

Cultural ecology: placing households in human-environment studies – the cases of tropical forest transitions and agrobiodiversity change

Karl S. Zimmerer

Department of Geography, Institute for Environmental Studies,
University of Wisconsin – Madison, 384 Science Hall,
550 N Park Street, Madison, WI 53706-1491, USA

I Introduction

Cultural ecology is today at a place of rapidly expanding interconnections with the growing number of human-environment approaches in geography and other fields. Productive interconnections are evidenced, for example, in the extensive debate and discussion within geography that surround the varied relations (e.g., theory, methods, roles of science and representation, scale and subject matter) of cultural ecology to political ecology, since the latter is regarded as a chief cognate approach. Sufficient similarities evident in that dialogue led to the renaming of the specialty group within the Association of American Geographers as Cultural and Political Ecology (CAPE). This broadly based cultural ecology is currently counted as one of the most active and popular of the specialty groups within the organization, and it is the largest of the groups that are focused on human-environment interaction. Reaching this position has occurred through a process of incremental growth over the course of the period since 1960 in a range of distinct subfields, such as cultural-historical ecology, human ecology, systems ecology and adaptive-dynamics ecology. Cultural ecology thus conveys the sense of an umbrella approach, which continues to serve as the integrator for a considerable variety of subfields.

While broad in scope, the approach of cultural ecology is also sharing new interconnections with the expanding suite of other human-environment approaches. For example, the 'human dimensions of global change' appears to share a defining emphasis on the interaction of global environmental processes with local actors and institutions that is common to much of cultural ecology. The interconnections of cultural ecology with political ecology and with 'human dimensions' is typically dialogic, often to a high degree, in that most studies associated with one field are actively informed by and engaged with the others. This dialogic tendency in cultural ecology is found also in relation to various other distinctly framed approaches toward human-environment interaction (in geography as well as anthropology, sociology and environmental studies). Several intersecting points

demonstrate an overlap of significant shared interests that reflect potentially fertile dialogues among these approaches. In a series of essays I plan to identify, explore, examine and advance the productive dialogue and debate on various issues (topical, theoretical, methodological) that distinguish the borderland areas of cultural ecology.

It is a particularly good time to examine the place of the household in cultural ecology and related human-environment approaches. As discussed below, recent research is demonstrating the utility of household-level analysis in the design of new frameworks for investigating the spatiotemporally complex and uneven processes of human environmental change. Household-level analysis can offer a much-needed level of finer resolution relative to the spatially aggregated examinations of human-environment interaction that are scaled to the community, region, country or world region level. The bulk of this report is based on examining a couple of core topical areas of research on human interactions with biogeophysical systems, namely tropical forest transitions and agrobiodiversity change, in which several advances rely on household-level analysis. This study argues that cultural ecology (as broadly defined and thus including its substantial overlap with 'human dimensions') is seen as placing continued or even added emphasis on the household-level of analytical frameworks. Yet, at the same time, household-level analysis of the human environment has diminished in political ecology and development studies due to the trenchant critiques begun over a decade ago. Examination of these differences regarding the place of household-level analysis demonstrates the surprisingly distinct trajectories in these two approaches. It is used here to examine how household-level analysis is a distinctive feature of much cultural ecology and overlapping 'human dimensions' research that emphasize human-environment interaction in specific resource systems. Reflecting on related works suggests the advantage of an open framework of the household for incorporation into research design and analysis on human-environment issues.

To depict this pivotal place of present-day household analysis it is worth looking briefly at developments that stem from the formative phase of cultural ecology within geography. Building on Harold Brookfield's 1964 classic 'Questions on the human frontiers of geography', the unit of the household gained centrality in geographical approaches to the human environment (Brookfield, 1964). Brookfield called for the analysis of resource-use behaviors at the level of local settings, which led to the study of households, communities and villages as they interact with conditions produced at larger national and international scales. Key codifications of cultural ecology as a geographical approach, such as the contributions of Denevan and Grossman (Denevan, 1983; Grossman, 1977), created a sense of this expanding subfield as partly synonymous with the household-level analysis of resource use. It was reinforced by the landmark volume on *Smallholders, householders: farm families and the ecology of intensive, sustainable agriculture* (1993) by Robert Netting (who is honored in the main award of the Cultural Ecology Specialty Group of the Association of American Geographers). The emphasis on household-level analysis in these early benchmarks has served as a continuing catalyst for cultural ecology's study of focused human-environment interactions – such as people-forest, people-wildlife, people-food plant and people-soils interactions – which are a mainstay of ongoing research in the sub-field (Bassett and Zimmerer, 2003).

Cultural ecology's reliance on household-level analysis has echoed a remarkable crescendo of studies undertaken by a wide array of social sciences during the 1960s and into the 1980s. Household studies were proliferating in economics, sociology and anthropology as a product of global development concerns. Major investigations were conducted into the economic and political rationality and traditionalism of third-world subjects by focusing on the household organization and behavior of peasant farmers, both of that particular time and cross-historically as exemplified in the work of Joan Smith, Immanuel Wallerstein and others (Smith *et al.*, 1984). The household level of analysis also reverberated in interdisciplinary circles, which included peasant studies and world systems theory, and well-defined subfields, such as household archaeology (LeMoine, 2003; Stanish, 1989). Perhaps not surprisingly, pioneers in political ecology shared cultural ecology's primary interest in households, evidenced for example in the classic work on *Silent violence: food, famine, and peasantry in northern Nigeria* of Michael Watts (1983).

By the mid-1980s the remarkable interweaving of interests around household analysis had begun to unravel into divergent yet highly productive strands, both in the social sciences generally and in the human-environment approaches of geography in particular. Gender analysis of human-environment issues, formulated in development economics and etched in major geographical contributions, demonstrated the often-determining influence of gendered conflicts and power relations that undermined social cohesiveness within the household unit (Agrawal, 1994; Carney, 1993; Folbre, 1986). The expansions of capitalism and globalization spurred realization of the rapid evolution of multifaceted and large-scale arrangements, such as agribusiness-based contract farming, that were engulfing farm households seemingly everywhere (Little and Watts, 1994). In the conclusion to their volume on *Native Amazonia*, the environmental anthropologists Raymond Hames and William Vickers neatly caught this unraveling trend and the emergence of contrasting tendencies. Study of the human environment, according to Hames and Vickers, was beginning to diverge into two strands: on the one hand, the political, social and economic analysis of resource-related development (e.g., political ecology) and, on the other hand, the household-level microeconomic analysis of environmental interactions that was being undertaken in cultural and human ecology (Hames and Vickers, 1983).

During the two decades since that prescient statement, cultural ecology research in geography has continued to place emphasis on the role of households. Such continuity of household-level analysis is not without change. The direction of change, however, is toward a persistent or perhaps even heightened emphasis. Below I discuss two areas that since 2000 have represented main poles in studies making use of household-level analysis: (i) tropical deforestation and secondary forest transitions; and (ii) linked changes in agricultural environments, agrobiodiversity and migration. In each research area, the emphasis on household-level analysis during the past few years, as demonstrated in publications since 2000, is tightly interwoven with new advances in methods, particularly the use of spatial imaging and analysis techniques (remote sensing, GIS), econometric modeling and field surveys (Kanbur, 2002; Turner, 2003; Turner *et al.*, 2001; Vosti *et al.*, 2003). This emphasis is also entwined with the advance of mixed-method approaches that range from the incorporation of qualitative field techniques, such as ethnography, to those of ecology and physical geography.

II Tropical deforestation and secondary forest transitions

Unprecedented attention has been directed during the past several years toward understanding the household-level processes and patterning of people-forest interaction in the humid tropics. A large number and diverse array of studies has begun to elucidate the role of forest-using households in the combined dynamics of deforestation pressures and, more recently, the partial regrowth of forest vegetation in the so-called secondary forest transition. Recent estimates have indicated that a significant portion of the area that was deforested from the 1970s through the 1990s, perhaps as much as 30–40 % in certain tropical countries, is returning to forest vegetation (Hecht, 2004; Rudel *et al.*, 2002). Equally noteworthy is continued or expanded tropical deforestation, which is evident in an ever-evolving array of processes that more recently have been driven by the global soybean and mineral booms. One key to cultural ecology's contribution, which is highlighted below, is the capacity to focus research designs on a selective combination of the key socio-economic and environmental dimensions that are embodied in the diverse logics and decision-making of forest-using households.

The management of tropical forest fallows among peasant smallholder households of the Amazonian tropical forests of Peru is the focus of several works based on household-level analysis by Oliver Coomes and his collaborators (Coomes, 2004; Coomes and Burt, 2001; Coomes *et al.*, 2000). Their contributions offer new insights on deforestation and the secondary forest transition by examining the interaction effects of settlement phase and household life cycle on forest fallow management (the managed 'rest period' during which forest is regrown while it is still utilized for the extraction of nontimber forest products). Worth highlighting is that these studies, emblematic of the recent cultural ecology research, base their analysis on carefully chosen factors that are meaningful to the decision-making of local households (in terms both socio-economic and environmental); in these cases environmentally significant decision-making is framed by taking fallow management choices as the focal point for the research design. Forest fallowing is found to be less common at the stage of households opening the frontier and increasingly more important as the frontier is closed and colonization ceases. The projects undertaken by Coomes and his collaborators have revealed that some of the defining characteristics of household socio-economic portfolios, especially the availability of land and labor, exert significant effects on the extent and duration of forest fallow. Not least is that Coomes has developed a variety of methods and techniques that range from the data-collection and analysis framework of field-level land-use histories to the innovative application of duration analysis (also known as extinction analysis) in order to examine forest fallow properties.

The general concepts of the forest-as-safety-net and forest-dependency are tested in the new works of McSweeney among the Tawakha indigenous people of the tropical lowlands of Honduras (McSweeney, 2002; 2004). McSweeney's research, which was begun as part of larger team projects on ethnicity and market-based conservation, are interested in such concepts as forest-as-safety-net and forest-dependency as potentially meaningful for the entwined social and economic dynamics of forest use and deforestation. Her interest in these twin concepts is providing an understanding beyond the simple blanket style of assumptions about them by examining the econometrics of forest product-using households that differ socio-economically

and across space and time within tropical forest environments. McSweeney finds that poorer and younger Tawakha households are more likely to increase their utilization of forest products as an income-generating safety-net in response to such 'shocks' as major illness or the loss of a family member. Her household-level studies of people-forest interaction contribute important new findings on the environmental significance of household asset portfolios and life cycle differences.

Other cultural ecology studies shade toward the assessment of household characteristics in conjunction with the analysis of remote-sensing images. Billie Lee Turner II, Colin Vance, Peter Klepeis, Jacqueline Geoghegan and their collaborators have embarked on a large project of this type that is located in the southern Yucatán peninsula region (Klepeis and Vance, 2003; Turner *et al.*, 2001; Vance and Geoghegan, 2002; Vance *et al.*, 2004). Their findings combine the remote-sensing-based analysis of deforestation with various household-level traits. Significant among the latter are found to be participation in a national farm subsidy program and the level of education, both of which are positively correlated with deforestation. These factors seem to reflect how certain social programs may be at odds with deforestation trends. (The findings also suggest, as the authors indicate, that the variables used to represent education may be associated with such factors as household portfolio assets that, although methodologically more difficult to study, may exert causative effects on deforestation.) This large team of researchers, mainly based at or working through Clark University, has also innovated a number of research methodologies, including the use of GPS-coded sketch plots in the field, while working with local informants in order to reconstruct plot- and household-level land-use and deforestation histories that can be merged with remote-sensing images and incorporated into GIS analysis.

Still other recent household-level studies of tropical deforestation and the secondary forest transition are clearly related to the cultural ecology perspective in geography, although they may not adopt this term *per se*. Research by Robert Walker, steeped also in regional science, is focused on the econometric modelling of colonist households and people-forest interaction in the Brazilian Amazon (Walker, 2003; Walker *et al.*, 2000). Household life cycle and the endowment of labor are found to be major conditioners of deforestation and secondary forest regrowth, with the latter occurring both early and late in the age of colonist households (Perz and Walker, 2002). Theoretically Walker's work is drawn from, and contributes to, the concept of interrelated production and consumption objectives among the smallholder or peasant agriculturalists that are predominant in many developing countries (on 'nonseparable' production and consumption in economic terms, rather than the standard neoclassical assumption of distinct markets; see 'Household economics' in Bardhan and Udry, 1999: 8–19). Empirically, it contributes to a cohort of household-level economics studies of the Brazilian Amazon (e.g., Evans *et al.*, 2001; Vosti *et al.*, 2003). Another example of cultural ecology-style studies on tropical forest transitions is a variety of new works on the effects of transportation systems that focus on the relation of roads to the household-level activities responsible for deforestation and secondary forest regrowth (Rudel *et al.*, 2002; Maki *et al.*, 2001). These road impacts are often surprisingly complex. For example, near-road sites in some regions have been the sites most covered by extensive areas of secondary forest vegetation, contrary to many assumptions about distance-from-road effects. Such

cases of near-road forest regrowth are due to a decline of crop markets and the weakening of staple agriculture under structural adjustment programs (SAPs) and global market integration of neoliberal government policies in the agricultural sector, such as in Ecuador.

Methodological advances are a mainstay of the household-level cultural ecology studies of tropical deforestation and the secondary forest transition. Most research is dependent on field-based surveys of as few as 30–50 households to upwards of several hundred. The emphasis on quantitative data is evident in analytical frameworks that most commonly consist of one or more regression equations (including, as mentioned above, the innovative incorporation of such techniques as duration analysis). Quantitative analysis in household-level cultural ecology is also apparent in the frequent use of GIS and remote-sensing analysis. In several cases, the field surveys combine quantitative data elicitation with qualitative techniques involving interview questions and ethnographic field activities.

III Agrobiodiversity change, agricultural (dis)intensification and migration

The recent surge of household-level analysis in cultural ecology is also fueled by a resurgence of interest in the processes and patterns of agricultural change. A new complex of concerns is shaping the cultural ecology of agriculture and contributing to the coalescence of interests. For one, agricultural change itself has become even more highly complex as farm landscapes and people worldwide are undergoing multipath transitions due to development change and globalization phenomena. These overarching trends have taken the shape of alterations of government agricultural policies; of markets for products, labor and inputs; and of agrarian politics and political movements. These complex conditions do not map neatly onto agricultural development outcomes (note the debates in these pages on ‘productivist’ versus ‘postproductivist’ agriculture; Evans *et al.*, 2002). Various new cultural ecology studies in geography have tended to respond to this complexity by designing household-level studies of agricultural change.

The concept of intensification is used as a key framework for the household-level analysis of agricultural change. It is a cornerstone of one major work, Thomas Bassett’s *The peasant cotton revolution in West Africa, Cote d’Ivoire, 1880–1995* (Bassett, 2001). Bassett’s book deploys the definition of intensification as the increase of production per unit of cultivated area or labor input in order to examine the on-farm dynamics through which a globally significant boom in cotton production was undertaken by tens of thousands of West African peasant farmers. Household-level analysis is crucial to Bassett’s account, especially the explanations of gender, labor and technological change in the boom phase (‘Making cotton work, 1964–1984’) as well as in the disintensification period (‘To sow or not to sow: the extensification of cotton, gender politics, and rural mobilization, 1985–1995’). These explanations show how farm households overcame labor bottlenecks through the intensification of women’s labor in adopting the new cotton packages of the French-owned parastatal marketing board. They demonstrate also that the households of West African farmers continued to pursue food cropping through women’s increased work during this transition albeit with the reduction of environmentally sound intercropping agriculture.

Household-level analysis of agricultural intensification, and of the inverse process of disintensification (or extensification), is also being applied with newfound interest to the issues of land use and sustainability. One focus is evaluation of the environmental and social effects of intensification/disintensification in the border areas or 'buffer zones' of protected areas. Hypothetically the intensification of farming is a sound direction for sustainability policy in such places since it is not only a positive benefit for local farmers but also leads to less pressure on nonfarm resources such as forest cover in particular. In reality, disintensification is often more common since the farm economies of such places are frequently in a state of decline. Avrum Shriar has conducted a systematic examination of household-level intensification/disintensification across three differing villages in the buffer zone of the world-renowned Maya Biosphere Reserve (Shriar, 2001). Shriar concludes that land-use disintensification, weakly differentiated by gender, is the more common process among these farm households and villages, although its effects are both environmentally sound (increased intercropping) and damaging (increased herbicide application), depending on the dimension of agriculture that is addressed.

Two additional monographs on agriculture and environmental change have been published during the past few years that use household-level analysis to describe the diversity of people-plant interaction and the interface of household units and community-level management. The first is *Exploring agrodiversity* by Harold Brookfield (2000). Published in the Columbia University Press series on Issues, Cases, and Methods in Biodiversity Conservation, this monograph is focused on the framework of agrodiversity, which Brookfield describes as a concept comprised of four elements: agrobiodiversity, management diversity, biophysical diversity and organizational diversity (Brookfield, 2000: 40–41). It is a monograph fueled by Brookfield's experience as a leader of the People, Land Management, and Environmental Change (PLEC) project of the Global Environmental Fund (GEF) and United Nations University (UNU). The book is written as a contribution to cultural or human ecology *per se*, and it uses this perspective of people-plant interaction in a masterfully crafted presentation that interweaves more than two dozen case studies taken from both developing and developed countries worldwide. Household-level analysis, along with that of the community level, is considered a core element of organizational diversity and is sustained throughout as a mainstay perspective in this tour-de-force survey of agrodiversity.

The second of these monographs is *Farmer's bounty: locating crop diversity in the contemporary world* (Brush, 2004). Stephen B. Brush, an environmental anthropologist, roots this monograph in the twin approaches of cultural and human ecology, drawing especially on the borderlands of anthropology with geography and interdisciplinary environmental studies, particularly conservation biology. Stemming from these approaches, the book forges a fruitful discussion of these fields as early and continuing contributors that are key to the understanding of food plant diversity in agricultural systems of both developing and developed countries. The place of household-level analysis is central to the monograph's interpretations of the management and usefulness of agricultural diversity in both production and consumption activities. Household-level analysis is also central as a methodological framework. Brush provides an insightful discussion of innovative research designs that rely heavily on household questionnaires and research designs that take account of the single farm households, their cultivation of several fields (albeit often small

in size) and multiple communities (in order to account for community-level differences).

Seed flow is a focus of recent studies that bridge the household and community levels analysis of resource management in order to address the sustainability policies, programs and projects that have been targeting agriculture, the environment and conservation (as well as the diffusion of transgenic crops). The networks of seed flows of the biodiverse Andean potato and ulluco food plants are tracings of distinct geographical contours within households, among the households of a community and, frequently, among the households of multiple communities (Zimmerer, 2003a). Melissa Smale and her colleagues find that the seed of particular maize varieties, one foundation of biodiversity in Mexican agriculture, is selected on the basis of household-level preferences for production and consumption traits (Smale *et al.*, 2001). Seed management occurring at the within-variety level is similarly an important integrator of household- and intrahousehold-level processes, such as resource level and differences in the gender-related management of field systems. These biocomplexity linkages are demonstrated in the preferences for the different sizes of seed that are chosen to cope with climatic variation using scarce household-level resources and, at the same time, a continued or possibly expanding type of local biodiversity-based agriculture referred to as 'native commercialized' agriculture (Zimmerer, 2003b). In all these studies, the household-level analysis of seed management and agrobiodiversity is central to evaluating the basic designs of rural livelihood and sustainability support.

The agricultural impact of migration processes (and ancillary effects such as deforestation) is a topic that seems neatly suited to household-level analysis in approaches that incorporate cultural ecology. Here the focus on households seems to make sense given the multiple pathways of possible agricultural adjustments and the myriad forms in which migration is fit into livelihood diversification strategies (Batterbury, 2001). Increased migration and transnational ties, as well as the growth of forest product-based handicraft industries, have led to rural households and communities abandoning agricultural land and thus resulted in the recent regrowth of pine and oak forests in west-central Mexico (Klooster, 2000). Similarly high levels of migration in the Ecuadorian Andes have resulted in neither scenarios of abandonment nor the disintensification of land use but rather the increase of real-estate speculation, at least among migrant households whose lands are found in peri-urban areas (Jokisch, 2002). In a still different scenario the increased international migration of men from rural Bolivian households to jobs in Argentina is apparently not a cause of changes in livestock management in the households that send these migrants (Preston *et al.*, 2003).

IV Conclusion: future directions of household-level analysis in human-environment approaches

Household-level analysis is commonplace in the cultural ecology of recent years, fueled by new interests in global environmental change and continued emphasis on human-environment interaction processes. Yet this cultural ecology faces new challenges if the view of the environmental and resource-using household is to be reconciled with the open-framework perspective of the multifaceted household

that is so central to close subfields such as political ecology. A broadly described development economics is one such subfield, for various new studies are developing a critically informed concept of the household, accounting for uneven power relations and diverse identities, while they innovate household-level and econometric analysis in order to examine the political economy of poverty and its types, trajectories and policy impacts (Akerloff and Kranton, 2000; Barham and Boucher, 1998; Blaikie *et al.*, 2002; Bodley, 1999; Creed, 2000; Harriss, 2002; Kanbur, 2002). Responding to the critiques of the feminist development economists and others, the open framework of the household concept in these studies is also a call for crossdisciplinary approaches and the careful mixing of quantitative and qualitative methods (White, 2002). These insights are promising for the cultural ecology and 'human dimensions' research under discussion since they tend to recognize the significance of gender- and age-related resource portfolios in so-called 'investment poverty' (threats or constraints on the sustainability of resource use and management that are placed by the lack of household endowments).

Similarly, the area of migration studies, which includes a substantial number in human geography, have ascribed to an open-framework view of households that places them as central to the analysis of development change while, at the same time, these studies are sensitive to the lack of cohesiveness of the household unit (Bever, 2002; Escobar Latapí and González de la Rocha, 2002; Lawson, 1998; Mutersbaugh, 2002; Nelson, 2002; Silvey, 2003; Watkins, 2003). These migration studies have helped to advance the concept of the household's management of resources and property as highly diverse and constituted in contingent and often fluid ways with respect to power relations both within the unit and in relation to outside social actors and institutions. In the parlance of the above cultural ecology, it suggests that such conditions as household choice and asset portfolios are usually less stable and not as synonymous with the household *qua* household as is sometimes assumed in the field's econometric modeling of resource use. This prediction supports the conceptual and methodological innovations, some already under way in the works above, that focus on the fluidity and multilevel framing of the household (see also Bassett and Zueli, 2000; Mertens *et al.*, 2000; Sunderlin and Pokam, 2002; Turner, 2000; Turner and Williams, 2002). These innovative studies expand the use of ethnographic techniques and longitudinal, diachronic designs that are mixed with household-level analysis in accounting for the importance to human environmental change of social relations (e.g., gender, age, village and region-level effects) that are often treated as secondary factors in the unitary household model.

Environmental studies offers a promising dialogue via its in-depth and ever-evolving understandings of nature's complexities as biogeophysical systems. Ecological and environmental scientific analysis is of immediate relevance to this study's cases of tropical forest transitions and agrobiodiversity change in cultural ecology and 'human dimensions' research. Significance of the secondary forest transition, for example, depends heavily on the degree to which this new regrowth may (or not) create healthy forest ecosystems, which is an environmental scientific analysis of obviously major import to the overall interpretation of forest change. Similarly in the case of agricultural change, the analysis of agroecosystem sustainability weighs heavily in interpreting the impacts of current biodiversity changes in which complex gene flows, dispersal and time-dependence are involved. In general, though, environmental studies has often eschewed or oversimplified some of the

major questions regarding social-environmental causation and scaling so that the logic of household-level analysis is largely absent from its lexicon (Zimmerer and Bassett, 2003c). As a result, environmental studies and its extensions into policy-making and public awareness is poised, at least potentially, for an enriching dialogue with recent household-level analysis in the human-environment approaches of cultural ecology and cognate fields.

Acknowledgements

I would like to gratefully acknowledge the encouragement, advice and inputs of Alexander Murphy, Rachel Shivey, Brad Barham and Eric Carter in this article.

References

- Agrawal, B.** 1994: *A field of one's own: gender and land rights in South Asia*. Cambridge: Cambridge University Press.
- Akerloff, G. and Kranton, R.E.** 2000: Economics and identity. *The Quarterly Review of Economics* 105, 715–63.
- Bardhan, P. and Udry, C.** 1999: *Development economics*. Oxford: Oxford University Press.
- Barham, B.L. and Boucher, S.** 1998: Migration, remittances and inequality: estimating the net effects of migration on income distribution. *Journal of Development Economics* 55, 307–31.
- Bassett, T.J.** 2001: *The peasant cotton revolution in West Africa: Côte d'Ivoire, 1880–1995*. Cambridge: Cambridge University Press.
- Bassett, T.J. and Zimmerer, K.S.** 2003: Cultural ecology. In Gaile, G.L. and Wilmott, C.J., editors, *Geography in America at the dawn of the new millennium*, Oxford: Oxford University Press, 97–112.
- Bassett, T.J. and Zueli, K.B.** 2000: Environmental discourses and the Ivorian savanna. *Annals of the Association of American Geographers* 90, 67–95.
- Batterbury, S.** 2001: Landscapes of diversity: a local political ecology of livelihood diversification in south-western Niger. *Ecumene* 8, 437–64.
- Bever, S.W.** 2002: Migration and the transformation of gender roles and hierarchies in Yucatan. *Urban Anthropology* 31, 199–230.
- Blaikie, P., Cameron, J. and Sneddon, D.** 2002: Understanding 20 years of change in west-central Nepal: continuity and change in lives and ideas. *World Development* 30, 1255–70.
- Bodley, J.H.** 1999: Socioeconomic growth, culture scale, and household well-being: a test of the power-elite hypothesis. *Current Anthropology* 40, 595–612.
- Brookfield, H.** 1964: Questions on the human frontiers of geography. *Economic Geography* 40, 293–303.
- 2000: *Exploring agrodiversity*. New York: Columbia University Press.
- Brush, S.B.** 2004: *Farmer's bounty: locating crop diversity in the contemporary world*. New Haven, CT: Yale University Press.
- Carney, J.** 1993: Converting the wetlands, engendering the environment: the intersection of gender with agrarian change in the Gambia. *Economic Geography* 69, 329–48.
- Coomes, O.T.** 2004: Rain forest 'conservation-through-use'? Chambira palm fibre extraction and handicraft production in a land-constrained community, Peruvian Amazon. *Biodiversity and Conservation* 13, 351–60.
- Coomes, O.T. and Burt, G.J.** 2001: Peasant charcoal production in the Peruvian Amazon: rainforest use and economic reliance. *Forest Ecology and Management* 140, 39–50.
- Coomes, O.T., Grimard, F. and Burt, G.J.** 2000: Tropical forests and shifting cultivation: secondary forest fallow dynamics among traditional farmers of the Peruvian Amazon. *Ecological Economics* 32, 109–24.
- Creed, G.W.** 2000: 'Family values' and domestic economies. *Annual Review of Anthropology* 29, 329–55.
- Denevan, W.M.** 1983: Adaptation, variation, and cultural geography. *Professional Geographer* 35, 399–407.

- Escobar Latapí, A. and González de la Rocha, M.** 2002: The restructuring of labor markets, international migration, and household economies in urban Mexico. In Chase, J., editor, *The spaces of neoliberalism: land, place, and family in Latin America*. Bloomfield, CT: Kumarian Press, 187–212.
- Evans, N., Morris, C. and Winter, M.** 2002: Conceptualizing agriculture: a critique of post-productivism as the new orthodoxy. *Progress in Human Geography* 26, 313–32.
- Evans, T.P., Manire, A., de Castro, F., Brondizio, E. and McCracken, S.** 2001: A dynamic model of household decision-making and parcel level landcover change in the eastern Amazon. *Ecological Modelling* 143, 95–113.
- Folbre, N.** 1986: Hearts and spades: paradigms of household economics. *World Development* 14, 245–55.
- Grossman, L.** 1977: Man-environment relationships in anthropology and geography. *Annals of the Association of American Geographers* 67, 126–44.
- Hames, R.B. and Vickers, W.T.,** editors 1983: *Adaptive responses of native Amazonia*. New York: Academic Press.
- Harris, J.** 2002: The case for cross-disciplinary approaches in international development. *World Development* 30, 487–96.
- Hecht, S.** 2004: Invisible forests: the political ecology of forest resurgence in El Salvador. In Peet, R. and Watts, M., editors, *Liberation ecologies: environment, development, and social movements*, London: Routledge, 64–104.
- Jokisch, B.D.** 2002: Migration and agricultural change: the case of smallholder agriculture in highland Ecuador. *Human Ecology* 30, 523–50.
- Kanbur, R.** 2002: Economics, social science, and development. *World Development* 30, 477–86.
- Klepeis, P. and Vance, C.** 2003: Neoliberal policy and deforestation in southeastern Mexico: an assessment of the PROCAMPO program. *Economic Geography* 79, 221–40.
- Klooster, D.** 2000: Beyond deforestation: the social context of forest change in two indigenous communities in highland Mexico. *Conference of Latin Americanist Geographers Yearbook* 26, 47–59.
- Lawson, V.A.** 1998: Hierarchical households and gendered migration in Latin America: feminist extensions to migration research. *Progress in Human Geography* 22, 39–53.
- LeMoine, G.** 2003: Woman of the house: gender, architecture, and ideology in Dorset prehistory. *Arctic Anthropology* 40, 121–38.
- Little, P.D. and Watts, M.J.,** editors 1994: *Living under contract: contract farming and agrarian transformation in sub-Saharan Africa*. Madison, WI: University of Wisconsin Press.
- Maki, S., Kallioa, R. and Vuorinen, K.** 2001: Road construction in the Peruvian Amazon: process, causes, and consequences. *Environmental Conservation* 28, 199–214.
- McSweeney, K.** 2002: Who is 'forest-dependent'? Capturing local variation in forest-product sale, Eastern Honduras. *Professional Geographer* 54, 158–74.
- 2004: Forest product sale as natural insurance: the effects of household characteristics and the nature of shock in eastern Honduras. *Society and Natural Resources* 17, 1–18.
- Mertens, B., Lambin, E.F. and Sunderlin, W.D.** 2000: Impact of macroeconomic change on deforestation in South Cameroon: integration of household survey and remotely-sensed data. *World Development* 28, 983–99.
- Mutersbaugh, T.** 2002: Migration, common property, and communal labor: cultural politics and agency in a Mexican village. *Political Geography* 21, 473–94.
- Nelson, P.B.** 2002: Perceptions of restructuring in the rural West: insights from the 'cultural turn'. *Society and Natural Resources* 15, 903–21.
- Netting, R.M.** 1993: *Smallholders, householders: farm families and the ecology of intensive, sustainable agriculture*. Palo Alto, CA: Stanford University Press.
- Perz, S.G. and Walker, R.T.** 2002: Household life cycles and secondary forest cover among small farm colonists in the Amazon. *World Development* 30, 1009–27.
- Preston, D., Beck, S. and Maas, G.** 2003: Grazing and environmental change on the Tarija Altiplano, Bolivia. *Mountain Research and Development* 23, 141–48.
- Rudel, T.K., Bates, D. and Machinguishi, R.** 2002: A tropical forest transition? Agricultural change, out-migration, and secondary forests in the Ecuadorian Amazon. *Annals of the Association of American Geographers* 93, 87–102.

- Shriar, A.** 2001: The dynamics of agricultural intensification and resource conservation in the buffer zone of the Maya Biosphere Reserve, Petén, Guatemala. *Human Ecology*, 29, 27–47.
- Silvey, R.** 2003: Spaces of protest: gendered migration, social networks, and labor activism in West Java, Indonesia. *Political Geography* 22, 129–55.
- Smale, M., Bellon, M.R. and Gómez, J.A.A.** 2001: Maize diversity, variety attributes, and farmers' choices in southeastern Guanajuato, Mexico. *Economic Development and Cultural Change* 50, 201–25.
- Smith, J., Wallerstein, I. and Evers, H., editors** 1984: *Households and the world economy*. Beverly Hills, CA: Sage Publications.
- Stanish, C.** 1989: Household archaeology: testing models of zonal complementarity in the South Central Andes. *American Anthropologist* 91, 7–24.
- Sunderlin, W.D. and Pokam, J.** 2002: Economic crisis and forest cover change in Cameroon: the roles of migration, crop diversification, and gender division of labor. *Economic Development and Cultural Change* 50, 581–606.
- Turner, B.L. II and 16 others.** 2001: Deforestation in the southern Yucatán peninsula: an integrative approach. *Forest Ecology and Management* 154, 355–70.
- Turner, M.D.** 2000: Drought, domestic budgeting and wealth distribution in Sahelian households. *Development and Change* 31, 1009–35.
- 2003: Methodological reflections on the use of remote sensing and geographic information science in human ecological research. *Human Ecology* 31, 255–80.
- Turner, M.D. and Williams, T.O.** 2002. Livestock market dynamics and local vulnerabilities in the Sahel. *World Development* 30, 683–705.
- Vance, C. and Geoghegan, J.** 2002: Temporal and spatial modeling of tropical deforestation: a survival analysis linking satellite and household survey data. *Agricultural Economics* 27, 317–32.
- Vance, C., Klepeis, P., Schmoock, B. and Keys, E.** 2004: The ejido household: the current agent of change. In Turner, B.L. II, Geoghegan, J. and Foster, D.R., editors, *Integrated land-change science and tropical deforestation in the southern Yucatán: final frontiers*, Oxford: Oxford University Press, 171–87.
- Vosti, S.A., Braz, E.M., Carpentier, C.L., D'Oliveira, M.V.N. and Witcover, J.** 2003: Rights to forest products, deforestation, and smallholder income: evidence from the Western Brazilian Amazon. *World Development* 31, 1889–901.
- Walker, R.T.** 2003: Mapping process to pattern in the landscape change of the Amazonian frontier. *Annals of the Association of American Geographers* 93, 376–98.
- Walker, R.T., Moran, E. and Anselin, L.** 2000: Deforestation and cattle ranching in the Brazilian Amazon: external capital and household processes. *World Development* 26, 683–99.
- Watkins, F.** 2003: 'Save there, eat here'. Migrants, households and community identity among Pakhtuns in northern Pakistan. *Contributions to Indian Sociology* 37, 59–82.
- Watts, M.** 1983: *Silent violence: food, famine, and peasantry in northern Nigeria*. Berkeley, CA: University of California Press.
- White, H.** 2002: Combining quantitative and qualitative approaches in poverty analysis. *World Development* 30, 511–22.
- Zimmerer, K.S.** 2003a: Geographies of seed networks for food plants and approaches to agrobiodiversity conservation. *Society and Natural Resources* 16, 583–601.
- 2003b: Just small potatoes (and ulluco)? The use of seed-size variation in commercialized agriculture and agrobiodiversity conservation among Peruvian farmers. *Agriculture and Human Values* 20, 107–23.
- Zimmerer, K.S. and Bassett, T.J.** 2003: Approaching political ecology: society, nature, and scale in human-environment studies. In Zimmerer, K.S. and Bassett, T.J., editors, *Political ecology: an integrative approach to geography and environment-development studies*, New York: Guilford, 1–25.

Copyright of Progress in Human Geography is the property of Arnold Publishers and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.