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Land and Diet: What's the most land efficient diet for New York State?

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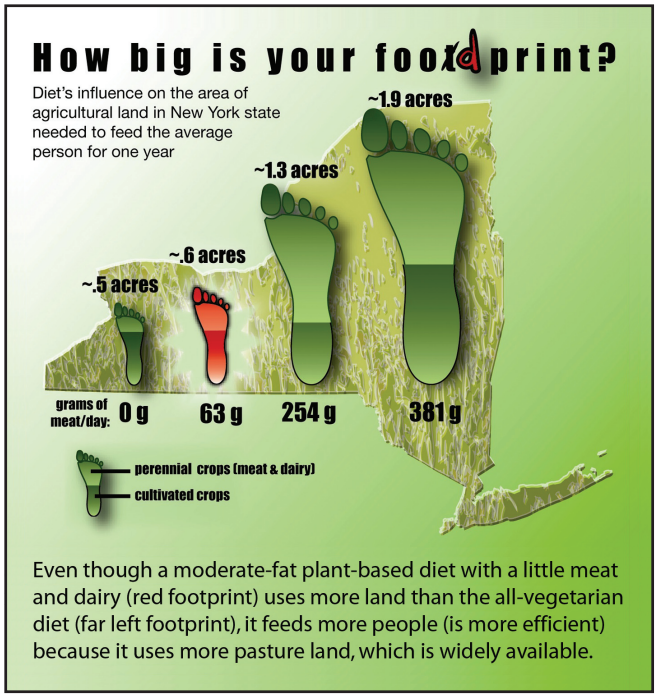
Increasing numbers of consumers are considering the environmental, social and economic impacts of their food purchasing and consumption habits.[1] To reduce environmental costs associated with transportation and support local economies, some consumers favor buying and consuming locally or regionally produced food. While this approach may seem logical, to support the nutritional requirements of a population an area's land base must be able to produce an appropriate variety and quantity of foods. Research suggests that while New York State doesn't have the land base to provide for its population's *total* food needs, more people could be fed by making some important adjustments to both diet and land use.[2]

We set out to understand how diet influences the amount of land needed to produce the food we eat and, consequently, how many people can be fed by the NYS land base. We compared 42 complete diets (2300 calorie/day) – all including the same NYS grown grains, fruits, vegetables, and dairy products, but varying in the amounts of meat and in the amounts of energy supplied by fats. We found a five-fold difference in acreage requirements between the diets incorporating the least amount of fat and meat and those with the least amount of fat and greatest amount of meat. A person following a low-fat vegetarian diet requires less than half an acre per year to produce the food required for their meals while a person consuming a low-fat diet with a lot of meat requires over 2 acres.

Importantly, even though all the vegetarian diets require less land than the meat diets, they do not necessarily feed the most people (see illustration). Because different soil types are suited to different crops (some of which are not consumed directly by humans), more people can be fed when their diets are not strictly vegetarian. The components of a vegetarian diet – fruits, grains, and vegetables – require high quality land, whereas meat producing animals can be raised on lower quality lands which produce crops we don't eat. In NYS, more land is suited to perennial forage production (pasture, dry hay, haylage, and greenchop) than for growing annual crops (corn, soy, wheat, and vegetables). In other words, land suited to the production of dairy and meat but not fruits, grains, and vegetables is more readily available, making it theoretically possible to feed more people who eat a modest amount of meat than those whose diets are completely vegetarian.



Source: Illustration by Steve Rokitka/University Communications. This graphic originally appeared in the Cornell Chronicle,10/5/07.

"Modest amount" of meat is the key, however. If all of the land suited to producing meat but not plant foods is used, *additional* meat production would require the use of land required for the production of plant foods. In order to achieve the most efficient balance between land use and consumption, our research suggests that New Yorkers would need to limit their egg and meat consumption to 2 cooked ounces per day. This adjustment would require a significant reduction in meat consumption, as the average American consumed almost 6 ounces of such products per day in 2005.[3] It would also require NYS producers to significantly change their land use practices. The influence of diet on land use has important implications for individuals and communities. Understanding these relationships can help policy makers ensure the well-being of both.

[1]Wilkins, J. How many people can the land feed? Depends on the amount of meat and milk in the diet. Hunger and Environmental Nutrition Newsletter, American Dietetic Association Hunger and Environmental Practice Group. Winter 2008. http://www.hendpg.com/

[2]Peters, CJ, Fick GW, Wilkins JL. 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.* 2007; 22(2): 145-153

[3]U.S.Department of Agriculture, Economic Research Service. 2007. Food consumption (per capita) data system: Loss-adjusted food availability. Available at Web site: http://www.ers.usda.gov/Data/FoodConsumption/FoodGuideIndex.htm (verified 19 June 2008).

* Heidi Mouillesseaux-Kunzman serves as guest editor for this issue.

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