

LCFS Expert Workgroup: Food Consumption Draft Work Plan for Discussion

1. Membership:

- a. Chair: Michael O'Hare
- b. EWG members: Blake Simmons, Seth Meyer, John Sheehan
- c. ARB staff representative: Jim Duffy

2. Priority topics/questions that the subgroup proposes to address:

The focus of the subgroup will be on comparing and evaluating existing estimates of the effect of substituting crop based biofuel for fossil fuel on world food and fuel prices and food consumption. We will describe these estimates and where possible critique and evaluate different models and methods used to obtain them. As other subgroups are focused on general reliability and accuracy of economic models used for land use change (LUC) estimation, our attention will be restricted to how food effects are modeled. Particular attention will be paid to understanding GTAP simulations. As it is unlikely that the subgroup will make significant progress in achieving all of the tasks described below prior to the deadline for the Expert Workgroup to submit a report this fall, much of the subgroup effort will be directed toward detailed recommendations for future work.

- a. Understanding GTAP simulations of the substitution of crop based biofuel for petroleum based fuel: Using the results from GTAP simulations, we will attempt to gain a better understanding of how and to what extent the model predicts changes in food consumption. As part of this study we will attempt to determine:
 - i. the amount by which GTAP simulations predict that agricultural commodity and petroleum based fuel prices will change.
 - ii. the amount by which GTAP simulations predict that non-biofuel agricultural commodity consumption will change.
 - iii. the primary means by which agricultural commodity consumption changes occur in GTAP simulations. For example, are simulated food/feed consumption changes primarily the indirect result of decreased production and consumption of livestock or are they primarily the direct result of decreased consumption of agricultural commodities by the world population (or are both major factors).
 - iv. the extent to which changes in food consumption disproportionately affect low income populations. Can the results of GTAP simulations be used to show which populations are most affected by agricultural commodity price and consumption changes?
 - v. the extent to which feedback from changes in petroleum based fuel prices affects changes in agricultural commodity prices and consumption. For example, the substitution of corn ethanol for gasoline is expected to exert downward pressure on the price of gasoline. Reduced gasoline prices will have a feedback effect by exerting downward pressure on the cost of producing agricultural

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- commodities. Is this feedback properly modeled in GTAP and to what extent does this feedback affect changes in food consumption?
- vi. how much of a LUC credit GTAP allocates for global agricultural commodity consumption changes. For example, if food consumption were held constant in GTAP during simulations, what would be the resulting effect on LUC? Hertel et al. have examined this as part of their 2010 Bioscience paper. Wally Tyner mentioned at the June 17 meeting that Purdue has a new paper in review that examines this for the most recent modeling performed for Argonne.

If the above information cannot be determined using the results of existing GTAP simulations, the subgroup may propose modifications to GTAP and/or new simulation experiments necessary to obtain this information.

- b. Model comparison and validation: Compare the results (e.g. agricultural commodity and petroleum based fuel price changes, food consumption changes, etc) from various economic/agricultural models (e.g. GTAP, IMPACT, FAPRI, MIRAGE, others). The JRC report on LUC model comparison may help inform this task.
 - i. Are GTAP model results consistent with those of other models?
 - ii. Can model results be validated using empirical data or other means?

3. **Invited technical advisors and other additional support needed:**

Proposed list of technical advisors

- a. IFPRI: Mark Rosegrant and/or Siwa Msangi
- b. GTAP: Wally Tyner (EWG member)
- c. FAPRI: Seth Meyer (EWG and Food Consumption subgroup member)
- d. MIRAGE Expert?
- e. Rosamond Naylor, Director of the Program on Food Security and the Environment, Stanford University
- f. C. Ford Runge, Center for International Food and Agricultural Policy, University of Minnesota
- g. Ronald Trostle, USDA
- h. JRC: Robert Edwards