

## Environment and Population: the ecology of risk, uncertainty, and demographic behavior

Spring 2006

Leader: Paul Leslie  
 Office: 302 Alumni Bldg. Office hours: M, W, Th 1:30 - 3:00  
 phone 843-8978, 966-6165 and by appointment  
 email: [pwleslie@unc.edu](mailto:pwleslie@unc.edu)

Concern over the relationship between population and environment abounds. But the most salient research and discussion has focused on one aspect of the relationship --human impact on the environment. In this seminar, we will be concerned primarily, though not exclusively, with the other side of the relationship – how environmental characteristics (especially the physical and biotic environments, but also the social/economic/political environment as it interacts with the above) affect population characteristics and dynamics. These two “directional arrows” are of course ultimately inseparable; the distinction here is one of emphasis. We will be concerned not only with how environmental characteristics affect human populations, but also with how responses to those environmental characteristics – mitigation or coping – in turn affect the environment. That is, we will whenever possible take a systems view. A special emphasis will be on the biological and behavioral consequences of environmental fluctuations and unpredictability.-

### Outline of Course Content

#### I. Preliminaries

- Some definitions and directions: what we mean and where we’re going
- The need for an “ecological demography”
- Myths and models of nature and human-environment relations
  - ▶ Adams 1995. *Risk*. University College London Press, selected sections.
  - ▶ Liu J. 2001. Integrating ecology with human demography, behavior, and socioeconomics: Needs and approaches. *Ecological Modelling* 140:1-8

#### 2. Environment and Population

- Classic views, original and reconsidered
  - ▶ Malthus, T 1798. *An Essay on the Principle of Population*
  - ▶ Boserup E. 1987. Population and technology in preindustrial Europe. *Population and Devel Rev* 13:691-701.
  - ▶ Holling CS 1994. An ecologist’s view of the Malthusian conflict. In K Lindahl-Kiessling and H Landberg, eds. *Population, Economic Development and the Environment*. Oxford. pp.79-104.
  - ▶ Rappaport, R. (1967) Ritual Regulation of Environmental Relations Among a New Guinea People. *Ethnology* 6:17-30.

- ▶ Rappaport, Roy A (1990) Ecosystems, Populations and People. In *The Ecosystem Approach in Anthropology*, ed. by E. Moran, pp. 41-72. University of Michigan Press, Ann Arbor.
  - ▶ Netting, R. (1981) *Balancing on an Alp. Ecological Change and Continuity in a Swiss Mountain Community*. Cambridge. (selected chapters).
  - ▶ Netting, R. (1990) Reconsidering the Alpine village as ecosystem. Ch. 8 in Moran.
  - ▶ DeWalt BR. 1998. The political ecology of population increase and malnutrition in Southern Honduras. In A Goodman and T Leatherman, eds. *Building a New Biocultural Synthesis. Political-Economic Perspectives on Human Biology*. U Michigan Press
- The “new ecology”
    - ▶ Ellis JE and D Swift 1988. Stability of African pastoral ecosystems: Alternative paradigms and implications for development. *J Range Management* 41:450-459.
    - ▶ Ellis JE and D Swift 1993. Climate variability, ecosystem stability, and the implications for range and livestock development. In *Range Ecology at Disequilibrium: New Models of Natural Variability and Pastoral Adaptation in African Savannas*. RH Behnke, I Scoones, and C Kerven, eds. London: Overseas Development Institute
    - ▶ McCabe JT 2004. *Cattle Bring Us to Our Enemies. Turkana Ecology, Politics, and Raiding in a Disequilibrium System*. U Michigan Press. (selected chapters)
    - ▶ Leslie P et al. 1999. Synthesis and lessons. Chap. 18 in *Turkana Herders of the Dry Savanna. Ecology and Biobehavioral Response of Nomads to an Uncertain Environment*. M Little and P Leslie, eds. Oxford University Press.
    - ▶ Berkes F and C Folke (2002) Ecosystem dynamics and local knowledge. In L Gunderson and C Holling, eds., *Panarchy. Understanding Transformations in Human and Natural Systems*. Island Press.
  - Common pool resource management: tragedy(?) of the commons; *individual vs. collective rationality*
    - ▶ Richerson P, R Boyd and B Paciotti (2002) An evolutionary theory of commons management. In Ostrom E, T Dietz, N Dolsak, P stern, S Stonich, and E Weber, eds. 2002. *The Drama of the Commons*. Committee on the Human Dimensions of Global Change, National Research Council. National Academy Press.
    - ▶ Falk A, E Fehr, and U Fischbacher. 2002. Appropriating the commons: a theoretical explanation. In Ostrom et al., eds.
    - ▶ Westley F 2002. The devil in the dynamics: Adaptive management on the front lines. In *Gunderson and Holling*, eds.
    - ▶ McPeak J (2005) Individual and collective rationality in pastoral production: Evidence from northern Kenya. *Hum Ecol* 33(2):171-

- Resilience: population persistence in the face of environmental fluctuation
  - ▶ Gunderson L and C Holling (2002) *Panarchy. Understanding Transformations in Human and Natural Systems*. Island Press. Selected chapters:
  - ▶ Holling C and L Gunderson, Resilience and adaptive cycles.
  - ▶ Walker B and N Abel, Resilient rangelands – adaptation in complex systems
  - ▶ Gunderson L, C Holling, and G Peterson 2002. Surprises and sustainability: cycles of renewal in the Everglades.
  - ▶ Leslie P, R Dyson-Hudson, and P Fry 1999. Population replacement and persistence. Ch14 in Little and Leslie, eds.
  - ▶ Gray, S.J., M. Sundal, B. Wiebush, M. Little, P. Leslie, and I. Pike (2003). Cattle raiding, cultural survival, and adaptability of East African pastoralists. *Current Anthropology* 44: S3 S30 Suppl

### 3. Mechanisms: Individual behavior in environment-population relationships

- Responses to enviro'l fluctuations: Reproductive function
  - ▶ Worthman, CM. 2003. Energetics, sociality, and human reproduction: life history theory in real life. In KW Wachter and RA Bulatao, eds., *Offspring. Human Fertility Behavior in Biodemographic Perspective*. National Academies Press, pp. 289-321.
  - ▶ Vitzthum VJ. 2001. Why not so great is still good enough. Flexible responsiveness in human reproductive functioning. Chapter 8 in PT Ellison, ed., *Reproductive Ecology and Human Evolution*
- Migration
  - ▶ Henry S, B Schoumaker, C Beauchemin, 2004. The impact of rainfall on the first out-migration: A multi-level event-history analysis in Burkina Faso. *Population and Environment* 25(5):423 – 460
  - ▶ Henry S, V Piché, Dieudonné, Ouédraogo, EF Lambin, 2004. Descriptive analysis of the individual migratory pathways according to environmental typologies. *Population and Environment* 25:397–422.
  - ▶ McCabe JT 2004. Cattle Bring Us to Our Enemies. Turkana Ecology, Politics, and Raiding in a Disequilibrium System. U Michigan Press. (Selected sections)

### 4. The need for an underlying theory – is evolutionary ecology the answer?

- Evolutionary ecology and demographic behavior
  - ▶ Low BS, AL Clarke and KA Lockridge. 1992. Toward an ecological demography. *Population and Development Rev.* 18(1):1-31.

- ▶ Lam D. 2003. Evolutionary biology and rational choice models of fertility. In Wachter KW and RA Bulatao, eds. 2003. *Offspring. Human Fertility Behavior in Biodemographic Perspective*. National Academies Press.
- ▶ Hobcraft, JN. 2003. Reflections on demographic, evolutionary, and genetic approaches to the study of human reproductive behavior. In KW Wachter and RA Bulatao, eds., *Offspring. Human Fertility Behavior in Biodemographic Perspective*. National Academies Press, pp. 339-357.
- Reproductive behavior: Life history theory, access to resources, parental investment
  - ▶ Kaplan HS and JB Lancaster. 2003. A evolutionary and ecological analysis of human fertility, mating patterns and parental investment. In Wachter KW and RA Bulatao, eds. 2003. *Offspring. Human Fertility Behavior in Biodemographic Perspective*. National Academies Press.
  - ▶ Strassmann BI and B Gillespie. 2001. Life-history theory, fertility and reproductive success in humans. *Proc. Royal Society London B* 269:553-562
- Environment, health, child care and survival
  - ▶ Barrett, R, C Kuzawa, T McDade, and G Armelagos. 1998. Emerging and re-emerging infectious diseases: the third epidemiological transition. *Ann Rev Anthro* 27:247-271
  - ▶ Swedlund AC and H Ball. 1998. Nature, nurture, and the determinants of infant mortality: A case study from Massachusetts, 1830-1920. In A Goodman and T Leatherman, eds. *Building a New Biocultural Synthesis. Political-Economic Perspectives on Human Biology*. U Michigan Press.
  - ▶ Altmann J and SC Alberts. 2003. Intraspecific variability in fertility and offspring survival in a nonhuman primate: behavioral control of ecological and social sources. In Wachter KW and RA Bulatao, eds.
  - ▶ Ball H and C Panter-Brick. 2001. Child survival and the modulation of parental investment. Physiological and hormonal considerations. Chapter 11 in Ellison, *Reproductive Ecology and Human Evolution*
  - ▶ Strassmann BI. 2000. Polygyny, family structure, and child mortality: a prospective study among the Dogon of Mali. In L Cronk, N Chagnon, and W Irons, eds., *Adaptation and Human Behavior. An Anthropological Perspective*. Aldine de Gruyter, pp. 49-67.

## 5. Risk and uncertainty

- Unpredictable environments and outcomes: coping with risk and uncertainty
  - ▶ Low BS 1990. Human responses to environmental extremeness and uncertainty: a cross-cultural perspective. In E Cashdan, ed., *Risk and Uncertainty in Tribal and Peasant Economies*. Westview Press
  - ▶ Stephens DW. 1990. Risk and incomplete information in behavioral ecology. In Cashdan, ed.

- ▶ Machina MJ 1997. Choice under uncertainty: problems solved and unsolved. In P Dasgupta and K-G Maler, eds., *The Environment and Emerging Development Issues*, Vol 1. Oxford: Clarendon Press, pp. 201-254
  - ▶ Winterhalder, BP. 1990. Open field, common pot: Harvest variability and risk avoidance in agricultural and foraging societies. In Cashdan, ed.
  - ▶ Leslie, PW and BP Winterhalder (2002) Demographic consequences of unpredictability in fertility outcomes. *Am J Hum Biol* 14(2): 168-183.
  - ▶ Winterhalder, BP and PW Leslie (2002) Risk-sensitive fertility: The variance compensation hypothesis. *Evolution and Human Behavior* 23(1):59-82.
  - ▶ McPeak J and C Barrett (2001) Differential risk exposure and stochastic poverty traps among East African pastoralists. *Amer J Agr Econ* 83(3):674-679.
  - ▶ Gray SG, PW Leslie, and HA Akol (2002) Uncertain disaster: Environmental instability, colonial policy, and the resilience of East African pastoralist systems. In, *Human Biology of Pastoral Populations*, W.R. Leonard and M.H. Crawford, eds., Cambridge University Press, pp. 99-130.
- Perception of risk
    - ▶ Sjoberg L (2000) Factors in risk perception. *Risk Analysis* 20(1):1-11
    - ▶ Smith K, C Barrett, and P Box (2000) Participatory risk mapping for targeting research and assistance: with an example from East African pastoralists. *World Development* 28(11):1945-1959.
    - ▶ Smith K, C Barrett, and P Box (2001) Not necessarily in the same boat: heterogeneous risk assessment among East African pastoralists. *J Devel Stud* 37(5):1-30.

## 6. Participants' projects

## 7. Full circle: population and environment, environment and population

- Overview, rehash, postmortem, facile conclusions, and celebration