

Poverty, Environment and Sustainable Development:

A Thematic Bibliography

by

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This bibliography is offered as a contribution to participants and resource persons active in the **Mainstreaming Environment in Poverty Reduction Strategies** program. The objective is to contribute to an informed debate about poverty-environment links, and to enhance the dissemination of good practice case studies.

The literature on environment/natural resource management and poverty has been organized with a view to identifying quantifiable links between poverty and environment. Articles which are analytically relevant, based on in-depth ethnographic studies but do not quantify the linkages are distinguished by (**) sign at the end of the reference.

Section A contains a thematic listing, while Section B provides a set of selected abstracts of sources that are considered as having high relevance for this program.

The bibliography represents work in progress with several new themes being added recently. Comments and contributions are welcome.²

¹ This work was commissioned by the World Bank. The author is responsible for the selection of articles and their thematic grouping. Selection of documents for this bibliography is based on relevance and contribution to informed debate, but does not imply endorsement by the World Bank of the views expressed therein. A large number of people have contributed their time, sources and suggestions to make this bibliography possible. Thanks are due to Gayatri Acharya, Jan Bojö, Katherine Bolt, Julia Bucknall, Carter Brandon, Ken Chomitz, , Michele DeNevers, John Dixon, Fadi Doumani, Anders Ekbohm, Kirk Hamilton, Indu Hewawasan, Nathalie Johnson, Christiane Kraus, Jim Listorti, Kseniya Lvovsky, Maria Sarraf, Priya Shyamsundar and Paul Steele.

Section A: Thematic Listing

Theme1: Environment, poverty and health impact

1. Akbar, S. & Lvovsky, K. (2000). Indoor Air Pollution: Energy and Health for the Poor. ESMAP Newsletter, No. 1, September 2000. *The World Bank*.
2. Brooks, N. and Sethi, R. (1997). The Distribution of Pollution: Community Characteristics and Exposure to Air Toxins. *Journal of Environmental Economics and Management*. Vol. 32, 233-250.
3. Bruce, N. et al. (2000). The Health Effects of Indoor Air Pollution Exposure in Developing Countries. Prepared for the USAID/WHO Global Technical Consultation on the Health Impacts of Indoor Air Pollution and Household Energy in Developing Countries. May 3-4, 2000. Washington DC.
4. Doumani & Listorti. (2000) Environmental health: bridging the Gaps (Case study on Ghana). *The World Bank*. (Chapter 3 could also go under theme 4)
5. Dunleavy, M et. al. (2000). Andhra Pradesh, India. Water, Household Environment and Health. Environment Unit, South Asia Region. *The World Bank*.
6. Esrey, S. (1991). Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. *Bulletin of the World Health Organization*. 69(5): 609-621.
7. Jalan, J. & Ravallion, M. (2000). Does Piped Water Improve Child Health in Poor Families? Propensity Score Matching Estimates for Rural India. Unpublished Manuscript.
8. Songsore, J. and Mc Granahan, G. (1993). Environment, Wealth and Health: Towards an analysis of intra-urban differentials within the Greater Accra Metropolitan Area, Ghana. *Environment and Urbanization*. Vol. 5(2):10-34.
9. Smith, K. & Mehta, S. (2000). The Burden of Disease from Indoor Air Pollution in Developing Countries: Comparison of Estimates. Prepared for the USAID/WHO Global Technical Consultation on the Health Impacts of Indoor Air Pollution and Household Energy in Developing Countries. May 3-4, 2000. Washington DC.
10. Smith, K. (1999). Indoor Air Pollution. Pollution Management in Focus. Discussion Note No. 4. *The World Bank*.
11. Surjadi, C. (1993). Respiratory diseases of mothers and children and environmental factors among households in Jakarta. *Environment and Urbanization*, Vol. 5(2):78-86.
12. Wagstaff, A. & Watanabe, N. (2000). Socioeconomic Inequalities in Child Malnutrition in the Developing World. DEC Working Paper #2434. *The World Bank*.

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13. Wagstaff, A. (2000). Unpacking the cause of inequalities in child survival: the case of Cebu, Philippines. Human Development Network. *The World Bank*: Washington DC.

Theme 2: Poor's dependence on natural resources

1. Byron, N. & Arnold, M. (1999). What Futures for the People of the Tropical Forests? *World Development*, Vol. 27, No. 5, p. 789-805. **
1. Cavendish, W. (1998). The Complexity of the Commons : Environment Resource Demands in Rural Zimbabwe. Center for the Studies of African Economies. Working Paper Series 99-8.
2. Cavendish, W. (1999). Poverty, Inequality and Environmental Resources: Quantitative Analysis of Rural Households. Center for the Studies of African Economies. Working Paper Series 99-9.
3. Cavendish, W. (2000). Empirical Regularities in the Poverty-Environment relationship of African rural Households. *World Development*. Vol. 28, No. 11, pp. 1979-2003.
4. Hossain, Z. R. (1995). Ecological Reserves and Expenditure Saving Scope for the Poor. In Rahman & Hossain (Eds.) *Rethinking Rural Poverty: Bangladesh as a Case Study* Sage Publications: New Delhi.
5. Jodha, N.S. (1986). Common Property Resources and Rural Poor in Dry Regions of India. *Economic and Political Weekly* Vol. XX1, No. 27, July 5, p. 1169-1181.
6. Jodha, N.S. (1991). Rural Common Property Resources: A Growing Crisis. IIED. Gatekeeper Series No. 24.
7. Reddy, S. R. C. & Chakravarty, S.P. (1999). Forest Dependence and Income Distribution in a Subsistence Economy: Evidence from India. *World Development*. Vol. 27, No. 7, pp. 1141-1149.

Theme 3. Natural resource degradation and impact on poor (impact in terms of health, time, income, literacy, labor, etc)

1. Brouwer, I. D., et. al. (1989). Nutritional Impacts of an Increasing Fuelwood Shortage in Rural Households in Developing Countries. *Progress in Food and Nutrition Science*. Vol. 13, pp. 349-361.
2. Devasia, L. (1998). Safe Drinking Water and its Acquisition: Rural Women's Participation in Water Management in Maharashtra, India. *International Journal of Water Resources Development*. Vol. , No. 4, pp. 537-546. ** (Also listed in gender section).
3. Kadekodi, G.K. (1995). Operationalizing Sustainable Development: Ecology-Economy Interactions at a Regional Level. The Netherlands: Institute for Environmental Studies.

4. Kumar & Hotchkiss. (1988). Consequences of Deforestation for Women's Time Allocation, Agricultural Production, and Nutrition in Hill Areas of Nepal. IFPRI, Research Report No. 69.
5. Saksena, S. et. al. (1995). Time Allocation and Fuel Usage in Three Villages of the Garhwal Himalaya, India. *Mountain Research and Development*, Vol. 15, No. 1, pp. 57-67.
6. Thapa, K. K. Bilsborrow, R.E. & Murphy, L. (1996). Deforestation, Land Use, and Women's Agricultural Activities in the Ecuadorian Amazon. *World Development*. Vol. 24, No. 8, pp.1317-1332.
7. Whittington, D. et al. (1990). Calculating the Value of Time Spent Collecting Water: Some Estimates for Ukunda, Kenya. *World Development*. Vol. 18, No. 2, pp. 269-280. (Could also be grouped in Theme 6)

Theme 4. Role of policy in influencing poverty/environment links; Distributional impacts of specific interventions

1. Barbier, E (2000). The economic linkages between rural poverty and land degradation: some evidence from Africa . *Agriculture, Ecosystems and Environment*, Vol. 82, pp. 355-370.
2. Binswanger, H.(1989). Brazilian Policies that Encourage Deforestation in the Amazon. Environment Department Working Paper No. 16, *The World Bank*.
3. Deininger, K. & Minten, B. (2000). Poverty, Policies, and Deforestation: The Case of Mexico. IFPRI. <http://www.worldbank.org/research/peg>
4. Datt, G. & Hoogeveen, H. El Nino or El Peso? Crisis, Poverty and Income Distribution in the Philippines. Policy Research Working Paper # 2466. *The World Bank*.
<http://wbi018.worldbank.org/Research/workpapers.nsf/>
5. Dutt, A. K. & Mohan Rao, J. (1996). Growth, Distribution and the Environment: Sustainable Development in India. *World Development*. Vol. 24, No. 2, pp. 287-305.
6. Eskeland, G. S. & Kong, C. (1998). Protecting the Environment and the Poor: A Public Goods Framework and an application to Indonesia. Development Research Group. *The World Bank*.
7. Heath, J. & Binswanger, H. (1996). Natural Resource Degradation Effects of Poverty and Population Growth are Largely Policy Induced: The Case of Columbia. *Environment and Development Economics*. Vol. 1, Part 1, pp. 65-83.
8. Van de Walle, D. (2000). Choosing Rural Road Investments to Help Reduce Poverty. Policy research Working Paper No. 2458, *The World Bank*.

Theme 5. Valuation of environmental degradation/conservation

1. Antzen, J. (1998). Economic Valuation of Communal Rangelands in Botswana: A Case Study. CREED Working Paper No. 17.
2. Bishop and Allen, The On-Site Costs of Soil Erosion in Mali, Environment Department Working Paper No. 21.
3. Bojo, J. (1996). The costs of land Degradation in Sub-Saharan Africa. *Ecological Economics* 16, pp. 161-173.
4. Brandon, C. & Hommann, K. (1995). Valuing Environmental Costs in Pakistan: The Economy-wide impact of Environmental Degradation. *The World Bank*: Washington DC.
5. Brandon, C. (1995). The Cost of Inaction: valuing the Economy-Wide Cost of Environmental Degradation in India. Asia Environment Division, *The World Bank*: Washington DC.
6. Daily, G. C. et al. (2000). The Value of Nature and the Nature of Value. *Science*. Vol. 289, pp. 395-396. <http://www.science.org>
7. Godoy, R. et al. (2000). Valuation of Consumption and Sale of Forest Goods from a Central American Rain Forest. *Nature*. Vol. 406, July 6.
8. Hughes, G. et al. (1997). Can the Environment Wait? Priorities for East Asia. *The World Bank*: Washington DC.
9. Johnson, T. et al. (1997). Clear Water, Blue Skies: China's Environment in the New Century. *The World Bank*: Washington DC.
10. Kramer, R. et al. (1995). Valuing Tropical Forests: Methodology and Case Study of Madagascar. World Bank Environment Paper No. 13. *The World Bank*.
11. Larson, B. et al. (1999). The Economics of Air Pollution Health risks in Russia: A Case Study of Volgograd. *World Development*. Vol. 27, No. 10, pp. 1803-1819. (Note: Does not look at impact on different socio-economic groups)
12. Repetto, R. et al. (1989). *Wasting Assets: Natural Resources in the National Income Accounts*. World Resources Institute: Washington D.C.
13. Tongeren, J. V. et al. Integrated Environmental and Economic Accounting: A Case Study for Mexico. Environment Working Paper No. 50. *The World Bank*.
14. Winter-Nelson, A. (1995). Natural Resources, National Income, and Economic Growth in Africa. *World Development*, Vol. 23, No. 9, pp.1507-1519.

Theme 6. Articles on micro-economic behavior of smallholder farmers/urban dwellers (resource use and conservation decisions, response to natural resource scarcity, valuation of environmental services, etc)

1. Adegbidi, A, et al. (1999). Farmer's perceptions and Sustainable land Use in the Atacora, Benin. CREED Working Paper No. 22. International Institute for Environment and Development.
2. Aheeyar, M.M. (1998). Small Holder Farmers, Poverty and Land Degradation: Evidence from Sri Lanka. Working Paper, HK/Agrarian Research and training Institute, Columbo. Email: hartilib@slt.lk
3. Altaf, M. A. (1996). Household demand for Improved Solid Waste Management: A Case Study of Gujranwala, Pakistan. *World Development*, Vol. 24, No. 5, pp. 857-868.
4. Amacher, G, et al. (1996). Household Fuelwood Demand and Supply in Nepal's Tarai and Mid Hills: Choice Between Cash Outlays and labor Opportunity. *World Development*. Vol. 24, No. 11, p. 1725-1736.
5. Barbier, E. (1990). The Farm-Level Economics of Soil Conservation: The Uplands of Java. *Land Economics*. Vol. 66, No. 2, pp. 199-211.
6. Briscoe, J. et.al. (1990). Toward Equitable and Sustainable Rural Water Supplies: A Contingent valuation study in Brazil. *The World Bank Economic Review*. Vol. 4, No. 2., 115-134.
7. Brouwer, I. D. et al. (1997). When Households Run out of Fuel: Responses of Rural Housholds to Decreasing Fuelwood Availability, Ntcheu District, Malawi. *World Development*.
8. Godoy, R. et al. (1997). Household determinants of Deforestation by Amerindians in Honduras. *World Development*. Vol. 25, No. 6, pp. 977-987.
9. Holden, S. T., Shiferaw, B. & Wik, M. (1998). Poverty, Market Imperfections and Time Preferences: Of Relevance for Environmental Policy? *Environment and Development Economics*.
10. Linde-Rahr, M. (1998). Rural Reforestation: Gender Effects on Private Investments in Vietnam. Working paper, Department of Economics, Göteborg University. Email:martin.linde-rahr@economics.gu.se.
11. Mekonnen, A. (2000). Valuation of community forestry in Ethiopia: a contingent valuation study of rural households. *Environment and Development Economics*. Vol. 5. pp. 289-308.
9. Monela, G.C. (2000). Household Livelihood Strategies in the Miombo Woodlands of Tanzania: Emerging Trends. To appear in Tanzania Journal of Forestry and Nature Conservation, Vol. 73. p. 1-18.
12. Shiferaw, B & Holden, S. (1999) Soil Erosion and Smallholder's conservation decisions in the Highlands of Ethiopia. *World Development*. Vol. 27, No. 4, 739-752.

13. Shiferaw, B & Holden, S. (1998). Investment in Soil Conservation in the Ethiopian Highlands: Does it Pay Small Farmers? Discussion Paper #D-32.
14. Whittington, D. et al. (1996). The Economic Benefits of Malaria Control: A Contingent valuation Study in Marracuene, Mozambique. Unpublished Manuscript.
15. Whittington, D. et al. (1993). Strategy for Cost recovery in the rural Water Sector: A Case Study of Nsukka District, Anambra, Nigeria. *Water Resources Research*, Vol. 26, No. 9, pp.1899-1913.
16. Whittington, D. et al. (1993). Household Demand for Improved Sanitation Services in Kumasi, Ghana: A Contingent Valuation Study. *Water Resources Research*, Vol. 29, No. 6, pp. 1539-1560.

Theme 7: Gender, Poverty and Environment / Natural Resource Management

1. Agarwal, B. (1997). Gender, Environment and Poverty Interlinks: Regional Variations and Temporal Shifts in Rural India, 1971-1991. *World Development*, Vol. 25, No. 1, pp. 23-52.
2. Devasia, L. (1998). Safe Drinking Water and its Acquisition: Rural Women's Participation in Water Management in Maharashtra, India. *Water Resources Development*, Vol. 14, No. 4, 537-546. **
3. Green, C. & Baden, S. (1995). Integrated Water Resources Management: A Gender Perspective. *IDS Bulletin*, Vol. 26, No. 1, pp. 92-101. **
4. Heyzer, N. (1995). Gender, Population and Environment in the Context of Deforestation: A Malaysian Case Study. *IDS Bulletin*, Vol. 26, No. 1, pp. 40-46. **
5. Joekes, S. (1995). Gender and Livelihoods in Northern Pakistan. *IDS Bulletin*, Vol. 26, pp. 66-74. **
6. Lastarria-Cornheil, S. (1997). Impact of Privatization on Gender and Property Rights in Africa. *World Development*, Vol. 25, No. 8, pp. 1317-1333. **
7. Meinzen-Dick, R. et al. (1997). Gender, Property Rights and Natural Resources. *World Development*, Vol. 25, No. 8, pp.1301-1315. **
8. Rocheleau, D. & Edmunds, D. (1997). Women, Men and Trees : Gender, Power and Property in Forest and Agrarian Landscapes. *World Development*, Vol. 25, No. 8, pp. 1351-1371. **
9. Sarin, M. (1995). Regenerating India's Forests: Reconciling Gender Equity with Joint Forest Management. *IDS Bulletin*, Vol. 26, No. 1, pp. 83-91.
10. Shreshtha, P. L. (1998). Conservation and Management of Watershed Region by Nepalese Women Leading to Enhancement of Water Potential. *Water Resources Development*. Vol. 14, No. 4, pp. 513-525.

11. Songsore, J. and Mc Granahan, G. (1998). The Political Economy of Household Environmental Management: Gender, Environment and Epidemiology in the Greater Accra Metropolitan Area. *World Development*, Vol. 26, No. 3, pp. 395-412.
12. Surjadi, C. (1993). Respiratory diseases of mothers and children and environmental factors among households in Jakarta. *Environment and Urbanization*, Vol. 5(2):78-86.
13. Thapa, K. K. Bilborrow, R.E. & Murphy, L. (1996). Deforestation, Land Use, and Women's Agricultural Activities in the Ecuadorian Amazon. *World Development*. Vol. 24, No. 8, pp.1317-1332. (Also included in Theme 3)
14. Zwartveen, M. Z. (1997). Water: From Basic Need to Commodity: A Discussion on Gender and Water Rights in the Context of Irrigation. *World Development*, Vol. 25, No. 8, pp.1335-1349. **

Theme 8: Property Rights and natural resource management (The issues here cut across with issues in Themes 9 and 10)

1. Beck, T & Nesmith, C. (2001). Building on Poor People's Capacities: The Case of Common Property resources in India and West Africa. *World Development*, Vol. 29, No. 1, pp. 119-133. **
2. Delville, P. L. (1998). Harmonising Formal Law and Customary Land Rights In French-Speaking West Africa. IIED Issue Paper # 86. <http://www.iied.org/drylands/pubs.html> **
3. Godoy, R et. al. (1998). The role of tenure security and private time preference in Neotropical deforestation. *Land Economics*, Vol. 74, No. 2, p. 162-170.
4. Hoy, M. & Jimenez, E. (1996). The Impact on the Urban Environment of Incomplete Property Rights. Working Paper No. 14. Policy Research Department. *The World Bank*.
5. McKean, M, Ostrom, E. Dembner, S. & Hess, C. (year). Common Property Regimes in the Forest: Just a Relic from the Past? *Unasylva*, No. 180. 1-17. Downloaded from <http://www.fao.org/v3960/v3960e03.htm> **
6. Mwebaza, R. (1999). How to integrate Statutory and Customary Tenure? The Uganda Case. IIED Issue Paper # 83. <http://www.iied.org/drylands/pubs.html> **
7. Saxena, N. C. (1988). Social Forestry in UP Hills, International Center for Integrated Mountain Development, Kathmandu.
8. Somanathan, E. (1991). Deforestation, Property Rights and Incentives in Central Himalaya. *Economic and Political Weekly*, Vol. 26, No. 4, pp. PE-71—PE-46. **
9. Southgate, Sierra and Brown. (1991). The Causes of Tropical Deforestation in Ecuador: A Statistical Analysis. *World Development*. Vol. 19, pp. 1145-1151.
10. Wunder, S. (2000). *The Economics of Deforestation: The Example of Ecuador*. Macmillan Press.

Theme 9: The role of the State, decentralization and debates over participation and community based management (Sub theme: Environment and Empowerment)

1. Agarwal, A. & Gibson, C. (1999). Enchantment and Disenchantment: The Role of Community in Natural Resource Management. *World Development*. Vol. 27, No. 4, pp. 629-649. **
2. Aggarwal, R. (2000). Possibilities and Limitations to Cooperation in Small Groups: The Case of Group-Owned Wells in South India. *World Development*. Vol. 28, No. 8, pp. 1481-1497.
3. Ahluwalia, M. (1997). Representing Communities: The Case of a Community-Based Watershed Management Project in Rajasthan, India. *IDS Bulletin*, Vol. 28, No. 4, pp. 23-34.**
4. Baland, J. & Platteau, J. (1999). The Ambiguous Impact of Inequality on Local Resource Management. *World Development*. Vol. 27, No. 5, pp. 773-788.
5. Cleaver, F. (1999). Paradoxes of Participation: Questioning Participatory Approaches to Development. *Journal of International Development*. 11, pp. 597-612.
6. Cramb, R.A. et al. (2000). Conservation Farming Projects in the Philippine Uplands: Rhetoric and Reality. *World Development*. Vol. 28, No. 5, pp. 911-927.
7. Devkota, S. R. (1999). Environment Management in Nepal: Unmanaging the Manageable. *Ecological Economics*, 28, pp. 31-40. **
8. Infield, M. & Adams, W. (1999). Institutional Sustainability and Community Conservation: A Case Study from Uganda. *Journal of International Development*. 11, pp. 305-315.
9. Ite, U. & Adams, W. (2000). Expectations, Impacts and Attitudes: Conservation and Development in Cross National Park, Nigeria. *Journal of International Development*. Vol. 12, pp. 325-342.
10. Jones, B. T. B. (1999). Policy Lessons from the Evolution of a Community Based Approach to Wildlife Management, Kunene Region, Namibia. *Journal of International Development*. 11, pp. 295-304. **
11. Kleemeier, E. (2000). The Impact of Participation on Sustainability: An Analysis of the Malawi Rural Piped Scheme Program. *World Development*. Vol. 28, No. 5, pp. 929-944.
12. Lam, W. (1996). Institutional Design of Public Agencies and Co-Production: A Study of Irrigation Associations in Taiwan. *World Development*. Vol. 24, No. 6, pp. 1039-1054. **
13. Lam, W. (1996). Improving the Performance of Small-Scale Irrigation Systems: The Effects of Technological Investments and Governance Structure on Irrigation Performance in Nepal. *World Development*. Vol. 24, No. 8, pp. 1301-1315.

14. Leach, M, Mearns, R. & Scoones, I. (1999). Environmental Entitlements: Dynamics and Institutions in Community-Based natural Resource Management. *World Development*. Vol. 27, No. 2, pp. 225-247. **
15. Lee, Yok-Shiu F. (1998). Intermediary Institutions, Community Organizations, and Urban Environmental management : The Case of Three Bangkok Slums. *World Development*. Vol. 26, No. 6, pp. 993-1011.
16. Ostrom, E. (1996). Crossing the Great Divide : Coproduction, synergy and Development. *World Development*. Vol. 24, No. 6, pp. 1073-1088. **
17. Porter, G. & Young, E. (1998). Decentralized Environmental Management and Popular Participation in Coastal Ghana. *Journal of International Development*. 10, pp. 515-526.
18. Roe, D et al. (2000). *Evaluating Eden: Exploring the Myths and Realities of Community-Based Wildlife Management*. Evaluating Eden Series No. 8. London: IIED. **
19. Singh, R. K. (2000). Participatory Forest Management in Madhya Pradesh. FAO, Rome.
20. Songorwa, A. N. (1999). Community-Based Wildlife management (CWM) in Tanzania: Are the Communities Interested? *World Development*. Vol. 27, No. 12, pp. 2061-2079. **
21. Thornburn, C. (2000). Changing Customary Marine Resource Management Practice and Institutions: The Case of Sasi Lola in the Kei Islands, Indonesia. *World Development*. Vol. 28, No. 8, pp. 1461-1479. **
22. Wade, R. (1988). The Management of Irrigation Systems: How to Evoke Trust and Avoid Prisoners' Dilemma. *World Development*. Vol. 16, No. 4, pp. 489-500. **
23. Wainwright, C. & Wehrmeyer, W. (1998). Success in Integrating Conservation and Development? A Study from Zambia. *World Development*, Vol. 26, No. 6, pp. 933-944.

Theme 10: The role of social capital in enhancing natural capital (Sub-theme: Environment and Empowerment)

1. Bebbington, A. (1997). Social Capital and Rural Intensification: local organizations and islands of sustainability in the rural Andes. *The Geographic Journal*, 163(2), pp. 189-197. **
2. Bebbington, A. (1998). Sustaining the Andes? Social Capital and Policies for rural Regeneration in Bolivia. *Mountain Research and Development*. Vol. 18, No.2, pp. 173-181.
3. Bebbington, A. & Knopp, A. (1998). Networking and rural Development through sustainable forest management: Frameworks for pluralistic approaches. *Unasylva*. Vol. 49, No. 3. <http://www.fao.org/docrep/w8827E/w8827e04.htm>

4. Bebbington, A. (1999). Capitals and Capabilities: A Framework for Analyzing Peasant Viability, Rural Livelihoods and Poverty. *World Development*, Vol. 27, No. 12, pp. 2021-2044.
5. Chibber, A. (2000). Social capital, the state and development outcomes. In Dasgupta, P. & Serageldin, I. (eds.) *Social Capital: A multiperspective approach*. The World Bank: Washington D.C.
6. Coleman, J.(1988). Social Capital in the Creation of Human Capital. *American Journal of Sociology*. No. 94. Supplement
7. Dasgupta, P. (2000). Economic Progress and the Idea of Social Capital. In Dasgupta, P. & Serageldin, I. (eds.) *Social Capital: A multiperspective approach*. The World Bank: Washington D.C.
8. Evans, P. (1996). Government Action, Social Capital and Development: Reviewing the Evidence on Synergy. *World Development*, Vol. 24, No. 6, pp. 1119-1132.
9. Fox, J. (1996). How does Civil Society Thicken? The Political Construction of Social Capital in Rural Mexico. *World Development*, Vol. 24, No. 6, pp. 1089-1103.
10. Grootaert, C. (1997). Social capital, the missing link? In Expanding the Measure of Wealth: Indicators of Environmentally Sustainable Development. ESSD and Monograph Series. No. 17. *The World Bank* : Washington D.C.
11. Harriss, J. & De Renzo, P. (1997). Missing Link or Analytically Missing?: The Concept of Social Capital. An Introductory Bibliographic Essay. *Journal of International Development*. Vol. 9, No. 7, pp. 919-937.
12. Helliwell, J. & Putnam, R. D. (1995). Economic Growth and Social Capital in Italy. *Eastern Economic Journal*. Vol. 21, No. 3.
13. Narayan, D. & Pritchett, L. (2000). Social Capital: Evidence and Implications (Case Study on Tanzania). In Dasgupta, P. & Serageldin, I. (eds.) *Social Capital: A multiperspective approach*. The World Bank: Washington D.C.
14. Krishna, A. (1999). Mapping and Measureing Social Capital: A Conceptual and Empirical Study of Collective action for conserving and developing Watersheds in Rajasthan, India. Social Capital Initiative, Working Paper No. 13. The World Bank: Washington D.C.
15. Krishna, A. (2000). Creating and Hanessing Social Capital. In Dasgupta, P. & Serageldin, I. (eds.) *Social Capital: A multiperspective approach*. The World Bank: Washington D.C.
16. Ostrom, Eleanor. (2000). Social Capital: A Fad or a Fundamental Concept? In Dasgupta, P. & Serageldin, I. (eds.) *Social Capital: A multiperspective approach*. The World Bank: Washington D.C.
17. Pretty J. & Ward, H. (2001). Social Capital and the Environment. *World Development*. Vol. 29, No. 2, pp. 209-227.

18. Paragal, S. et. al. (year). Private Provision of a Public good: Social Capital and Solid Waste Management in Dhaka, Bangladesh. Downloaded from (write web site).
19. Serageldin, I. (1996). Sustainability as Opportunity and the problem of Social Capital. *The Brown Journal of World Affairs*. 3(2) (Summer/Fall).
20. Serageldin, I. & Grootaert, C. (2000). Defining Social Capital: an integrating view. . In Dasgupta, P. & Serageldin, I. (eds.) *Social Capital: A multiperspective approach*. The World Bank: Washington D.C.
21. Stiglitz, J. (2000). Formal and Informal Institutions. In Dasgupta, P. & Serageldin, I. (eds.) *Social Capital: A multiperspective approach*. The World Bank: Washington D.C.
22. Uphoff, N. (2000). Understanding social capital: Learning from the analysis and experience of participation. In Dasgupta, P. & Serageldin, I. (eds.) *Social Capital: A multiperspective approach*. The World Bank: Washington D.C.
23. Uphoff, N. & Wijayarathna, C.M. (2000). Demonstrated Benefits from Social Capital: The Productivity of Farmer Organizations in Gal Oya, Sri Lanka. *World Development*. Vol. 28, No. 11, pp. 1875-1890.
24. Woolcock, M. (1999). Managing Risk, Shocks and Opportunity in Developing Economies: The Role of Social Capital. Downloaded from: (write web site)

Theme 11: Migration, Poverty and Environment

1. Amacher, G. S. & Hyde, W. F. (1996). Migration and the Environment: The Case of Philippine Uplands. *Journal of Philippine Development*, Volume XXIII, No. 2.
2. Amacher, G. et al. (1998). Environmental Motivations for Migration: Population Pressure, poverty and Deforestation in the Philippines. *Land Economics*. Vol. 74, No.1, pp. 92-101.
3. Black, R. & Sessay, M. (1998). Refugees and Environmental Change in West Africa: The Role of Institutions. *Journal of International Development*. 10, pp. 699-713.
4. Chopra, K. & Gulati, S.C. (1998). Environmental Degradation, Property Rights and Population Movements: Hypothesis and Evidence from Rajasthan. *Environment and Development Economics*. Vol. (), pp 35-57.
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Theme 12: Poverty and Natural Disasters

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Theme 13: Good Practice Case studies on poverty alleviation and environment

1) CAMPFIRE

1. Matzke, G. E. & Nabane, N. (1996). Outcomes of a Community Controlled Wildlife Program in a Zambezi Valley Community. *Human Ecology*. Vol. 24, No. 1, 65-85.
2. Murindagomo, F. (1992). Wildlife Management in Zimbabwe: the CAMPFIRE programme. *Unasylva*. 168, Vol. 13.
3. Murombedzi, J. C. (1999). Devolution and Stewardship in Zimbabwe's Campfire Programme. *Journal of International Development*. 11, 287-293.

2) Watershed management in Madhya Pradesh, India

1. Regaining Paradise. State of India's Environment: The Citizen's 5th Report. Center for Science and Environment (Case study).

3) Joint Forest Management in Andhra Pradesh

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4) Sodic Lands Project

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Theme 15: Sustainable development (See Themes 9 and 10 for case studies on conservation and development)

1. Anand, S. & Sen, A. Human Development and Economic Sustainability. *World Development*. Vol. 28, No. 12, pp. 2029-2049.
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4. Tiffen, M. (1993). Productivity and Environmental Conservation Under Rapid Population Growth: A Case Study of Machakos District. *Journal of International Development*, Vol. 5, No. 2, pp. 207-223.

Theme 19: Markets based mechanisms and Sustainable Development

1. Moser, T. (2001). MNCs and Sustainable Business Practice: The Case of the Columbian and Peruvian Petroleum Industries. *World Development*. Vol. 29, No. 2, pp. 291-309.

2. Richards, M. (2000). Can Sustainable Tropical Forestry be Made Profitable? The Potential and Limitations of Innovative Incentive Mechanisms. *World Development*, Vol. 28, No. 6, pp. 1001-1016.
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Section B: Selected Abstracts

Theme 1: Environment, poverty and health impact

1. Songsore, J and Mc Granahan, G. (1993). Environment, Wealth and Health: Towards an analysis of intra-urban differentials within the Greater Accra Metropolitan Area, Ghana. *Environment and Urbanization*, Vol. 5, No. 2.

Abstract: The focus of this paper is to look at the links between household environment, health and socio-economic status. The authors' main point is that intra-urban differences in morbidity and mortality can be explained in terms of unequal access to resources that help households protect themselves from environmental risks. The study draws upon a survey of 1000 households in the Greater Accra Metropolitan area, Ghana. A wealth index defined in terms of possession of eight consumer durables and the frequency of consumption of meat poultry or fish was used to create wealth quintiles so that comparisons could be made between the poorest 20% of the population and the richest 20% of the population. The study specifically focuses on respiratory and diarrheal diseases for children under the age of 6.

The authors find a strong correlation between socio-economic characteristics and children's diarrhea prevalence. Thus 22% children in the poorest quintile but only 9% in the richest quintile were subject to diarrhea in the two weeks prior to the interview. The links between respiratory diseases and wealth are weaker but suggest a negative relationship for women and children.

The authors explain this disparity in terms of differences in access to various environmental services (safe water, sewerage), lack of knowledge or inability to prevent diseases. The poor, they argue, often lack knowledge or means to effectively prevent diseases, are exposed to more health hazards, are subject to more crowding (that is more people share toilets and housing space), and are therefore more subject to parasitic and diarrheal infections. For instance, while 78% of the richest quintile had access to in-house piped water, only 6.3% of the poorest quintile had this resource. 69% of the poorest but only 12% of the richest shared toilets with more than ten persons. Measures of crowding indicated that 71% of the poorest households but only 34% of the richest households occupy less than 4 square meters/person in the sleeping room. According to the authors, greater incidence of some infections amongst the poor, especially parasitic and diarrheal infections, can be explained in terms of poor food handling, storage and hygiene practices. 61% of the poorest but only 33% of the richest households in Accra depend on food vendors for daily intake, vendors being a potential source of contaminated food. 83% of the richest but only 3% of the poorest stored food in refrigerators.

2. Doumani, F. & Listorti, J. (2000). Environmental Health: Bridging the Gaps (Case study on Ghana). *The World Bank*.

Abstract: The purpose of this study is to mainstream environmental health into World Bank operations, especially environmental assessments. The study has three parts. Part 1 provides background on environmental health and outlines an approach to reducing poverty by addressing environmental health problems. This involves harmonizing sectoral approaches through targeted collaboration to tap health benefits outside the health care system, benefits that tend to be missed. It departs from the single sector approach to service delivery which tends to underestimate the environmental health benefits possible through a multi-sectoral approach. Part 2 presents the basic tools needed to implement this approach. Part 3 presents findings of and background for a workshop in Ghana that puts into practice the ideas presented in Parts 1 and 2.

Abstract of Chapter 3

Many of the underlying causes of disease, injury and death in developing countries lie outside the realm of the health care system. They are related to the absence of basic services, such as potable water, decent housing with proper ventilation, non-polluting household fuels, and proper sanitation and waste disposal, services usually taken for granted in developed countries. Yet, the health sector tends to focus on interventions within the health care delivery system and not on sectors that are the source of the problem. In this chapter, the authors show that environmental health measures can target an equal or greater share of the BOD compared to the health sector for a fraction of the cost of health sector interventions. Moreover, they quantify and value in terms of social costs, the environmental health burden of disease and apportion the environmental health burden of disease (BOD) borne by the poor. The chapter also prioritizes a cluster of interventions based on environmental health BOD (measured in terms of DALYs) to relieve the burden on the entire population and on the poor. BOD is disaggregated and reaggregated which allows for back of the envelope calculations on the SSA burden of disease that can be targeted through environment health and health care interventions. These are quantified in terms of lower-bound social cost to SSA economies.

Specifically, the authors show that environmental health remedial measures can target roughly 20% of the BOD for the entire population in SSA compared to approximately 18% achieved by the health care delivery system, for the same targeted diseases. Moreover, while the former can target 10% of the BOD for the poorest quintile, the latter can target only 9% (Table 3-8). The authors consider 5 types of infrastructure investments namely (a) improved indoor air quality, (b) improved outdoor air quality, (c) improved transport management, (d) improved water sanitation and waste management, and (e) vector control through improved land use management, and improved drainage and irrigation. They show that DALYs saved through indoor air interventions that is 19.2 million DALYs or almost 6% of the SSA BOD are by far the most cost-effective among the five interventions. By comparison, the social benefits of investments in outdoor air quality are negative. That is, for every \$1.0 spent on improving outdoor air quality, only \$ 0.90 is recouped (Table 3-9). Cost-effectiveness interventions per environmental health DALY saved were compiled from different studies and the \$/DALY saved numbers rely on global averages or a small sample of studies.

Theme 2: Poor's dependence on natural resources

1. Cavendish, W. (1998). *The Complexity of the Commons: Environment Resource Demands in Rural Zimbabwe*. Center for the Studies of African Economies. Working Paper Series 99-8.

Abstract: This paper looks at one aspect of the poverty-environment relationship, namely that between rural households and natural resource utilization and change. Its main argument is that freely available natural resources or the “commons” provide rural households with a range of goods and not simply a single homogenous good as is often assumed. Further these goods are significantly differentiated in economic terms being utilized by rural households as consumption goods, consumer durables, production inputs, inputs into productive capital and as assets. Various factors affect their utilization such as the household's spatial location, the opportunity cost of labor, relative price of environmental goods, household income, harvesting and processing technologies, resource scarcity. Thus each of these resources can be affected quite differently by changes in exogenous parameters. Cavendish argues that this constitutes the complexity of the commons, a feature not represented in standard models of characterizing the poverty-environment relationship.

The bulk of the paper provides econometric substantiation for the claim of resource differentiation and utilization. This is based on data set drawn from 29 villages in Shindi Ward, Chivi District in south-eastern Zimbabwe. Results from environmental demand regressions support the assumption of economic differentiation of natural resources and their multiple uses by rural households. Estimated income elasticities differ across goods and species, and there is evidence that other determinants of demand such as species substitutes and backstops, scarcity and household structure also affect different goods in different ways. By providing evidence for natural resource differentiation this paper fills an important gap in the literature where quantitative studies that integrate the value and use of a *broad range* of environmental resources alongside more standard set of household economic activities is scarce.

2. Cavendish, W. (1999). Poverty, Inequality and Environmental Resources: Quantitative Analysis of Rural Households. *Center for the Studies of African Economies*. Working Paper Series 99-9.

Abstract: Although rural households are taken to rely substantially on freely available environmental resources, few studies have attempted to quantify the contribution of environmental resources to household welfare. Most standard household budget surveys omit this source of household income. In this paper, Cavendish examines the impact of including this missing source of household income on the measurement and causes of rural poverty and inequality. This is done using a purpose collected 213 household data set from rural Zimbabwe. The study shows that incorporating environmental income in household accounts results in dramatic and significant reductions in measured poverty, 50% or more over income as conventionally measured. Environmental income is also strongly equalizing, bringing about a roughly 30% reduction in measured inequality. Thus, access to commons has a substantial impact on rural poverty and inequality, and omitting these activities from the income measure systematically overstates inequality and poverty measures. However, contrary to what one might expect, the inclusion of environmental income surprisingly had very little effect on the analysis of the causes of inequality and poverty. Differences in access to formal labor markets and inequalities in land distribution emerged as the main determinants of rural inequality in the study area. Variations in the cash income from formal wage employment and agriculture are the two most important sources of rural inequality. One explanation for this puzzle could be in the presence of entry barriers in these other economic activities which are likely to generate a surplus. Cavendish argues that since environmental income sources are entry free, they are disproportionately undertaken by rural households and are also low return. Hence they play little role in helping households overcome accumulation constraints that impede the household from raising its income significantly.

3. Cavendish, W. (1999). Empirical Regularities in the Poverty-Environment relationship of African rural Households. *Center for the Studies of African Economies*. Working Paper Series 99-21.

Abstract: Conventional household surveys usually ignore the contribution of environmental resources to household income. Hence analysis of rural households and environmental resources is beset by inadequate data and little is known about the value of environmental resources in terms of overall household welfare. Using purpose collected data in 1993/94 and 1996/7 from Shindi Ward in southern Zimbabwe, involving a random sample of 197 panel households in 29 villages, Cavendish provides quantitative evidence for a number of regularities that characterize environmental resource use by rural households. In particular, his study shows that environmental resources contribute significantly to rural incomes, comprising roughly 35% of average total income. Further, the contribution of some of the environmental sources from which the poor derive their income is equal to or greater than other income sources such as cash crop production,

unskilled labor income, income from small-scale enterprises that have received much more attention in the literature. An important finding of Cavendish's study is that poorer households are much more dependent on environmental resources than richer households. While the poorest quintile generate 40% of their total income from environmental resources, the figure for the richest quintile is 29%. However, even though the poor are more resource dependent than the rich, in quantity terms they are not the main users of environmental resources. Data shows that the richest quintile consumes approximately 3-4 times the value and hence quantity of environmental resources compared to the poorest quintile. This suggests that comparative affluence rather than comparative poverty could be the main issue of concern. The study affirms the importance of maintaining the commons especially from the perspective of the welfare of poorer households. Moreover, it points out that studies that ignore the contribution of environmental resource utilizations, miscalculate measurements of many rural phenomena such as incomes, consumption, and expenditure.

4. Rahman, H. Z. (1995) Ecological Reserves and Expenditure Saving Scope for the Poor. In Rahman & Hossain (Eds.) *Rethinking Rural Poverty: Bangladesh as a Case Study* Sage Publications: New Delhi.

Abstract: In this article the author distinguishes between two types of productive activities that together comprise rural household welfare, namely income earning (such as working for a wage in agriculture) activities and expenditure saving (such as fuelwood collection, collection of house-building materials from village commons) activities. Overall household welfare is an outcome of both types of activities. The main focus is to measure the extent to which expenditure saving activities contribute to the welfare of poor households. The authors estimate annual savings on expenditure on three items, fuel, house-building materials and fruits/vegetables from survey data gathered from 62 sample villages in Bangladesh between 1985-1990, covering all geographic areas of the country. Their study shows that expenditure saving activities contribute approximately 20% to the annual household welfare of the landless and approximately 4% to the total household welfare in the case of large landowners. What is striking is that these estimates do not include the value of fish obtained from common access waters, which is very significant in Bangladesh. Thus, Rahman's study emphasizes the importance of ecological reserves in the routine functioning of rural household economies.

5. Jodha, N.S. (1986). Common Property Resources and Rural Poor in Dry Regions of India. *Economic and Political Weekly*. Vol. XXI, No. 27, pp. 1169-1181.

Abstract: In his now classic study, Jodha quantifies the extent to which the rural poor benefit from common property resources (CPRs). His argument is that the decline of CPRs, in part a consequence of privatization of CPRs, results in the subsequent pauperization of the poor. The study, based on data from 80 villages in 21 districts in dry regions of seven states in India, reveals several important findings. It shows that poor households ("poor" refers to landless laborers and small farmers with less than 2 ha of dryland.) are much more dependent on CPRs than larger farm households. For instance, while 95% of the poor households in Andhra Pradesh were dependent on CPRs for food items, only 10% of the larger farm households were dependent on CPRs for food. Further, Jodha's study shows that income from CPRs account for a larger percentage of income from all other sources for poor households compared to better off households. Thus, CPRs accounted for 15-23% of total income from all other sources for the poor households. The corresponding figure for larger farm households was only 1-3%. The study also reveals considerable inter-regional variation in household's dependence on CPRs. For instance, while in

Mahabubnagar, Andhra Pradesh 84% of poor households were dependent upon CPRs for fuelwood, the figure for Sabarkantha, Gujarat is 66%.

The evidence presented in this study is based on field studies of CPRs conducted during 1982-1985. The method included regular monitoring structured surveys, physical verification/measurement, oral history, and participant observations from people in each district. The above information was supplemented by longitudinal data available from ICRISAT's village level studies.

6. Jodha, N.S. (1991). Rural Common Property Resources: A Growing Crisis. IIED. Gatekeeper Series No. 24.

Note: This is an abbreviated version of Jodha's 1986 study published in a different outlet.

Theme 3: Role of policy in influencing poverty and land degradation problems.

1. Barbier, E (2000). The economic linkages between rural poverty and land degradation: some evidence from Africa. *Agriculture, Ecosystems and Environment*, Vol. 82, Issues 1-3 (I am getting this article through inter-library loan).

Abstract: This paper focuses on the potential role of policy in influencing the poverty and land degradation problems facing Africa. This is done through exploring a few case studies, chosen from a broad spectrum of African countries—Sudan, Malawi, Nigeria, Ghana and Kenya. The first case study examines the comparative returns to the gum arabic agroforestry system cultivated by poor farmers in Northern Sudan, and the role of policies in influencing these returns. The second explores how erratic agricultural pricing policies in Malawi during the 1980s may have distorted the incentives of poor smallholders to adopt less erosive crops in their farming systems. The third case study illustrates how inappropriate policies and investments can cause displacement of poorer rural groups from their traditional farming and grazing lands, by examining the loss of a major floodplain due to dam building in northern Nigeria. The final two case studies are concerned with policy lessons learned. The first looks at the impact of a macro-economic adjustment policy—in this case trade liberalization—on farmer's decisions to expand cultivated area rather than intensify crop production in western Ghana. The final case study examines the role of policy in land management success story in Africa, the Machakos district, Kenya, and explores the critical question of whether this success can be replicated elsewhere in Africa. These case studies serve two important functions. First, they demonstrate how policy analysis can be effective in highlighting key dimensions of the poverty-environment linkages underlying land degradation. Second, they illustrate how both good and bad policies can affect the economic incentives determining poor rural household's decisions to conserve or degrade their land.

Theme 6: Articles on micro-economic behaviour of smallholder farmers/urban dwellers (resource use and conservation decisions; response to natural resource scarcity etc.)

1. Brouwer, I. D. et al. (1997). When Households Run out of Fuel: Responses of Rural Households to Decreasing Fuelwood Availability, Ntcheu District, Malawi.

Abstract: The focus of this paper is to look at the strategies that rural households use to cope with decreasing fuelwood availability. The authors argue that fuelwood scarcity does not automatically result in collection of fuelwood at greater distances, neither is more time necessarily spent in collecting fuelwood as is often assumed in the literature. A comparison of 4 different villages in central Malawi showed that with increasing distance to woodlots, household members initially

collected at greater distances. But when distance to woodlots increased beyond a certain point, they collected alternative resources (such as twigs) from nearby places, often switching over to lower quality wood. Moreover, the study shows that households *within* the same village also show considerable variation in the way they respond to fuelwood shortage. The distance household members chose to travel and the time they spent collecting fuelwood depended upon labor availability. That is, larger households and households with more adult females tended to collect fuelwood more frequently and at greater distances.

2. Shiferaw, B & Holden, S. (1999) Soil Erosion and Smallholder's conservation decisions in the Highlands of Ethiopia. *World Development* Vol. 27, No. 4, pp. 739-752.

Abstract: In Ethiopia, land degradation mainly due to soil erosion and nutrient depletion is one of the most serious environmental problems. The Ethiopian highlands which account for 95% of the cultivated area and support about 88% and 75% of the human and livestock populations respectively, have been classified as suffering from severe to moderate soil degradation. Soil erosion results in loss of productive land and undermines rural livelihoods.

The focus of this article is to look at smallholders' resource use and conservation decisions in the Ethiopian highlands. The authors use an applied non-separable model to examine the conditions under which smallholders will adopt soil conservation measures. In order to examine small holder responses, the authors assume three different scenarios, where average anticipated yields are 20% less than conventional farming, same as conventional farming and 20% more than conventional farming. Moreover, for several different discount rates, they simulate farmer responses both in the short run and long run. The authors argue that in the short run when peasants anticipate lower or the same returns from switching over to a soil conserving technology, they will not invest in soil conservation methods because of substantial installation costs. Only when private discount rates are as low as 5-10%, would some conservation plan become part of the optimal farm plan. Even in the long run, conservation will not become part of the farmers' optimal production plan if it reduces the productivity of the land. Their research shows that for a private discount rate of 5%, in the long run 78% of the land can be conserved compared to 39% in the short run. Moreover, in the long run even for high discount rates, some conservation can occur even if the anticipated yields with conservation are same as those with conventional farming. This underscores the need for policy incentives in the short term to persuade farmers to install conservation practices. The authors conclude by stressing the need for conservation policies that can both enable erosion control and produce higher yields.

Theme 10: The role of social capital in enhancing natural capital (Sub-theme: Environment and Empowerment)

Tiffen, M. (1993). Productivity and Environmental Conservation Under Rapid Population Growth: A Case Study of Machakos District. *Journal of International Development*, Vol. 5, No. 2, pp. 207-223. (See also Tiffen, M., Mortimore, M & Gichuki, F. (1994) *More people, less erosion : environmental recovery in Kenya*. J. Wiley: New York.

Abstract: A prevailing view regarding the relationship between population and environmental degradation is that any agro-ecological region has a population supporting capacity and environmental degradation results if the population exceeds that threshold. Contrary to this perspective, in this article, Tiffen argues that under certain conditions, increasing population density can be an important motivating factor for economic growth, without necessarily resulting in long-term environmental degradation. She demonstrates this through a case study in Machakos district, Kenya, covering a span of 60 years from 1930-1990.

According to Tiffen, in the 1930s and 1940s, the cultivated and grazing land in many parts of Machakos district was severely eroded. The population density was 60 persons/sq kms, which according to some had exceeded the carrying capacity of the land. By 1990 however, there was much less soil erosion, almost none of cultivated land and more animal and crop production on a district basis. Although there was a real dip in output per hectare in 1957, as people spread on to more land, from 1960-1977, output per head rose more steeply than population density. Moreover, income per head increased due to growth in non-farm incomes. At the household level, farmers invested in terms of capital and labor in making terraces, hedging and fencing, building dams, buying equipment, planting tree seedlings, investing in improved livestock, etc. and put increased working capital to finance the two seasons and secure timely operations. At the community level, there were investments in gully stopping, dip construction, coffee processing plants, and construction of roads and dams.

According to Tiffen the explanation for increasing productivity in terms of output per capita and per hectare as population grew does not lie in better rainfall that has been quite erratic. Government interventions, such as the construction of compulsory terraces many of which collapsed, also do not explain the puzzle. Rather, following Boserup (1965) and Simon (1986), she argues that increasing population density had several positive effects. It resulted in agricultural intensification requiring increased inputs of labor, which in turn provided the impetus for technological innovation. Moreover, she argues that in a semi-arid unpredictable climate where it was difficult to raise money from agriculture, off-farm income provided an important source of capital. This was facilitated by community investment in infrastructure and also in complementary services such as investment in shops, stores, lorries from traders to deliver inputs and consumption goods to collect farm products. For example, roads played a crucial role in linking the district with urban markets such as Nairobi, thus facilitating access to new knowledge and demand. For instance, supporting agricultural technologies came from many different sources, both within and outside the district.

One of the policy implications of Tiffen's study is that government investments in physical and educational infrastructure are more important than direct government investment in agriculture. It also suggests that higher farm gate prices are perhaps the single most important factor to encourage soil and water conservation. The study does not argue that growth rates in excess of 3 per cent are necessarily ideal, especially once densities have increased to a point which provide real economies of scale in infrastructure provision. However, the study does provide an important counterpoint to the assumption that high population densities automatically result in environmental degradation.

Theme 13: Good Practice Case studies on poverty alleviation and environment

1. Murombedzi, J. C. (1999). Devolution and Stewardship in Zimbabwe's Campfire Programme. *Journal of International Development* 11, pp. 287-293.

Abstract: Zimbabwe's CAMPFIRE (Communal Areas Management Programme for Indigenous Resources) program, based on decentralized management of wildlife resources is well recognized

as one of Africa's most successful conservation initiatives. Started in the early 1980s, it involves a shift in power from the central government to local communities and institutions, in particular rural district councils (RDCs) to limit arable agriculture, grazing and livestock through collaborative land use planning. Further, it enables residents of communal lands, primarily poor black people to share the benefits generated by wildlife utilization on those lands. In this paper, the author discusses some of the challenges still faced by the program. He points out that even though revenues are highest in wards where wildlife density is highest and human population density is lowest, Masoka ward (considered as a prime CAMPFIRE ward) continues to actively attract people to come and settle there. This is because the only way to get the government to invest in basic infrastructure is to have a sizable enough population. Further, research shows that most CAMPFIRE wards invest wildlife revenues not in improved wildlife management but in improving agricultural productivity. Moreover, while CAMPFIRE has displaced local economic imperatives, wildlife revenues have not become the main source of household income in CAMPFIRE areas. The author's contention is that problems such as population in migration, extension of cropping and increased livestock numbers arise to a significant degree because the CAMPFIRE program has devolved authority over natural resources from the central government to the RDC but not to the local communities themselves. While local communities can benefit from the use of wildlife by others, they have no right to use wildlife directly. Hence they do not view themselves as joint owners of wildlife and have little stake in investing in wildlife conservation.