Multilayer network modeling of socio-ecological systems: Analyses to inform management strategies

Karen A. Garrett[1] **Robin A. Choudhury**

[1] *University of Florida, Gainesville, FL, US, 32611 garrettlab.com*

karengarrett@ufl.edu

Multilayer network models offer an important perspective on system interactions that determine whether invasive species are successfully managed and endangered species are protected. The success of intervention projects in ecological systems depends not only on the quality of a management strategy, but also how that strategy plays out among decision makers. Impact network analysis is a framework for evaluating the likely regional success of interventions before, during, and after projects, for project implementers, policy makers, and funders. INA integrates across three key system components: (a) the quality of a management strategy and the quality of information about it, (b) the socioeconomic networks through which managers learn about the management strategy and decide whether to use it, and (c) the biophysical network that results from those decisions. As an example of a system where these components must be understood to develop successful management strategies, laurel wilt of avocado is a recently introduced disease causing extensive damage in Florida. Management strategies to reduce the probability of establishment of this pathogen may or may not be adopted by each land manager in the region, and the resulting management landscape will determine whether the intervention project is successful. INA can be applied in general to evaluate the success of immediate intervention strategies, and to contribute to fundamental understanding about what makes interventions successful.

References

[1] Garrett, K.A., R.I. Alcalá-Briseño, K.F. Andersen, C.E. Buddenhagen, R.A. Choudhury, J.C. Fulton, J.F. Hernandez Nopsa, R. Poudel and Y. Xing. (2018): Network analysis: A systems framework to address grand challenges in plant pathology. Annual Review of Phytopathology 56:559-580.

---

[*]Mini-Symposium: Recent Advances in Epidemiological Modeling Arising from Human, Animal and Plant Communities