TECHNICAL APPROACH: NETWORKS TO REGRESSIONS

We use linear regressions combined with network formalisms to generate estimates of the significance and polarity of key organizations and roles in each survey state. We use a consistent set of roles across all four survey states, while we use SME (Subject Matter Expert) guidance to sub-select key organizations in each state.

Our consistent roles for pollination information sources across the study are based on functional groups identified in the data, and are 1) Beekeeper, 2) Commercial, 3) Commodity Group, 4) ConservationOrg, 5) Extension, 6) Farming Coop, 7) Government, 8) Grower, 9) GrowerOrg, 10) Meetings, 11) Non-Profit, 12) Pest Control Agents, 13) Personal Experience, 14) Published Materials (both online and print), and 15) Other.

In each state, the organizations of interest vary, but are primarily 1) university extension services, 2) dominant crop organizations, 3) federal organizations, 4) and pest control advocates. We keep the number of organizations limited to avoid unnecessary regression comparisons.

In each case, we develop a bipartite network graph to serve as a feature vector, based on each participant's answer to a specific survey question, "Please list the most important information source that you on pollinator management practices and why?". Although the question suggests a single most important information source, some participants provided multiple answers, while others refused to answer. The preponderance of participants provided one "important information source".

Participants (1393)	Count
No Response	592
1 Response	728
2 or more responses	73

The bipartite network that results is participant by information source. When we did the role analysis, we grouped information sources according to their roles, this produces a much denser network and resulting feature vector.

	Information Sources	Information Source Roles
Number	172	15
Links	881	870
Density	0.00368	0.0416

Viewed as a binarized matrix (which is then converted to a feature vector for statistical regression), if a link exists, then the value in the appropriate cell of the matrix is a '1', while if a link does not exist, the value in the appropriate cell is '0'. We merge this feature vector with a set of outcome variables of interest for each respondent. We then use linear regression to determine whether a source of information significantly correlates to innovative crop practices, including 1) non-

conventional pollinators (ICP), 2) non-conventional or wild pollinators (ICP.Wild), 3) use cover-crops to encourage bee pollinators (Covercrop), 4) create permanent habitat areas such as bee pastures or pollinator food plots (Permhabitat), and 5) create bee nesting sites (Nesting). Note that these comparisons include both negative and positive factors, and urge that these factors are strictly correlative. Also, because we do not have time series data, some outcomes may be unexpected. Purely as an illustrative example, extension agents may be listed as a negative factor for innovative crop practice, but this may be because growers who are interested but not yet committed to innovative crop practices are seeking out extension agents.