

The Human Nutritional Equivalent (HNE) is a valuable tool for comparing different strategies for meeting a population's food needs that are nutritionally comparable but may have different land or other resource requirements. HNE refers to the amount of food needed to meet all nutritional requirements for the average consumer for one year, representing all food groups combined in the proper proportions to constitute a complete diet.

The foodshed model first introduced HNEs as an example of a methodology to help analyze a population's nutritional needs and the carrying capacity of the land to meet these needs.<sup>1</sup> Carrying capacity is defined as the environment's maximal load, or the maximum number of individuals of a given species that an area's resources can sustain indefinitely without significantly depleting or degrading those resources. Such a measure can be applied in multiple contexts, however: from farmland preservation to food security to the growing food-versus-fuel debate. For example, HNEs could help people examine how cities might change how and where they source food to help curb greenhouse emissions.

## HNE ACROSS CULTURES

In theory, an HNE represents a diet containing foods in adequate quantities and varieties to meet human nutritional requirements. Because of differences in food preferences based on geographic location and culture, diets can differ substantially from place to place and person to person. Examples include strictly vegetarian or vegan diets and a wide range of omnivore diets. An HNE often reflects dietary recommendations and food consumption preferences. Once the individual foods that make up the HNE are defined, one can estimate the land and resource requirements to sustain that diet for a population.<sup>2</sup>

## THE FOODSHED MODEL METHODOLOGY

According to the diet used in the foodshed model, one HNE weighs 2,750 pounds, provides 2,300 kcal (23,000 calories) per day and contains representatives from all major food groups: grains, fruits, vegetables, dairy, protein, added fats, and sweeteners. The amount of dairy in each diet is the only constant. The nutritional requirements for the average person were determined based on recommended intake for different age and gender groups and population demographics.<sup>3</sup>

## FINDINGS FROM NEW YORK STATE

Research gathered through the foodshed model revealed that a strictly vegetarian diet required less than half an acre of land to meet one HNE, that is, to provide the food needs for one person for a year, whereas a diet low in fat and high in meat (e.g., 20 percent calories from fat) required more than 2 acres of land to meet one HNE. New York state consists of a higher degree of lands suitable for the production of perennial forage crops, or crops that grow back, than those lands required to support annual crops. Therefore, the foodshed model found that the most efficient New York state diet — defined in terms of the amount of people who can be fed based on the land available — consists of modest to low meat intake. However, a number of tested diets were fundamentally comparable in terms of their potential carrying capacity.

Examining HNEs is a way to normalize diets, since HNEs represent all food groups combined in the proper proportions to constitute a complete diet for the average consumer for one year.

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<sup>1</sup> Peters, C. J., Wilkins, J. L., & Fick, G. W. (2007). Testing a complete-diet model for estimating the land resource requirements of food consumption and agricultural carrying capacity: The New York state example. *Renewable Agriculture and Food Systems*, 22(2), 145–153.

<sup>2</sup> Peters, C. J., Bills, N. L., Lembo, A. J., Wilkins, J. L., & Fick, G. W. (2009). Mapping potential foodsheds in New York state: A spatial model for evaluating the capacity to localize food production. *Renewable Agriculture and Food Systems*, 24(1), 72–84.

<sup>3</sup> Peters et al. (2007).