas: An Instructor's Handbook. Alexandria, Va.:

George Washington University Human Resources Research Office. May.

Primarily a series of specific case references from development and anthropological literature, presented through lengthy quotations in index-card format. Major sections cover resistance to innovation, unanticipated consequences of planned change, communication difficulties, the resolution of cross-cultural problems, etc.

63. FRASER, Thomas M. Jr. 1963. "Sociocultural Parameters in Directed Change." Human Organization. Spring: 95-104. (Reprinted in A.H. Niehoff, 1966.)

Case studies of three pairs of projects within an American Friends Service Committee program in India: pump wells vs. sanitary latrines; vegetable vs. poultry production; cooperatives for leather workers vs. weavers. Within each pair, one project succeeded and one failed, invariably due to specific features of the local social system. Drawing on these studies, the author outlines a number of questions designed to provide insight into cultures where innovations are to be promoted. The predictive force of information acquired in this way is not total, and in fact would probably have led to support for one of the projects that ultimately failed. In general, however, attention to such social factors should help planners choose and implement projects successfully.

64. FROST, Dennis H. 1976. Proposals for the Development of Small Farm Technology in Honduras. Report to U.S./AID. London: Intermediate Technology Services, Ltd. June 5.

Outlines a project having four major elements: First, a study of local agriculture (climate, land use, farm economy, labor inputs) to find constraints on increased production. Second, introduction of equipment and techniques to overcome these constraints. Third, provision of facilities for local manufacture of the equipment. Fourth, establishment of training, information and feed-back services.

65. GANIERE, N. 1973. Transfer of Technology and Appropriate Techniques: A Bibliography. Paris: OECD Development Center.

66. GERMAN FOUNDATION FOR DEVELOPING COUNTRIES, Seminar Center for Economic and Social Development. 1972. Development and Dissemination of Appropriate Technologies in Rural Areas (workshop report). Berlin: German Foundation For Developing Countries.

Proceedings of a conference held in Kumasi, Ghana, in July 1972. The working papers included here are primarily technical descriptions of specific experiments in housing, small industry, road-building, textiles, agriculture, etc. A section summarizing workshop discussions stresses the desire for closer investigation of local economic and social factors to determine the need for particular technologies, as well as the impact of these technologies on living patterns. A series of formal recommendations emphasizes that development of new technologies should be based on careful study of existing ones.

67. GIBBON, D. et al. 1974. "Minimum Tillage System for Botswana." World Crops 26 (5).

Describes an animal-drawn implement designed for local conditions.

68. GODART, Albert L. 1966. "Social and Cultural Aspects of Integrated Rural Development in Some West African Countries." International Labour Review 94 (3): 255-273. September.

Finds a need in several West African countries for integrated rural development programs, to be drawn up by interdisciplinary teams under the tutelage of community leaders.

69. GORDON, E. 1967. "Intermediate Technology in West African Agriculture." World Crops 19 (3).

Argues for the use of simple machines to be made by village blacksmiths or carpenters.

70. GRANT, James. 1973. Growth From Below: A People-Oriented Development Strategy. ODC Development Paper No. 16. Washington, D.C.: Overseas Development Council. December.

71. HAMER, J.H. 1967. "Voluntary Associations as Structures of Change Among the Sidamo of Southwestern Ethiopia." Anthropological Quarterly 40 (2): 73-91.

72. HAMMOND, Peter B. 1966. Yatenga: Technology in the Culture of a West African Kingdom. New York: The Free Press.

Notes that anthropologists in Africa have concentrated on social organization and religion to the almost total exclusion of technology. Goes on to indicate "some ways in which a beginning understanding of the integration between the environment and the technology of a particular African people, the Mossi of Yatenga, may be related to the achievement of a better understanding of the structural and functional interrelations between the other aspects of their culture as it is today, as it was, and as it seems likely to change in the future."

73. HAMNETT, Ian. 1973. "The Role of the Sociologist in Local Planning." Journal of Development Studies 9: 493-507.

74. HAVENS, Eugene A. and William Finn. 1973. Green Revolution Technology and Community Development. LTC No. 93. Madison, Wisconsin: Land Tenure Center.

75. HILDEBRAND, Peter E. 1976. A Multidisciplinary Methodology for Generating New Technology for Small, Traditional Farmers. Guatemala: Instituto de Ciencia y Tecnologia Agricola.

76. HILL, P. 1974. A Plea for the Development of Indigenous Methods of Grain Storage in the West African Savannah. Paper presented at the International Seminar on Change in Agriculture, University of Reading. September.

Describes traditional methods of grain storage, arguing that these should be studied and improved.

77. HOBEN, Allen. 1976a. Social Soundness of the West Benoue Integrated Rural Development Proposal. Washington, D.C.: U.S./AID. May.

78. HOELEN, Allen. 1976b. Social Soundness of the Masai Livestock and Range Management Project. Washington, D.C.: U.S./AID. October.

This project had successfully introduced a number of new livestock technologies. There was at least partial failure, however, in achieving two central objectives: reducing herd size and creating ranching associations. Although some observers had attributed difficulties to tradition-bound constraints on behavior, the author argues that the Masai in fact were acting in a rational manner under difficult and changing circumstances. Given this assumption, a series of proposals indicates how a revised project could improve the quality of life within the project area in ways consistent with Masai needs and perceptions of self-interest.

79. HOBEN, Allen. 1976c. Social Soundness of Agrarian Reform in Ethiopia. Washington, D.C.: U.S./AID. December.

80. HOLMBERG, Allan R. 1952. "The Wells that Failed: An Attempt to Establish a Stable Water Supply in the Viru Valley, Peru." In E.H. Spicer (ed.), 1952.

Attempts to supply water for household and irrigation needs had to be abandoned because of local suspicion of the project. Although the attitude of area residents seemed inexplicable to project engineers, widespread resistance had grown from decisions to drill the initial well on the property of an unpopular landowner, under the general supervision of an unpopular local governing body. Had informal community leaders been involved in the project from its earliest stages, these problems could have been avoided.

81. INGERSOLL, Jasper. 1977. Social Analysis of Development Projects: A Suggested Approach for Social Soundness Analysis. Washington, D.C.: U.S./AID Development Studies Program. May.

Notes that AID analyses of "social soundness" cover a mass of data within three broad areas: a project's "sociocultural feasibility," the likelihood of its diffusion, and the equity of project effects. Unfortunately, little guidance is provided on using these data to isolate the most pertinent features of a society and to show specific ways in which projects affecting it might be improved. Accordingly, the author suggests an approach to viewing reward systems, role behavior, and other aspects of social organization with which a project will interact, and indicates how this approach would modify AID's current guidelines for social analysis.

82. INTERNATIONAL DEVELOPMENT RESEARCH COUNCIL. 1973. Technology Assessment and Research Priorities for Water Supply and Sanitation in Developing Countries: With Special Reference to Rural Populations and Small Communities. Ottawa: IDRC.
- Calls for community involvement in project design, construction and operation. Emphasizes the need to determine local perceptions and value systems.
83. INTERNATIONAL LABOR OFFICE. 1973. Mechanization and Employment in Agriculture. Geneva: ILO.
- Finds that mechanization has benefited wealthy minorities at the expense of society as a whole.
84. JACKSON, S. 1972. Economically Appropriate Technologies for Developing Countries. ODC Occasional Paper No. 3. Washington, D.C.: Overseas Development Council. February.
85. JANSEN, William H. II. 1977. Walking an Old Path in New Shoes: Anthropology Returns to A.I.D. Discussion paper for a workshop on "The Role of Anthropology in A.I.D." Mimeo.
- By the mid-1970s, AID was under considerable pressure to serve the "poor majority." Among other responses, procedures for social analysis were established and a number of anthropologists hired. These initiatives so far have been only poorly integrated into the total AID system, which continues to stress economic and financial issues. Anthropologists need somehow to assert themselves within this system while retaining their professional approach and critical eye.
86. JEDLIČKA, Allen. 1975. Diffusion of Technical Innovation: A Case for the Non-Sexist Approach Among Rural Villages. Paper prepared for the Seminar on Women in Development, jointly sponsored by the American Association for the Advancement of Science, the U.N. Development Program, and the U.N. Institute for Training and Research, Mexico City. Mimeo.
- Ways of introducing new "female" technologies, based on inclusion of women in the formation and functioning of rural participant groups.
87. JEQUIER, Nicolas (ed.). 1976. Appropriate Technology: Problems and Promises. Paris: OECD Development Center.
- Includes 19 short papers, primarily case studies of a great variety of projects in specific developing countries. In addition, a lengthy introductory essay by the editor summarizes important themes. Taken together, these contributions reflect a number of unresolved issues within the appropriate technology field, including: what sort of technology is to be defined as "appropriate"; what criteria should be used to judge the value of particular projects; whether programs should be directed at the very poor or at wealthier innovators; whether new ideas will primarily

come from local people or from outside experts; and whether individualism or cooperation should be the basis of progress in this field. Observing that most foreign aid officials lack intimate experience with rural areas, the editor concludes that such groups as local government agencies or private voluntary organizations should assume primary responsibility for developing the "softwares" (local organizational, legal, and knowledge systems) necessary for a total "innovation system." See also J. Pilgrim, 1976.

88. JOHNSTON, Mary Boppell. 1975. "Training Needs of Overseas Americans as Seen by Their National Co-Workers in Asia." Peace Corps Program and Training Journal 3 (4): 25-28.
- Results of a limited survey. Training needs considered most important included human relations skills, understanding of local cultures, ability to adapt, orientation for service, and understanding of mission. Technical competence tied with "sensitivity training" for sixth position.
89. JONES, G.N. 1965. "Strategies and Tactics of Planned Organizational Change: Case Examples in the Modernization Process of Traditional Societies." Human Organization 24: 192-200.
90. KERRI, James N. 1976. "Studying Voluntary Associations as Adaptive Mechanisms: A Review of Anthropological Perspectives." Current Anthropology 17 (1): 23-47.
91. KERRI, James N. 1977. "Applied Anthropology, Urbanization, and Development in Africa: Dream or Reality?" Human Organization 36 (1): 34-42. Spring.
92. LANCE, Larry M. and Edward E. McKenna. 1975. "Analysis of Cases Pertaining to the Impact of Western Technology on the Non-Western World." Human Organization 34 (1): 87-94. Spring.
- Misleadingly titled, since there is no discussion of "the impact of Western technology on the non-Western world." Instead, emphasis is on conditions under which innovations are "successful," apparently meaning that they have been adopted. In the 50 cases analyzed, "participation" was the only effective strategy for introducing change. Technology hardwares were more successfully transferred than softwares. Where projects failed, a major cause was inadequate understanding of local cultural beliefs and political structures.
93. LEAHY, Michael. 1976. "Water Supply Projects." Peace Corps Program and Training Journal 4 (3): 27-31.

Drawing on personal experience in Tunisia, the author concludes that effective water projects are likely to be based on "an 'intermediate technology' which comes more from common sense and local observation than from engineering skills." Peace Corps Volunteer generalists, who are well suited by training and motivation to apply such technologies, can be of great use to development organizations that wish to fund local projects but lack field personnel to give these the day-to-day attention they require.

94. LELE, Uma. 1976. "Designing Rural Development Programs: Lessons From Past Experience in Africa." Economic Development and Cultural Change 24 (2): 287-308. January.
95. LEVY, C.R. 1975. The Introduction of Wood Preservation into Papua New Guinea and its Effects on the Rural Community. Abidjan: I.U.F.R.O. Feb.
- New processes allowing villagers to maintain the advantages of traditional housing while avoiding difficulties associated with traditional building materials.
96. LEWIS, D. 1973. "Anthropology and Colonialism." Current Anthropology 14 (5): 581-591.
97. LINDBLAD, Carl et al. 1975. "Considerations in Rural Development--One Perspective: Grain Storage in Dahomey." Peace Corps Program and Training Journal 3 (4): 19-24.
- Guidelines for considering small-scale projects. Emphasizes that initial planning should be based on careful analysis of the problem--in terms of traditional techniques, local market realities, and social customs--as seen from the farmer's point of view.
98. LINDENBAUM, Shirley. 1974. The Social and Economic Status of Women in Bangladesh. New York: Dept. of Anthropology, York College, City University of New York. Mimeo.
- With "development," the economic role of women has narrowed. This is reflected in such social changes as having the bride's father make marriage payments to the groom, rather than the other way around. Suggests programs to improve women's status.
99. LONGACRE, Doris Janzen. Undated. Nutrition and Development. Development Monograph Series No. 4. Akron, Pa.: Mennonite Central Committee.
- Causes and effects of poor nutrition, with special attention to ways in which nutrition relates to problems of agriculture, health, and justice. A major section deals with "indigenizing/humanizing nutritional education as part of a development process emphasizing decision-making at the local level. The author discusses nutrition experiments in rural areas, noting that small agencies have an advantage in determining needs and priorities in accord with "the people's agenda" in each location.
100. LUZZATTO, Francis A. 1976. "Intermediate Technology: The Peace Corps Contribution." Peace Corps Program and Training Journal 4 (1): 20-23.
- Suggests that Peace Corps Volunteers have a natural advantage in creating appropriate technologies due to their first-hand experience with local cultures. Outlines a series of technology manuals being written for use by PCVs and others involved in development.

101. MACPHERSON, George and Dudley Jackson. 1975. "Village Technology for Rural Development: Agricultural Innovation in Tanzania." International Labour Review 3 (2): 102-112. February.

Even "intermediate" technologies are often too expensive for poor villagers to buy and too complex for them to maintain. The authors therefore experimented with "village technologies," generally substituting wood for metal and using such familiar materials as bush poles and discarded tires. Costs of ox carts and cultivators produced in this way were one-fourth to one-half those of "intermediate" equipment made in Tanzania. Repairs were greater for the "village technologies," but these required the owner's own labor instead of cash outlays and more commonly could be carried out during slack seasons.

102. MAHONY, Frank. 1961. "The Pilot Project in Range Management Near Afmadu." Community Development Review. June: 34-39. (Reprinted in A.H. Niehoff, ed., 1966.)

A mid-project look at tensions between technically-based criteria and local realities in a range management project in the Somali Republic. As framed by outside experts, the project would have required: financial contributions by local nomads, implying a proprietary interest in water resources that could have led to warfare with groups whose access to water would have been restricted; a more settled pattern of grazing, interfering with nomadic tradition; a commercial approach to cattle-raising, contrary to prevailing attitudes relating prestige to possession of large herds. The author suggests reshaping the project to bring it more in line with local custom, while training Somalis more carefully in principles of animal husbandry.

103. MANN, R.D. 1976. A Survey Technique for Identifying the Needs of Small Farmers, And an Example of its Use in Zambia. London: Intermediate Technology Publications. March.

104. MARSDEN, K. 1970. "Progressive Technologies for Developing Countries." International Labour Review 101 (4). May.

Case studies of various industries, including leather, footwear, ceramic tiles, fiberboard, and bread.

105. MARTIN, Luann Habegger. Undated. Women and Development. Development Monograph Series No. 3. Akron, Pa.: Mennonite Central Committee.

Many factors affect women's involvement in development: cultural roles, religious and class attitudes, education practices, political structures, etc. In many parts of the world, these result in systematic inattention to women by national planners, many of whose efforts actually increase women's work. To improve the situation, development agencies should consider women-oriented projects in intermediate technology, formal and nonformal education, handicrafts, child care, credit, family planning, and cooperatives.

106. MAYBURY-LEWIS, David. 1977. "Societies on the Brink." Harvard Magazine: 56-61. January-February.

An appeal for respect for isolated societies in danger of being overrun by the modern world. Rejects accusations that anthropologists seek simply to preserve such societies as "human zoos," arguing that the real issue is how to regulate changes so that costs are minimized and benefits maximized for the affected groups.

107. McDOWELL, J. 1973. "Development of High Protein/High Calorie Biscuits in Uganda Using Indigenous Protein Sources." East African Journal of Rural Development 6 (1&2).

Examines problems of packaging and acceptance.

108. McLOUGHLIN, Peter F. (ed.). 1970. African Food Production Systems: Cases and Theory. Baltimore: Johns Hopkins Press.

Cf., for example, Peter Weil's chapter on "The Introduction of the Ox Plow in Central Gambia."

109. McROBIE, G. 1975. "An Approach for Appropriate Technologists." In R.J. Congdon (ed.), 1975.

Suggests a division of responsibility for three major tasks. First, Western experts can do state-of-the-art surveys and applied research to find models of appropriate technology for clothing, shelter, health, community services, growing and using food, etc. Second, people with thorough knowledge of local conditions can determine technology needs, community by community. Third, centers within developing countries can make specific adaptations of available technologies to local needs.

110. MEAD, Margaret (ed.). 1955. Cultural Patterns and Technical Change. New York: Mentor.

A "manual" for development workers, especially good for conveying the bewildering variety of traditional cultures and change processes. Particular attention is given to social constraints on technical innovation, and on how to overcome these. As a secondary concern, the social consequences of successful innovations are examined. A basic point of reference is the need to support the "mental health" of people subject to these processes.

111. MELLOR, John W. 1975. The Impact of New Agricultural Technology on Employment and Income Distribution: Concepts and Policy. Occasional Paper No. 81. Ithaca: Cornell University, Department of Agricultural Economics. May.

112. MINER, Horace. 1960. "Culture Change Under Pressure: A Hausa Case." Human Organization. Fall: 164-167. (Reprinted in A.H. Niehoff, ed., 1966.)

A follow-up study of British efforts to eliminate sleeping sickness in

one area of northern Nigeria. The project's core activity, periodic clearing of brush along streams, continued ten years after the formal project itself was terminated. This apparent success, however, reflected only that the regional emir annually ordered the work to be done. Local chiefs and villagers, to whom the relationship between brush, flies, and sleeping sickness had never been convincingly explained, made it clear that they would abandon brush clearing if coercion to carry out this work were withdrawn.

113. MITCHNIK, David A. 1972. The Role of Women in Rural Development in Zaire. London: Oxfam. Mimeo.

Studies projects of voluntary agencies, concluding that women are too often left out of those concerning agriculture and livestock. Suggests training schemes to support women in productive activities.

114. MORAWETZ, D. 1974. "Employment Implications of Industrialization in Developing Countries: A Survey." The Economic Journal 84 (335): 491-542. September.

115. NAPITUPULU, W.P. et al. 1976. "BUTSI's Village Technology Unit." Peace Corps Program and Training Journal 4 (1): 13-19.

Stresses the importance of placing the Technology Unit inside BUTSI, an Indonesian program with 1700 university graduates serving as community development volunteers throughout the country. This approach makes two-way communication on technology problems at the village level an integral part of the system.

116. NIEHOFF, Arthur H. 1966. A Casebook of Social Change. Chicago: Aldine.

Directed at Western "change agents," this book looks primarily at innovations introduced by outside experts into the lives of rural peoples. In this context, "success" and "failure" refer simply to whether or not the expert's innovation has been adopted. In a chapter on "The Process of Innovation," the editor outlines a series of forces which impinge on the change process and argues that better understanding of these by development personnel can improve the prospects for acceptance of their ideas. The case studies themselves concentrate on such innovation "softwares" as land reform, community development, health practices, and cooperatives. For cases of particular interest, summarized separately, see: T.M. Fraser, Jr., 1963; F. Mahony, 1961; H. Miner, 1960; P.T. Orata, 1954.

117. NIEHOFF, Arthur H. 1969. Planned Change in Agrarian Countries. Report prepared for the Department of the Army, Office of Chief of Research and Development. Alexandria, Va.: Human Resources Research Organization. December.

118. NIEHOFF, Arthur H. and J. Charnel Anderson. 1964. "The Process of Cross-Cultural Innovation." International Development Review 6 (2): 5-11. June.

119. OKAI, M. 1975. "The Development of Ox Cultivation Practices in Uganda." East African Journal of Rural Development 8 (1&2).
Describes ox-drawn implements in current use and suggests possible improvements.
120. O'KELLY, E. 1973. Aid and Self-Help. London: Charles Knight & Co.
Chapter 16 describes the introduction of small corn mills in the Cameroon during the 1950s, a process that required women to form societies to purchase the mills. As the societies became established, women used leisure time to organize classes in such subjects as cooking, child welfare, and hygiene.
121. OLIVER, P. (ed.). 1971. Shelter in Africa. London: Barrie and Jenkins.
Sixteen articles describing traditional forms of shelter. Suggests ways of improving customary materials and techniques.
122. OPLER, Morris. 1954. "Problems Concerning Official and Popular Participation in Development Projects." Economic Development and Cultural Change 2 (4): 269-278.
123. ORATA, Pedro T. 1954. "Community Education in Rural Philippines." Overseas Education. April: 3-10. (Reprinted in A.H. Niehoff, 1966.)
A teacher's account of successful community projects in his home village building of pig pens, a feeder road, a canal. Use of schoolchildren in these activities provided at the same time volunteer labor and the opportunity for practical education in community needs. In all cases, "leaders" also assisted with manual labor. Among other things, the experience "proved once more that the longest way round is the shortest way to the goal": construction of a winding road around the property of antagonistic landowners allowed this project to be completed, for example although not according to plan. And there was emphasis throughout on soliciting opinions, support, and participation of community members, a time-consuming process essential to project success.
124. OWENS, Edgar. 1976. "Small Farmer Participation and World Agricultural Development." Public Administration Review 36 (2): 142-148. March/April.
Four kinds of organization can be used for small farmer participation at the village level: local governments, farmer cooperatives, irrigation and other land improvement associations, and land tribunals. In countries such as Egypt and Taiwan, where such mechanisms are healthy and widespread, agricultural productivity is high. Most developing countries however, have given attention only to cooperatives, typically run on organizational and financial lines of limited value to the small farmer. Since productivity is low in such cases, and prospects for hunger high, the U.S. should use its aid programs to promote greater participation by small farmers in development.

125. PAUL, Benjamin D., ed. 1955. Health, Culture and Community: Case Studies of Public Reactions to Health Programs. New York: Russell Sage Foundation.

126. PILGRIM, John W. 1976. "The Role of Non-Governmental Institutions in the Innovation Process." In N. Jequier, 1976.

Describes the introduction of maize and supporting technologies in colonial Kenya. The particular success of religious missions as agents in this process followed from their institutional commitment to low-cost, locally-based programs; their general concern with education and training activities; and the absence of any rigid time limits for completing projects. The innovations themselves had a number of results, notably enclosure of formerly communal lands and the concentration of benefits on a restricted group of "innovators" consisting largely of mission members.

127. PROGRAM OF ADVANCED STUDIES IN INSTITUTION BUILDING AND TECHNICAL ASSISTANCE. 1976. Private Voluntary Organizations and Appropriate Technology. Bloomington, Ind.: PASITAM. June. (Reprinted in U.S./AID, 1977.)

Notes that the "appropriateness" of a technology must be measured against local needs in specific places. Since PVOs typically concentrate on field operations, especially in impoverished rural areas, they are uniquely qualified to identify and respond to these needs. Most PVOs are considerably less strong, however, in technical areas required for research and development, as well as in the formal assessment and dissemination of their experience. In a general conclusion, the authors stress the need for applied social science in evaluating those "vital conventions" of particular societies that will determine their response to given technology projects.

128. REMY, Dorothy. 1974. Social Networks and Patron-Client Relations: Ibadan Market Women. Washington, D.C.: Federal City College, Department of Urban Studies. Mimeo.

Describes networks serving financial, marketing and political functions. These associations help Yoruba women maintain economic independence from their husbands at a time when "development" is otherwise making this difficult.

129. SARTORIUS, Peter. 1975. Churches in Rural Development: Guidelines for Action. Geneva: World Council of Churches.

A strategy based on appropriate technology and popular participation.

130. SAVE THE CHILDREN FEDERATION. 1977. Community Report: Bangladesh (No. 2). Westport, Ct.: Save the Children Federation.

Briefly describes progress of a drum-makers' cooperative established with SCF assistance. In line with usual SCF practice, a decision to support the co-op had emerged from consultations between SCF's Field Coordinator

and a local "community committee" created to select and implement projects. This community-based approach grows from a basic SCF belief that the ability of villagers to understand, plan, and manage their own affairs is essential to development.

131. SCIENCE FOR THE PEOPLE. 1974. China: Science Walks on Two Legs. New York: Avon Books.

Describes the Chinese attempt to use various kinds of technology--big and small, modern and traditional--in as decentralized a manner as possible.

132. SCUDDER, Thayer. 1977. The Place of the Behavioral Sciences in Development Agencies: Three Propositions Based on Personal Experiences With Multilateral Organizations. Working paper for meeting on "The Role of Anthropology in A.I.D." May.

First, there is a crucial need for the behavioral sciences to be used at all stages in the development process, rather than simply for "troubleshooting" after a project has been given shape by national planners. Second, behavioral science must be institutionalized within the development agency, rather than being supplied only by occasional consultants. Third, behavioral science must have friends in high places within the organization, so that its contributions are not undercut by project planners unconvinced of its value.

133. SEWARD, Shirley B. 1977. Technology, Non-Market Activities, and Household Productivity (draft). Ottawa: International Development Research Center. March 31.

Interest in new technologies for development has stressed production of goods for the market, generally by men. This paper argues that the definition of "productive" effort should be broadened to include other activities of households. In this view, technical inventiveness should also be applied to domestic tasks (child care, food preparation, provision of fuel and water, making of clothes) and "informal income-generating activities" (primarily handicrafts and other goods made by women). Changes in these areas could have significant effects on human capital formation (through improvements in nutrition and education), fertility (through increased incomes and access to jobs), and so on. The author reviews papers and development projects concerned with technological impact on household productivity, and concludes that additional research in this area is needed.

134. SHARP, Lauriston. 1952. "Steel Axes for Stone Age Australians." Human Organization 11 (2): 17-22. Also in E.H. Spicer (ed.), 1952.

Ways in which stone axes were acquired and used by Australian aborigines helped define sex, age, and kinship roles for owners and users, trading partners, etc. Viewing axes only as means of production, however, local missionaries in pursuit of "progress" began to distribute more "efficient"

steel axes. As seemed rational, these were given to the people who might use them most, including women and children who traditionally had never owned axes. Ultimately, these new patterns for acquisition and possession of axes led to serious role confusions, a diminished place for the ceremonies at which axes had been traded and other social relationships affirmed, creation of heretofore unknown leader-follower relationships, widespread erosion of values, intolerable pressure on the totemic belief system, and profound demoralization. Although the missionaries could hardly have foreseen this, the resulting atmosphere of cultural and psychological disintegration was ideal for introduction of the new "cultural universe" which their Christianity represented.

135. SIGURDSON, J. 1973. "The Suitability of Technology in Contemporary China." Impact of Science on Society 23 (4): 341-352. Paris: UNESCO.

136. SINGH, Rudra Datt. 1952. "The Village Level: An Introduction of Green Manuring in Rural India." In E.H. Spicer, 1952.

Initial attempts to introduce green manuring failed due to strained relationships between villagers and government officials, who were seen as authoritarian and paternalistic. With American support, a fresh project relied on young, non-governmental field workers, much of whose training took place on the job and stressed the need for close involvement in village life. Coupled with considerable delegation of authority, this deemphasis of technical criteria in favor of creating interpersonal bonds between workers and villagers led to widespread adoption of the new technology.

137. SOLES, Roger. 1968. Experiences of a Peace Corps Volunteer Introducing Family Gardening in Colombia. LTC No. 52. Madison, Wisconsin: Land Tenure Center. July.

Describes the early failures of a gardening project introduced without village participation in project development. Partial success followed endorsement of the program by an influential local family.

138. SOMMER, John G. 1975. U.S. Voluntary Aid to the Third World: What is Its Future? ODC Development Paper No. 20. Washington, D.C.: Overseas Development Council. December.

Stresses the major potential of private voluntary organizations "because of their flexibility and because their projects generally have been qualitatively more effective than have parallel government efforts in reaching the poorest groups in the developing countries..."

139. SPENCER, D.S.C. 1976. African Women in Agricultural Development: A Case Study in Sierra Leone. African Rural Economy Working Paper No. 11. East Lansing: Michigan State University.

140. SPICER, E.H. (ed.). 1952. Human Problems in Technological Change: A Casebook. New York: Russell Sage Foundation. (Also, John Wiley & Sons edition, 1967.)

This book originated in a Cornell program concerned with "facilitating the introduction of modern agriculture, industry, and medicine to areas that are deficient in these technologies." Cases, organized around "suggestions for study" and other teaching devices, include material on the introduction of green manuring in India, steel axes in aboriginal areas of Australia, stable water supplies in Peru, and democratic leadership in Micronesia. The remaining studies are drawn from various parts of North America. See A.R. Holmberg, 1952; L. Sharp, 1952; R.D. Singh, 1952.

141. SPINDLER, Louise S. 1977. Culture Change and Modernization: Mini-Models and Case Studies. New York: Holt, Rinehart and Winston.

142. STEWART, Edward C. 1966. Aspects of American Culture: Assumptions and Values That Affect Cross-Cultural Effectiveness. Pittsburgh. Mimeo.

Widely used in Peace Corps training programs.

143. STOESZ, Edgar. 1977. Thoughts on Development (revised edition). Development Monograph Series No. 1. Akron, Pa.: Mennonite Central Committee.

Since underdevelopment reflects more a poverty of spirit than a lack of wealth, true progress will begin only with transformations in basic attitudes. Changes should have a strong community base, expressed through locally-owned development institutions. Generally, local capabilities for management, financing, and technical action should determine the scale of new activities. Outside assistance will be helpful only if it is viewed as subordinate to a primarily indigenous process.

144. STOLMAKER, Charlotte. 1974. Adaptations of Traditional Peasant Practices to Modern Needs. Paper presented at the Southwestern Anthropological Association meetings, Santa Monica, Calif. April. Mimeo.

Describes attempts of a peasant village in southern Mexico to fit outside modernizing pressures into a traditional social framework. Identifies factors leading to adoption or rejection of certain innovations.

145. SUBCOMMITTEE ON WOMEN IN DEVELOPMENT, Committee on Development Assistance, American Council of Voluntary Agencies for Foreign Service. 1975. Criteria for Evaluation of Development Projects Involving Women. New York: Technical Assistance Information Clearing House (ACVA). December.

Among criteria listed are whether women are involved in initiating and directing projects; who benefits and how, including any improvement in the participants' ability to pursue other objectives after initial ones are achieved; social changes, such as increases in women's status; the

extent to which projects treat development as a continuing and flexible process. Several projects are measured against these criteria, notably a case where support of a women's club in rural Honduras by the Community Development Foundation led to a number of economic and institutional advances. The authors conclude that much remains to be done to acquire information about successful projects, as well as to use this to improve development efforts affecting women.

146. SUTER, D.A. and B.J. Wallace. 1972. Interaction Between Technology and Social Developments in Farming Communities in Northern Luzon, Philippines. American Society of Agricultural Engineers, Paper No. 72-604.

147. TECHNICAL ASSISTANCE INFORMATION CLEARING HOUSE, American Council of Voluntary Agencies for Foreign Service, Inc. 1976. Bibliography of Materials in the TAICH Information System on Case Studies and Program Planning, Management and Evaluation. New York: TAICH. May.

Material on small-scale overseas development in such areas as construction, co-ops, education, human resources, industrial development, public health, rural and urban planning.

148. THIESENHUSEN, William C. 1972. Green Revolution in Latin America: Income Effects, Policy Decisions. LTC Reprint No. 83. Madison, Wisconsin: Land Tenure Center. (Originally in Monthly Labor Review, March 1972.)

Although many Green Revolution technologies are theoretically neutral with respect to farm size, the credit and extension services necessary to disseminate them are heavily oriented to the larger farmer. In practice, benefits of these technologies will therefore flow primarily to the relatively wealthy. In much of Latin America, smaller farmers will profit from the Green Revolution only if there are "massive, rapid, and drastic" reforms in land tenure and the provision of agricultural services.

149. THIESENHUSEN, William C. 1974. What Changing Technology Implies for Agrarian Reform. LTC Reprint No. 116. Madison, Wisconsin: Land Tenure Center. September. (Originally in Land Economics 50 (1), Feb. 1974.)

The Green Revolution may intensify social problems by (1) diminishing agricultural employment, and (2) enriching those elites having greatest access to new technologies. Even where total employment does not fall, an intensification of seasonal peaks in demand for labor may cause hired workers to displace resident farm labor, leading to major social dislocations. In general, solutions may lie in reforms providing poorer farmers with land, small-scale technologies, and greater institutional support. International development agencies can support such tendencies in various ways, and should conduct more research to ensure that loans are in fact benefiting the poor.

150. THOMAS, John Woodward. 1975. "The Choice of Technology for Irrigation Tubewells in East Pakistan: Analysis of a Development Policy Decision." In C.P. Timmer et al., 1975.

Planners chose medium-cost tubewells, even though the low-cost alternatives promised a higher rate of economic return, greater opportunities for employment and training, a more equitable distribution of benefits, superior opportunities for local industry, and improved prospects for long-term success through involvement of local villagers in construction of their own wells. This seemingly irrational choice followed from organizational perspectives of the implementing agencies, including the World Bank, which gave great weight to risk avoidance, the appearance of modernity, established procedures and familiar techniques, and centralized control over the process as a whole, conditions better fulfilled by the more expensive technology.

151. THOMPSON, Laura. 1976. "An Appropriate Role for Postcolonial Applied Anthropologists." Human Organization 35 (1): 1-7. Spring.

Many anthropologists are still operating in the "colonial harness," seeking to induce or direct change according to Western viewpoints as to what people in new nations require to "develop." A better approach would be for anthropologists to consider local groups as their real "clients," using professional skills to help the groups themselves define options and select courses of action.

152. TIMMER, C. Peter. 1975. "The Choice of Technique in Indonesia." In C.P. Timmer et al., 1975.

Three reasons for the choice of capital-intensive techniques even where these may be inappropriate for local economic conditions. First, sectoral planners are led in this direction by factors ranging from ignorance of national capital availability to opportunities for corruption. Second, entrepreneurs are pushed toward capital-intensive choices by distortions in tariffs, credit, labor costs, availability of management skills, and governmental red tape. Third, the experts who prepare and evaluate projects often identify capital-intensive with modern, and modern with good. Policy-makers in countries such as Indonesia can counteract these tendencies by insisting that projects follow economically rational guidelines that stress employment maximization.

153. TIMMER, C. Peter, et al. 1975. The Choice of Technology in Developing Countries: Some Cautionary Tales. Harvard Studies in International Affairs No. 32. Cambridge, Mass.: Harvard University Center for International Affairs.

Four studies: irrigation tubewells in East Pakistan, petrochemicals in Colombia, rice milling and small industry in Indonesia. The authors find technological decisions to be influenced by a wide range of economic and non-economic factors, including market distortions, the administrative convenience of planners and foreign assistance agencies, and a general

preference for "modern" methods. Together, these factors push both policy-makers and entrepreneurs toward inappropriately capital-intensive choices of technique. See J.W. Thomas, 1975; C.P. Timmer, 1975.

154. TINKER, Irene and Michele Bo Bramsen (eds.). 1976a. Women and World Development. Prepared under the auspices of the American Association for the Advancement of Science. Washington, D.C.: Overseas Development Council.

Includes essays on the general impact of development on women; specific problems of women in Moslem countries, Latin America, and sub-Saharan Africa; women in cities; women in agriculture; etc. Also reviews proceedings of the AAAS Seminar on Women in Development held in Mexico City during June 1975. See I. Tinker and M.B. Bramsen, 1976b.

155. TINKER, Irene and Michele Bo Bramsen. 1976b. "Workshop 1: Food Production and the Introduction of Small-Scale Technology Into Rural Life." In I. Tinker and M.B. Bramsen (eds.), 1976a.

Participants in this workshop noted that development often adds to the work of rural women: they must do more of the farming when men take on "modern" jobs; where men stay home but expand cultivation with new machinery, women have a larger area to weed by hand; shifting of land from subsistence to cash crops makes proper nutrition more difficult to maintain, etc. A first need is for governments to view women's work as true "economic activity." Support for such activity might then come through encouragement of women's organizations, provision of credit, and transfer of technologies appropriate to women's needs.

156. UCHENDU, Victor C. 1970. "The Impact of Changing Agricultural Technology on African Land Tenure." Journal of Developing Areas 4 (4): 477-485. July.

In large parts of Africa, there has been a tradition of multiple interests in given areas of land, with many people having rights of access to these. As innovations such as tree crops, improved cattle, and high-value cash crops have been introduced, however, there often has been an individualization of land tenure systems. To be most effective, agents of technical change should become aware of the tenure implications of innovations they seek to introduce.

157. UCHENDU, Victor C. 1975. "The Role of Intermediate Technology in East African Agricultural Development." East African Journal of Rural Development 3 (1-2): 182-190.

158. U.N. ADVISORY COMMITTEE ON THE APPLICATION OF SCIENCE AND TECHNOLOGY TO DEVELOPMENT. 1977. Report of the Ad Hoc Working Group on Appropriate Technology. Document E/AC.52/XXIII/CRP.2. New York: United Nations. June 10.

Suggests that technological "appropriateness" is primarily a matter of saving scarce capital and providing jobs. Briefly reviews policies and broad programs in support of appropriate technology on the part of

UNCTAD, UNIDO, UNITAR, ILO, FAO, UNESCO, WHO, IBRD, and WIPC. Calls for more research and better exchange of information on the subject.

159. U.N. ECONOMIC COMMISSION FOR AFRICA, Human Resources Development Division, Women's Program Unit. 1974. The Role of Women in Population Dynamics Related to Food and Agriculture and Rural Development in Africa. Addis Ababa: U.N./E.C.A. Mimeo.
- Women have a predominant role in food production and other activities, but so far have received little developmental aid. Recommends technologies to help women on the farm and at home.
160. U.N. INDUSTRIAL DEVELOPMENT ORGANIZATION. 1977. Cooperative Program of Action on Appropriate Industrial Technology: Report by the Executive Director Document ID/B/100. Vienna: UNIDO. April 14.
- Defines technology as "appropriate" if it contributes to such development goals as growth, an increased standard of living, reduced income disparities, greater employment, and self-reliance. Suggests a program for encouraging appropriate industrial technologies through research, collection and dissemination of practical experience, evaluation, application of technology to rural development, adjustment of national and international policies, training, etc.
161. U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT. 1975. "Social Soundness Analysis Appendix 5A of AID Handbook 3, Project Assistance. Washington, D.C.: U.S./AID. September 1.
- A suggested approach to "social soundness analysis" of AID projects. Originally, this was to be included "to the extent it is considered applicable" in the PRP, a recently-abolished, intermediate stage of project documentation. Now, such analysis will mostly appear in the final Project Paper. Covers three major topics. First, the compatibility of the project with the sociocultural environment in which it is to be introduced, based on determination of local values, beliefs, social structure and organization. Second, the likelihood that new practices or institutions will spread outside the immediate project area. Third, the distribution of benefits and burdens in terms of access to resources, implications for employment, displacement of people, and changes in power and participation. With the use of "professional expertise," to collect this information for a region or project area should take 2-3 weeks.
162. U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT. 1976. Women's Roles in Development (Project Paper). Ouagadougou: USAID/Upper Volta.
- A proposal for support in Upper Volta to such "micro-projects" as individual gardening or collective mills, fields, and poultry-raising. These activities would be carried out by village women, assisted by local extension agents, according to expressed needs of the women themselves.

163. U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT. 1977. Proposal for a Program in Appropriate Technology (revised edition). Washington, D.C.: U.S. Government Printing Office. February 7.

Proposes establishment of an independent organization (now A.T. International) "to assist developing countries strengthen their own capacities to develop, adapt and utilize appropriate technology." Describes the process--workshops, meetings, papers--through which AID arrived at this position. In a series of attachments, various contributors cover such topics as policies and institutions for appropriate technology, the role of private and voluntary organizations, appropriate techniques for industry and agriculture, and the inducement for U.S. firms to adapt products and processes to conditions in developing countries. See P. Askins, 1976; Program of Advanced Studies..., 1976.

164. VOLUNTEERS IN TECHNICAL ASSISTANCE. 1975. Village Technology Handbook. Mt. Rainier, Md.: VITA.

Technical instructions for appropriate technologies in health and sanitation, water resources, agriculture, food processing and preservation, construction, home improvement, crafts and village industries, and communications.

165. WALLENDER, David E. 1976. "Paysans Progressistes of Dakiri." Peace Corps Program and Training Journal 4 (5): 31-34.

A Volunteer's discussion of problems in creating cooperative farming ventures for school graduates in Upper Volta. A first attempt failed largely as a result of trying to move students away from their families into a separate cooperative having no organic basis in traditional society. Greater success followed from encouraging students to form cooperatives in their own villages under the direction of local elders.

166. WARD, Barbara E. 1970. "Women and Technology in Developing Countries." Impact of Science on Society 20 (1): 93-101.

Ways in which technological change has limited the range of activities available to women, while freeing them from some previous chores.

167. WARREN, Dennis M. 1976. "Indigenous Knowledge Systems for Activating Local Decision-Making Groups in Rural Development." In Godwin C. Chu et al. (eds.), Communication for Group Transformation in Development. 1976. Communication Monographs No. 2. Honolulu: East-West Center. September.

Although experts speak of the need for full local participation in development, the communication process remains largely unidirectional, with information passing simply from planners or technicians to villagers. By offering a set of techniques for understanding indigenous knowledge systems, ethno-science allows information to move more easily in the other direction as well. Practical implications are suggested in a brief discussion of the disease classification system of the

Ghanaian Bono. In general, the requirement is for an approach to development which takes full account of village realities as perceived by villagers themselves.

168. WEAKS, Daniel. 1976. The Photonovel: A Tool for Development. Program & Training Journal Manual Series No. 4. Washington, D.C.: ACTION/Peace Corps. September.

A detailed "how-to" introduction to educational uses of the photonovel, a publication similar to a comic book but with photographs used in place of drawings. Referring to his own experiences in Ecuador, the author stresses the need to direct photonovels at specific class and cultural groups, whose clothes, mannerisms and speech habits can be clearly represented. Of special importance is the "pre-test," where intended readers are sampled to determine a given photonovel's effectiveness.

169. WERGE, Robert W. 1976. Socioeconomic Aspects of the Production and Utilization of Potatoes in Peru: A Bibliography. Lima: Centro Internacional de la Papa.

170. WERGE, Robert W. 1977. Anthropology and Agricultural Research: The Case of Potato Anthropology (draft). Lima: Centro Internacional de la Papa, Socio-economic Unit. April.

An anthropologist's case for application of his discipline to agricultural development problems, including an account of his own work at the International Potato Center in Peru. Werge has tried to make the Center's research program more responsive, for example, to traditional storage and processing practices. In addition, he has added reporting, field trip, and role playing elements to the Center's training programs, in order to help participating specialists see farmers as sources of information rather than simply recipients of advice.

171. WHITE, Lynn, Jr. 1962. Medieval Technology and Social Change. New York: Oxford University Press.

Three long essays: (1) Following vast increases in the horseman's military advantage through introduction of the stirrup in the eighth century, feudal institutions and attitudes evolved to support a class of mounted knights. (2) Most fruitfully in Northern Europe, a combination of agricultural innovations--the heavy plow, horses as draft animals, three-field crop rotation--led by the ninth century to increased farm productivity, urbanization, and the rise of an artisan/merchant class. (3) A great array of basic mechanical inventions between the eleventh and fifteenth centuries was associated with a new conception of the universe as a source of energies to be exploited for human use.

172. WHYTE, William Foote. 1975. Organizing for Agricultural Development. New Brunswick, N.J.: Transaction.

173. WIESE, H. Jean C. 1976. "Maternal Nutrition and Traditional Food Behavior in Haiti." Human Organization 35 (2): 193-200.

Rural Haitians base diet on a "hot/cold" classification of life states and foods, according to principles of humoral medicine. Even more than economic or environmental factors, this may be a serious constraint on attempts to improve nutrition through dietary change.

174. WIGHT, William L. 1970. Guidelines for Peace Corps Cross-Cultural Training: Part IV, Annotated Bibliography. Washington, D.C.: Peace Corps Office of Training Support. March.

175. de WILDE, A. 1975. "Some Social Criteria for Appropriate Technology." In R.J. Congdon (ed.), 1975.

Resources, people, technology and economic/political structures all need to be in harmony for new technologies to be applied successfully. With this in mind, the author reviews several appropriate technology organizations. Some of these (International Rice Research Institute) give relatively little attention to the broad context of technology transfer, while others (Brace Research Institute) give more. In studying the experience of such organizations overseas, we may better understand the role of technology in Western societies as well.

- 176: WILKES, Joy. 1977. "But We're Not Afraid to Speak Anymore": A Report on the Church World Service Consultation in India on Women and Development. New York: Church World Service.

Concludes that women should be helped to participate more fully in development, especially through activities emphasizing local cooperation and self-reliance. Several brief case studies from India support the point that local participation in project design and implementation will help villagers over the long term by raising their consciousness, their sense of community, and their knowledge of how to tap outside resources.

177. WOOD, Deborah A. 1975. Directed Cultural Change in Peru: A Guide to the Vicos Collection. Ithaca, N.Y.: Cornell University Latin American Studies Program.

178. WORLD BANK. 1976a. Scope for the Substitution of Labor and Equipment in Civil Construction: A Progress Report. Washington, D.C.: World Bank. July.

A significant part of Bank lending is for civil construction: roads, irrigation channels, dams, reservoirs, etc. Given improved tools, special organization and management skills, and availability of an adequate labor supply during the construction season, labor-intensive methods for doing these jobs are economically competitive at low wage rates. Unfortunately, there are many developing countries where these conditions do not prevail. To improve prospects for use of labor-intensive technologies, the Bank will carry out demonstration/training programs and conduct further research.

179. WORLD BANK. 1976b. Appropriate Technology in World Bank Activities. Washington, D.C.: World Bank. July 19.

The Bank believes that technology used in its projects should be appropriate to development goals and local conditions. In practice, however, a number of factors may lead to technology choices which deviate from these criteria. The Bank therefore needs to consider "appropriate" innovations in product design, production systems, and market institutions. Examples are provided of appropriate technology in Bank activities in agriculture, rural infrastructure, urban housing, public works, telecommunications, and other areas.

180. WRIGHT, David L. 1977. Appropriate Technology for Small-Scale Industries: Possible Roles for Development Finance Institutions in Africa. Document AIAFD/77/SEM.1/DOC.1. Abidjan: Association of African Development Finance Institutions.

If governments wish to create employment for the rural and urban poor, they should give active support to appropriate technologies. Unfortunately, there are a number of obstacles to this approach, including: lack of awareness that small-scale technologies exist, resistance or limited interest on the part of government agencies and research institutes, and lack of funds for proving the commercial viability of new techniques. In spite of these barriers, a number of countries (e.g., Ghana, Zambia, India, Pakistan, Sri Lanka) have established appropriate technology organizations. Other countries should create such units, in order to encourage research, development, adaptation, testing, education and training in support of appropriate technologies.