

# CAMS iFarm Research Question Ideas

## 1 Questions

1. How does crop density affect nitrogen pollution? Can we plant “cheap” crops to offset N surplus similar to pond “scrubbing” or planting trees to reduce runoff?
  - See how to balance the cost of “scrubbing” crops within current financial situation.
  - Possibly need to consider long-term costs (land usage, re-planting, etc.).
  - Extra data needed: per-crop costs.
2. Can we investigate the connection between reactive Nitrogen and Phosphorus created by human farming practices?
  - Method:
    - (a) Look for highest-polluting countries.
    - (b) Investigate which human practices might account for the excess pollution.
    - (c) Consider changes in practices to reduce pollution.
  - Extra data needed: same structure as for N, but for Phosphorus (yield, fertilization, fixation, deposition, surplus, crop content). Might need separate “reactive” nitrogen data to compare/contrast with non-reactive.
3. How might growth in population and climate change impact nitrogen pollution?
  - Consider how pollution might change with changes in population, assuming current rates and efficiency.
  - Room for regression techniques here to model changes/relationships represented by current datasets.
  - Extra data needed: More detailed country population and climate statistics: publicly available?
4. How does nitrogen pollution impact animal populations?
  - For example: Indus River Dolphin, established research suggests that there are only 1000 left, and they are heavily impacted by fertilizer runoff. How much does N pollution contribute to this?
  - Extra data needed: estimated animal populations by region (partially available via WWF), habitat regional data, farming data by geographic areas near habitats.
5. How drastically can single imports/exports of N affect the N economy in a single country?
  - Repeat example research question 1a across each country and crop. Determine which country has the greatest NUE or pollution impact when a single import or export is ceased.
  - What does this imply about the country’s N economy? Are there other implications/relationships to explain this?
  - Extra data needed: None.
6. How does the N economy differ between both geographic regions and crops?

- For example, compare affect of stopping a single crop import/export for different countries, controlling for volume, and see if one would be affected more drastically.
- What other factors can help determine these relationships? Region? Hemisphere? GDP?
- Extra data needed: None.