Forecasting Agriculture's Future in a Water Quality World

What? Develop the CBP Partnership capacity to generate 10-year, and 20-year forecasts of agricultural land and production based upon historical trend data, analysis of driving forces (markets, technologies, policies) , and stakeholder' practical insights regarding future trends.

This capacity will include"

1. A set of narratives (e.g., storylines) with which to forecast the likelihood of future agricultural non-point source loads based on the range of potential and plausible market changes, technological innovations and regulatory policies and incentives.
2. Improved interpolation and extrapolation of agricultural land use and production trends.
3. Spatially simulate future changes to the agricultural land base and production.
4. Spatially quantify the potential relative resistance of farms to conversion to development based on farm demographic, economic, and environmental characteristics.

Why?

Equity across sectors:

The CBPP currently uses long-term forecasts, i.e., "future scenarios," for the urban sector, to account for practices and innovations beyond the realm of historical trends and current technologies. This capacity is used to inform policy goals and investment decisions and to complement and support Phase 3 WIPs, Nutrient Trading and Offset Strategies. No such capacity exists for agricultural sector placing the sector at a disadvantage.

Examine problems showing up in current scenarios:

Current model assumptions foreshadow potential "problems" for the Ag sector, i.e., greater nutrient imbalances as Ag land is developed and crop and animal production increase. Better forecasting may show how technologies, genetics, management systems could address these problems (as is currently the case with environmental site design in the development sector).

Opportunity to increase Ag Industry collaboration

Ag industry representatives have shown an increased willingness to share data to improve the accuracy of the CBP Models (e.g., Building a Better Bay Model Conference, collaboration between poultry integrators and Penn State). This effort can expand on this trend and strengthen the partnership.

How?

1. Convene crop and livestock industry reps, agencies and farm economists in an "AG Futures Group"

2. Collect input from structured interviews and roundtable discussions to:
    a. Obtain data on production trends that will affect nutrient loads to the Bay, e.g., crop genetics, animal nutrition, new technologies,
    b. Identify coherent sets of logical assumptions that describe and bound the plausible future of agriculture in the watershed.

3. Downscale USDA regional agricultural projections.
   The USDA-ERS projections, based on national yield distributions and marketing conditions cover farm commodities, trade, and aggregate indicators of the sector. The project team will:
    a. Perform a statistical disaggregation of projections for 9 major crop commodities and 6 animal products;
    b. Translate regional commodity projections and input from industry and economists into estimates of state crop composition/ acres/rotations and animal numbers;
    c. Allocate the state-level demand projections for crop acres and animals to counties within each state through enhancements to the CBPO Land Change Model.

4. Develop alternative future scenarios
   Futures Group workshops identify policies, regulations, and technologies that may impact industry and farmer decisions. Develop alternative future scenarios and combine with the USDA's downscaled data to generate county-level agricultural forecasts.

    1. Business As Usual- extrapolation of historic trends + WIP implementation
    2. Policy Implementation – urban growth management (e.g., Plan Maryland), nutrient management, etc. that affect sector loads and spatial distribution.
    3. Market Forces – meeting the long-term demand for commodities and services including offset capacity, taking into account changes in crop genetics, animal nutrition, and the adoption of new technologies.
    4. Agricultural Sustainability – aggressive protection of productive soils and urban growth management, reforestation, broad adoption of new technologies, and better management of nutrient imports and exports in the face of climate change.

5. Evaluate alternative future scenarios
   With the CBPO, estimate nutrient and sediment loads and regional offset capacity associated with each scenario. Review by Ag Futures Group and the Ag Workgroup.

6. Watershed Stakeholder review of scenarios and impacts

   Host a third workshop of broad stakeholder interests (e.g., land use, habitat, open space, forestry, water quality) to review the scenarios and potential impacts of policies, markets, and investments. Gain insights into common interests and concerns across sectors and identify the components to support a vision for sustainable agriculture in the watershed.

7. Compile input and write final report with finalized scenario version.

Outcomes

- Accurate, well informed and scientifically sound data on future agricultural trends are supported by a broad spectrum of the scientific, agricultural and environmental communities.
- A documented and replicable process/protocol for deriving county scale agricultural trend data from national and regional projections is available to Bay Partnership and jurisdictions.
- A set of feasible policy and program options that public and private decision-makers may use to promote the sustainability of agriculture while meeting the TMDL requirements.
- A shared vision and commitment to policy options that restore the Bay and foster a vibrant agricultural economy.