Homework Assignment #2
Food Prices, Nutrients and the Least-Cost Diet
(due Thursday, Sept. 25th in class)

This exercise is intended to give you a sense of the magnitudes and trade-offs involved in the nutritional aspects of food consumption choices. You will use real data from authoritative sources. [Note: if you access this assignment from the course website (www.agecon.purdue.edu/academic/agec640) you will have live links to the data sources. This will alleviate you from the need of retyping each website’s URL.]

To save time you are welcome to work in groups – up to a point. I encourage you to do the data work in groups. In other words, share the burden of making a single spreadsheet with common numbers in it to facilitate the computations. However, beyond this you should plan to work alone. Your explanations should be written separately. It is easy to make mistakes, so if you do work with others to enter data and make computations, be sure you fully understand what has been done and can explain the result! As you work through the exercise, pace yourself and don’t take too long on any one question. Time is always the key constraint.

You should submit your answers in a single document that you can print and deliver to me in class. Unlike the 1st homework assignment, for this assignment your numerical results are best presented in tables rather than charts. [In developing your presentation “style” as a researcher it is important to become a master of both tables and graphs.] Your grade will depend on the quality of your tables (including the 3 Ls: Layout, Legibility, and Labeling) as well as the verbal explanations. The data should be formatted carefully so as to present data clearly – use the tables you see in your readings as exemplars. Explanations should be typed (I will not accept any hand-written assignments!). Place your text below or above the tables, but always make sure to label the tables and refer to them directly in your text (e.g. as “Table 1” not “the table”). Write as thoughtfully as possible in concise but complete sentences. If a sentence contains more than 1 idea, then break it into multiple sentences!

Part 1. If you suddenly became very poor, what would you eat?

1.1 What would you buy? During your next grocery shopping trip identify a small basket of food items that you think might be the lowest cost way to meet what you would guess to be a biologically sustainable diet for a day. The key here is to compile a short list of foods, including only what’s actually available for you to buy right now. Please include no fewer than 5 items and no more than 10 items. You should spend no more than 15-30 minutes actually choosing the foods, their units of measure, and their prices.

1.2 In a spreadsheet, begin to make “Table 1” of your assignment by listing the items (generic or brand names), their quantities or package sizes, and their prices. Compute their cost per kilogram, making any necessary measurement conversions. Then enter your best estimate as to how much you would actually buy and consume in kgs PER DAY, and compute this diet’s total cost per day. Be careful in this step. We are interested in DAILY consumption, so convert any large quantity packages to a realistic daily amount.

1.3 What would you actually get for your money? Go online to the USDA National Nutrient Database <http://fnic.nal.usda.gov/food-composition/usda-nutrient-data-laboratory> to compute the estimated nutritional value of what you’ve bought. We are especially interested in a few key nutrients (with their units of measurement in parentheses):
Macronutrients: Energy (kcal), Protein (g), Carbohydrates (g)
Micronutrients: Iron (mg), Vitamin C (mg), Vitamin A (RAE),

If you don’t find the exact same food items in the USDA database, choose a substitute that seems reasonably similar. For “Table 2” of your assignment, compute the quantity of the nutrients indicated above on a per day basis for each food item, as well as the total diet you have constructed.

[Note: in this part of the assignment you must exercise special care to get the correct units of measurement. These are usually reported per 100 grams of the food product. If so, you need to multiply by 10 to obtain the quantity per kilogram as in Table 1. If nutrients are reported in other units, convert accordingly.]

1.4 Have you acquired enough food to sustain you? Now go to the U.S. Institute of Medicine’s Dietary Reference Intake at http://fnic.nal.usda.gov/interactiveDRI/ to obtain the DRI recommendation for each of the six nutrients listed above, to find out what is required to sustain an average person of your age and sex.

[Note: these recommendations are computed and communicated depending on the type of nutrient. For total calorie intake (measured in kcal), use the “Daily Calorie Needs” to find the recommendation for someone who is as close as possible to your actual height, weight, sex, age and activity level. Vitamin measurement can be confusing. Keep an eye on the units of measurement.]

Once you have obtained these estimates of the actual nutrients required for a biologically sustainable diet, please compute what fraction of these needs would be met by the diet you actually chose in the earlier step of this exercise. Add this information to Table 2 in a column that shows your diet’s percentage of the recommended intake for each nutrient. These would be precisely 100% if you happened to have chosen a diet that exactly meets your RDA needs, but this is very unlikely. Almost everyone has a daily diet that is somewhat above or below 100% of her RDA.

1.5 Could you afford this diet if you were really poor? Go online to the World Bank’s World Development Indicators <http://databank.worldbank.org/data/home.aspx>. You can get there directly or via the World Bank Data selection under the dropdown “Databases” tab at www.lib.purdue.edu/mel. Use these data to compute what your income would be if you were a typical low-income person. For “Country” select one country from sub-Saharan Africa and one other non-SSA low-income country of your choice. For “Series”, use the search box to select “GDP (current LCU)”, “GDP (current US$)”, “GDP, PPP (current international $)”, and “Population, total”. Then choose the most recent year of data available, and “export” to save the result as an Excel spreadsheet. Then compute the per-capita value of each type of income, in current LCU, current US$, and in PPP International $. Note that income in PPP (“purchasing power parity”) terms is computed using local prices for what is bought, whereas ordinary GDP per capita in LCU (local currency units) is converted to US$ at prevailing exchange rates. In one or two paragraphs, please explain: Which level of measured income would be more relevant to your ability to buy food in the United States, at the prices you recorded in part 1.1, if you took your income from that country and travelled to the U.S. with dollars converted at the official exchange rate? Which would be more relevant to your ability to buy food in the countries you chose, at local prices in your home area? What proportion of the relevant income level would it cost to buy the food basket you chose for question 1.1? And finally, what do you think might be the cost of a similar food basket in the country, and what proportion would that be of the relevant income level?

2. What do very poor people actually eat? Answering this question well turns out to be quite difficult. It is very instructive to consider two different approaches: the FAO’s “Food Balance Sheets” that add up total annual availability in a country, and then household surveys that ask individuals what they have eaten in recent days.

2.1 Food Balance Sheet (FBS) data. For the aggregate approach, go online to FAOSTat database of “Food Balance Sheets” (find the relevant button in the upper right-hand corner of the page linked at
http://faostat3.fao.org/home/index.html#VISUALIZE). Select your first country and the most recent year of data available (probably 2012), then click download the data to make your own table. Do the same for your other chosen country, and then for both countries please cut and paste the results to make a nice, publication-quality table. Include only the far-right columns of the Food Balance Sheet, for food quantity in terms of weight (kg) and energy content (kcal), and protein (g), and the most important rows (the 10-20 foods you think are most significant in the diet, plus category totals). To make sense of your data, please write a brief (one- or two-paragraph) explanation of how these quantities differ from the ones in your own food basket.

2.2 Food survey data. One particularly accessible set of data comes from South Africa, and is available at <http://www.mrc.ac.za/chronic/foodstudies.htm>. Browsing the full document is interesting, but for this assignment all you need is to open “Part 2” (http://www.mrc.ac.za/chronic/foodstudy2.pdf), and cut and paste from pages 77-8 the last column of results using “method 1”, showing the estimated intake of rural people aged ten and older. Then write a brief (one- or two-paragraph) explanation of how these quantities differ from those in your food basket.

[Note: in this survey, all quantities include the weight of their water content, so for example tea is listed as a major food item even though it has almost no nutrient value, and the quantity of maize porridge shown (858 g/person/day) is measured in terms of its weight after preparation. To make sense of these numbers, please describe what it would be like to eat this quantity of maize.]

3. Conclusions. This exercise asks you to try to solve one of the fundamental problems faced by very poor people, and to check whether you got the same answer that they do. This is the heart of economics: we ask what the optimal solution to a problem would be, and then look to see how close people really are to that solution. In fact the minimum-cost diet problem is often used to teach the mathematics of constrained optimization (as in AGEC 552). But food choices are among the most emotional, culturally-influenced decisions people make, and their choices differ widely. To conclude, please summarize one or two facts or insights that you found during this exercise to be particularly surprising. Then, in a brief paragraph, how might you explain the similarities and differences between your chosen food basket, and what very poor people actually eat?