





Ecological Anthropology


Basic premises

- Ecological anthropology focuses upon the complex relations between people and their environment. Human populations have ongoing contact with and impact upon the land, climate, plant, and animal species in their vicinities, and these elements of their environment have reciprocal impacts on humans (Salzman and Attwood 1996:169).
- Ecological anthropology investigates the ways that a population shapes its environment and the subsequent manners in which these relations form the population's social, economic, and political life (Salzman and Attwood 1996:169).
- In a general sense, ecological anthropology attempts to provide a materialist explanation of human society and culture as products of adaptation to given environmental conditions (Seymour-Smith 1986:62).

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- In *The Origin of Species* (1859), Charles Darwin presented a synthetic theory of evolution based on the idea of descent with modification.
 - In each generation, more individuals are produced than can survive (because of limited resources), and competition between individuals arises.
 - Individuals with favourable characteristics, or variations, survive to reproduce. It is the environmental context that determines whether or not a trait is beneficial.

Malthus, Thomas R. (1766-1834)-

- Thomas R. Malthus work *Essay on Population* (1798) greatly influenced Charles Darwin.
- Malthus argued that populations grow exponentially, while resources only grow geometrically.
- Eventually, populations deplete their resources to such a degree that competition for survival becomes inevitable. This assumes that a struggle for existence will ensue, and only a certain number of individuals will survive.
- Malthus's ideas helped to form the ecological basis for Darwin's theory of natural selection.
- Malthus pioneered demographic studies, arguing that human populations naturally tend to outstrip their food supply (Seymour-Smith 1986:87).


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- This circumstance leads to disease and hunger which eventually put a limit on the growth of the population (Seymour-Smith 1986:87).
 - As a reaction to Darwin's theory, some anthropologists eventually turned to "environmental determinism" as a mechanism for explanation.
 - The earliest attempts at environmental determinism mapped cultural features of human populations according to environmental information (for example, correlations were drawn between natural features and human technologies) (Milton 1997).
 - A detailed ethnographic accounts of Boas, Malinowski, and others led to the realization that environmental determinism could not sufficiently account for observed realities, and a weaker form of determinism began to emerge (Milton 1997).
 - At this juncture, Julian Steward looked for the adaptive responses to similar environments that gave rise to cross-cultural similarities (Netting 1996:267) and coined the term "cultural ecology".

Steward, Julian (1902-1972)

- Steward's theory centered around a *culture core*, which he defined as "the constellation of features which are most closely related to subsistence activities and economic arrangements" (Steward 1955:37).
- Steward demonstrated that lower population densities exist in areas where the tree is sparsely distributed, thus illustrating the direct relationship between resource base and population density.
- Steward was also interested in the expression of this relationship in regards to water availability and management.
- His ideas on cultural ecology were also influenced by studies of South American indigenous groups.

Cultural ecology is a subset of Human ecology. Human ecology is the study of the interactions between humans, their biology, their cultures, and their physical environments. Cultural ecology is the study of how humans have adapted to their cultural and natural settings

- Steward specified three steps in the investigation of the cultural ecology of a society:
- (1) describing the natural resources and the technology used to extract and process them;
- (2) outlining the social organization of work for these act of maintaining or supporting oneself, especially at a minimal level subsistence and economic activities;
- (3) tracing the influence of these two phenomena on other aspects of culture (Barfield 1997:448). Julian Steward often fluctuated between determinism and possibilism (Balée 1996).
- He was interested in the comparative method in order to discover the laws of cultural phenomena (Barfield 1997:448).

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- By the 1960s and 1970s, cultural ecology and environmental determinism lost favour within anthropology.
 - Ecological anthropologists formed new schools of thought, including the ecosystem model, ethnoecology (*see next slide for details*), and historical ecology (Barfield 1997:138).
 - Researchers hoped that ecological anthropology and the study of adaptations would provide explanations of customs and institutions (Salzman and Attwood 1996:169).
 - Ecological anthropologists believe that populations are not engaged with the total environment around them, but rather with a habitat consisting of certain selected aspects and local ecosystems (Kottak 1999:23-4).
 - Furthermore, each population has its own adaptations institutionalized in the culture of the group, especially in their technologies (Salzman and Attwood 1996:169).

Relevance of Ecological Anthropology

- A field such as ecological anthropology is particularly relevant to contemporary concerns with the state of the general environment.
occurring in the present
- Anthropological knowledge has the potential to inform and instruct humans about how to construct sustainable ways of life.
- Anthropology, especially when it has an environmental focus, also demonstrates the importance of preserving cultural diversity.
- Biological diversity is necessary for the adaptation and survival of all species; culture diversity may serve a similar role for the human species because it is clearly one of our most important mechanisms of adaptation.
Cultural diversity is the presence of various cultural and ethnic groups within a society

Ecological Anthropology

- This new perspective considers the role of the physical environment in cultural change in a more sophisticated manner than environmental determinism.
involving a great deal of worldly experience and knowledge of culture.
- Ecological anthropology is also a reaction to idealism, which is the idea that all objects in nature and experience are representations of the mind.
- Ecological anthropology inherently **opposes** the notion that ideas drive all human activities and existence.
- This particular field illustrates a turn toward the study of the material conditions of the environment, which have the potential to affect ideas.
- Steward was disillusioned with historical particularism and culture area approaches, and he subsequently emphasized environmental influences on culture and cultural evolution (Barfield 1997:448).

Harris, Marvin (1927-2001)

- Marvin Harris, best known for his development of “cultural materialism”.
- This school of thought centers on the notion that technological and economic features of a society have the primary role in shaping its particular characteristics. He assigned research priority to concepts of infrastructure over structure and superstructure (Barfield 1997:137).
- The infrastructure is composed of the mode of production, demography, and mating patterns.
- Structure refers to domestic and political economy, and superstructure consists of recreational and aesthetic products and services.
- Harris’s purpose was to demonstrate the adaptive, materialist rationality of all cultural features by relating them to their particular environment (Milton 1997).

Rappaport, Roy A. (1926-1997)

Structural functionalism, or simply functionalism, is "a framework for building theory that sees society as a complex system whose parts work together to promote solidarity and stability"

- Roy A. Rappaport was responsible for bringing ecology and structural functionalism together. Rappaport defined and was included in a paradigm called **neofunctionalism**.
- He saw culture as a function of the ecosystem. The **carrying capacity** and energy expenditure are central themes in Rappaport's studies, conducted in New Guinea.
- Rappaport completed the first systematic study of ritual, religion, and ecology, and this study is characterized as **synchronic** and functionalist.
- The scientific revolution, functionalism in anthropology, and new ecology are the three main influences upon Rappaport.



Neofunctionalism

- This term represents a productive but short-lived 1960s revision of structural-functionalism. Neofunctionalism attends explicitly to the modeling of systems-level interactions, especially negative feedback, and assigns primary importance to techno-environmental forces, especially environment, ecology, and population (Bettinger 1996:851).
- Within neofunctionalism, culture is reduced to an adaptation, and functional behaviors are homeostatic and deviation counteracting, serving to maintain the system at large (Bettinger 1996:851).
Homeostasis is the ability to maintain internal stability in an organism in response to the environmental changes.
- Neofunctional well being is measured in tangible currencies, such as population density, that relate to fitness (as in evolutionary biology) (Bettinger 1996:852).

Carrying Capacity

- According to Moran (1979:326), carrying capacity is "[t]he number of individuals that a habitat can support" (Moran 1979:326).
- This idea is related to population pressure, referring to the demands of a population on the resources of its ecosystem (Moran 1979:334).
- If the technology of a group shifts, then the carrying capacity changes as well. An example of the application of carrying capacity within ecological anthropology is demonstrated in Rappaport's study of the Tsembaga Maring.

Conklin, Harold (1926-)

In slash and burn agriculture, the farmers cut down the trees of the forest and burn the plant remains and the land is used for farming.

- Harold Conklin is most noted within ecological anthropology for showing that **slash-and-burn cultivation** under conditions of abundant land and sparse population is not environmentally destructive (Netting 1996:268).
- Furthermore, he gives complete descriptions of the wide and detailed knowledge of plant and animal species, climate, topography, and soils that makes up the ethnoscientific repertoire of indigenous food producers (Netting 1996:268).
- He sets the standards for ecological description with detailed maps of topography, land use, and village boundaries (Netting 1996:268).
- Conklin's work focuses on integrating the ethnoecology and cultural ecology of the agroecosystems of the Hanunoo and Ifugao in the Philippines (Barfield 1997:138).

Ellen, Roy F. (1947-)

the ways people meet their basic needs, particularly the procurement and processing of food

- Roy F. Ellen studies the ecology of subsistence behaviours, ethnobiology, classification, and the social organization of trade (Moran 1990:x).
- His work with the Nuaulu in West Java has led him to develop awareness concepts concerning indigenous peoples and their understandings of the environment (Ellen 1993).
- Ellen has published *Nuaulu Settlement and Ecology* (1981); *Environment, Subsistence and System: The Ecology of Small-Scale Social Formations* (1982); *Social and Ecological Systems; and Malinowski between Worlds* (1989).



Culture Core

- ➡ Julian Steward (1955:37) defined the *cultural core* as the features of a society that are the most closely related to subsistence activities and economic arrangements.
- ➡ Furthermore, the core includes political, religious, and social patterns that are connected to (or in relationship with) such arrangements (Steward 1955:37).



Ethnobotany

➡ Ethnobotany is an ethnoscientific study of the relationship between human beings and plant life. During the 1960's ethnobotanical units were used in ecological comparisons (Kottak 1999:24).

Ethnoecology is the scientific study of how different groups of people understand the ecosystems around them and their relationships with the surrounding environments

Historical Ecology

- Historical ecology examines how culture and environment mutually influence each other over time (Barfield 1997:138). These studies have diachronic dimensions.
- Historical ecology is holistic and affirms that life is not independent from culture. This is an ecological perspective adhering to the idea that the relationship between a human population and its physical environment can be examined holistically, rather than deterministically.
- Landscapes can be understood historically, as well as ecologically. Historical ecology attempts to study land as an artifact of human activity (Balée 1996).

concerned with the way in which something, especially language, has developed and evolved through time

Holistic: relating to or concerned with wholes or with complete systems rather than with the individual parts.

an object made by a human being, typically one of cultural or historical interest.

Methodologies

Ecological anthropology has utilized several different methodologies during the course of its development.

- The methodology employed by cultural ecology, popular in the 1950s and early 1960s, involved the initial identification of the technology employed by populations in the use of environmental resources (Milton 1997).
- Patterns of behavior relevant to the use of that technology are then defined, and lastly, the extent to which these behaviours affect other cultural characteristics is examined (Milton 1997).

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Marvin Harris's work led to the development of new methodologies in the 1960s.

- Harris's cultural materialism incorporates the ecological explanation and advances a more explicit and systematic scientific research strategy (Barfield 1997:137).
- The concept of adaptation was Harris's main explanatory mechanism (Milton 1997). His research, describe in *The Cultural Ecology of India's Sacred Cattle* (1966), indicated his methodology of extensive literary research and comparison.

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Rappaport and Vayda also contributed importantly to the application of new methodologies in the 1960s.

- They focus upon the ecosystem approach, systems functioning, and the flow of energy.
- This ecosystem approach remained popular among ecological anthropologists during the 1960s and the 1970s (Milton 1997). Ethnoecology was a prevalent approach throughout the same decades.
- The methodology of ethnoecology falls within cognitive anthropology

Ethnoecology is the scientific study of how different groups of people living in different locations understand the ecosystems around them, and their relationships with surrounding environments.

The Ecosystem-based model of human ecology


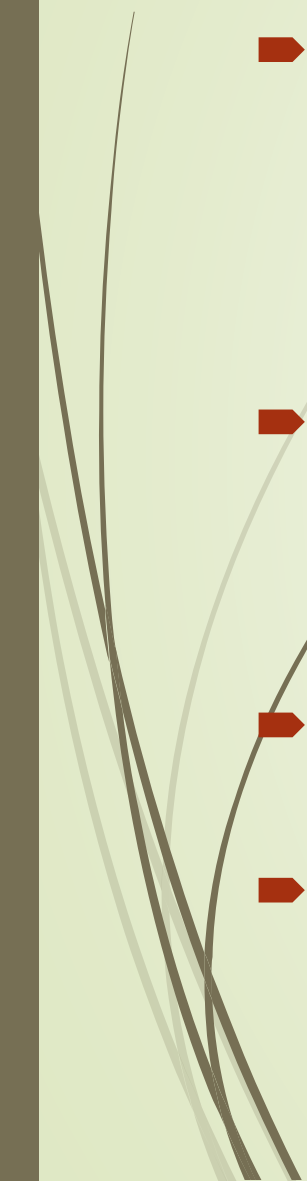
- American anthropologists Andrew Vayda and Roy Rappaport suggested that instead of studying how cultures are adapted to the environment attention should be focused on the relationship of specific human populations to specific ecosystems.
- In their view, human beings constitute simply another population among the many populations of plant and animal species that interact with each other and with the nonliving components (climate, soil, water) of their local ecosystem.
- Thus the ecosystem, rather than the culture, constitutes the fundamental unit of analysis in their conceptual framework for human ecology.
- Cultural traits are of interest only as they can be shown to contribute to the population's survival in the context of the ecosystem.

Roy Rappaport

- Roy Rappaport's well-known work *Pigs for the Ancestors* (1968), follows the ecosystem-based model of human ecology and attempted to demonstrate how the religious rituals practiced by the Tsembaga tribal group of New Guinea functioned to maintain their population in balance with the available resources of their environment.
- Rappaport saw religion, an institution that Steward had largely excluded from his concept of the ecologically adaptive cultural core, as playing a key regulatory role in relations between the Tsembaga population and the other components of their ecosystem.
- The Tsembaga employ a swidden system of farming similar to that described by Geertz for the outer islands of Indonesia.
- The principal domestic animal raised by these New Guinea tribes is the pig.

Religious ritual and the environment

- The great ritual feasts (slaughtering of pigs) have often been thought to be an example of a maladaptive cultural trait similar to the sacred cows of India.
- Rappaport argued that, far from being a maladaptive feature of their culture, the ritual regulation of pig killing actually functions to better adapt the Tsembaga population to their tropical forest ecosystem.
- Rappaport asserted that the ritual restrictions of killing pigs only on certain ceremonial occasions serves to -
 - (1) maximize the supply of protein at times when the Tsembaga most need it, and
 - (2) maintain the size of the Tsembaga population in balance with available resources.
- Tsembaga's killing of pigs is done for supernatural reasons to appease evil spirits believed to cause sickness and ensure the help of ancestral spirits in fighting



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- Rappaport not only sees ritual as serving the nutritional best interests of the Tsembaga population; he further claims the ritual cycle functions to maintain the population density compatible with the long-term carrying capacity of the ecosystem by regulating the frequency and intensity with which warfare occurs.
 - According to the cultural ground rules followed by the tribes of the New Guinea highlands, war is only permitted during certain limited periods, the beginnings and ends of which are signaled by great ritual pig feasts.
 - No group can go to war, however great the provocation, until a sufficient herd has been assembled to hold a proper feast.
 - Thus, the very ability of the Tsembaga to engage in war is determined by their ability to produce pigs, and their ability to raise pigs is determined by the overall state of their ecosystem.


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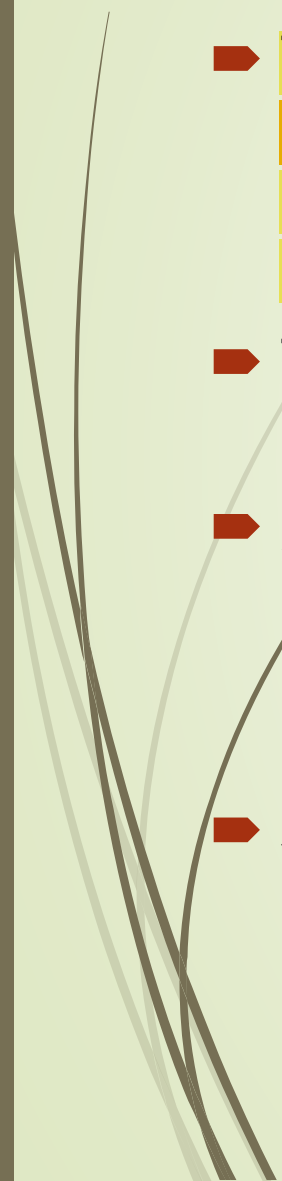
- Of course the Tsembaga are not concerned with ecological efficiency; they slaughter pigs for religious and social reasons and not because they are striving to ensure the maximum flow of protein from the ecosystem to themselves.
- In particular, the mass slaughter of pigs at the end of a truce is intended to display the wealth and power of the tribe to potential friends and enemies alike while ensuring the support of both their ancestral spirits and their human allies in the next round of fighting.
- The mass consumption of pork on these occasions, however wasteful it may be from a nutritional standpoint, serves the social needs of the Tsembaga by promoting the formation of effective alliances with needed allies in the coming war.
- The efficacy of the ritual slaughter should therefore be assessed, not as Rappaport has done in terms of the interaction of the Tsembaga population with their local ecosystem, but-in terms of the adaptation of the tribal society to the conflict-ridden social environment of the New Guinea highlands.



Actor-based model of human ecology


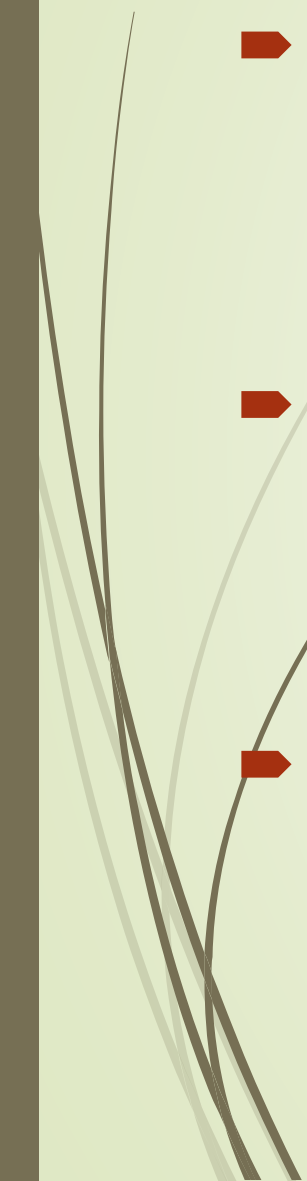
- This actor-based model of human ecology, as Orlove (1980) has labeled it, has become the major new wave in human ecology. [Adaptation occurs at the level of individuals rather than of cultures or populations]
- The model reflects both anthropologists' general concern with individual decision-making processes and evolutionary biologists' current preoccupation with showing that natural selection operates exclusively at the level of the individual organism.
- From this perspective, any higher levels of organization, whether communities, ecosystems, or human social systems, exist only as the fortuitous outcome of interactions among many individual organisms.



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- In the case of human society, therefore, environmental adaptation is seen as occurring not as the result of natural selection on the cultural or social system level but rather as the result of the outcome of thousands of individual decisions about how best to interact with the environment.
 - Individuals are assumed to be making choices constantly about how to exploit available resources while coping with environmental hazards. Those who make the "correct" choices will survive and prosper; those who choose less wisely will be selected against.
 - For example, an actor-based analysis of the Tsembaga might explain the ritual cycle of pig killing described by Rappaport as simply the accidental outcome of hundreds of separate decisions by individual tribesmen about how to best maximize the use of the limited resources available in order to achieve power and prestige within their society.
 - Thus, while the success of the feast from the societal viewpoint is measured by the total number of pigs that are sacrificed, the status of each individual Tsembaga male is enhanced only in direct relationship to the number of pigs that he contributes.


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- The larger the number of animals he can kill, the greater the number of guests he can entertain and the larger the portions of meat he is able to present to his guests, thus placing them under greater obligation to assist him in the future.
 - Each Tsembaga male therefore will seek to build up the largest herd that his family's labor force can support. Only when he reaches that limit will he want to hold the feast and only when a sufficient number of men have achieved the desired number of pigs will the community as a whole agree that it is time for the ceremonial slaughter.
 - It may be, as Rappaport claims, that this happens before the carrying capacity of the ecosystem is exceeded and its future productivity degraded but, from the perspective of the actor-based model of decision making, this happy result is no more than the summed outcome of many separate individual decisions.

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- The actor-based model, with its emphasis on the processes by which people make decisions about how to interact with their environment, is a valuable approach for understanding how change occurs in social systems in response to environmental perturbations.
 - The approach is particularly useful for the insight it gives in to why traditional farmers accept or reject agricultural innovations.
 - A study by Michael Mocrman (1968) has, for example, helped to explain why peasant rice farmers in northern Thailand have adopted tractors under certain environmental circumstances while they continue to rely on water buffalo under other circumstances.
 - Similarly, Michael Calavan (1977) has shown how willingness of Thai farmers to plant improved rice varieties reflects rational consideration of environmental forces affecting crop yields. Logical

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- Asian peasants are shown to be highly rational *decision* makers who carefully assess agricultural innovations in terms of potential benefits and costs.
 - Despite their promise of higher yields, "modern" cropping methods are often rejected because such innovations may require high inputs of fertilizer, pesticides, and water.
 - These inputs are unavailable to the poorer farmers, and modern cropping methods are also much more vulnerable to environmental hazards such as floods, droughts, and insect and disease outbreaks.

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- An individual Tsembaga tries to raise the largest possible pig herd, not because that is the optimum strategy for adapting to the New Guinea environment but because that is the way in which he can gain status within Tsembaga society;
 - Similarly, a Thai farmer chooses to grow rice variety A instead of rice variety B because he believes that it will give him a higher yield from his land and a higher yield will allow him to live in the style that Thai culture considers good.
 - Their decisions may or may not be correct ones within the context of their cultural values, but they as individuals did not create these values. Instead, the values are a pre-existing aspect of the social systems into which these individuals were born.



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- As children they were socialized to accept these values as correct, and as adults they make their choices about interactions with the environment in terms of those values.
 - The actor-based model of human ecology is thus one of limited applicability. It can reveal a great deal about why individuals within a particular social system make the particular choices about interactions with the environment that they do, but it cannot explain why their social system presents them with the particular choices it does.





Cultural traits, therefore, do not necessarily function to ensure the welfare of either individuals or local populations but instead serve primarily to ensure the survival of the social system itself.

- From this perspective, the ritually regulated warfare of the Tsembaga is not seen as directly benefiting either most individual Tsembaga or the Tsembaga local population as a whole.
- In the systems model of human ecology both the social system and the ecosystem with which it interacts retain their integrity as systems, with each changing its structural configuration according to its internal dynamics.

The state of being whole and undivided.

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- The point of this discussion is that the relationship between the social system and the ecosystem is both complex and dynamic.
 - The virtue of the systems model of human ecology is that it focuses attention on the processes of change and adaptation rather than emphasizes the static structural characteristics of the social and ecological systems.
 - Moreover, this approach avoids any necessity for specification of any universal "prime mover" for change: neither environmental nor social factors have any *a priori* primacy because impulses for change may flow in either direction

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- There is no inherent *contradiction* between the systems model and the actor-based model of human ecology.
 - The latter approach is simply one among many that can be incorporated within the larger social systems framework. Certainly, decision making by individual participants affects both the character of the social system and its interactions with (the ecosystem, but, as has already been discussed, all such decisions are made within the context of these systems).
 - Perhaps the greatest virtue of (the systems model of human ecology) is that it offers specific guidelines for doing research on human interactions with the environment.