

Impact network analysis (INA)

RTB Seed System Toolbox Course:
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Purpose of impact network analysis (INA)

Provides scenario analysis to evaluate seed system outcomes. Key types of questions include:

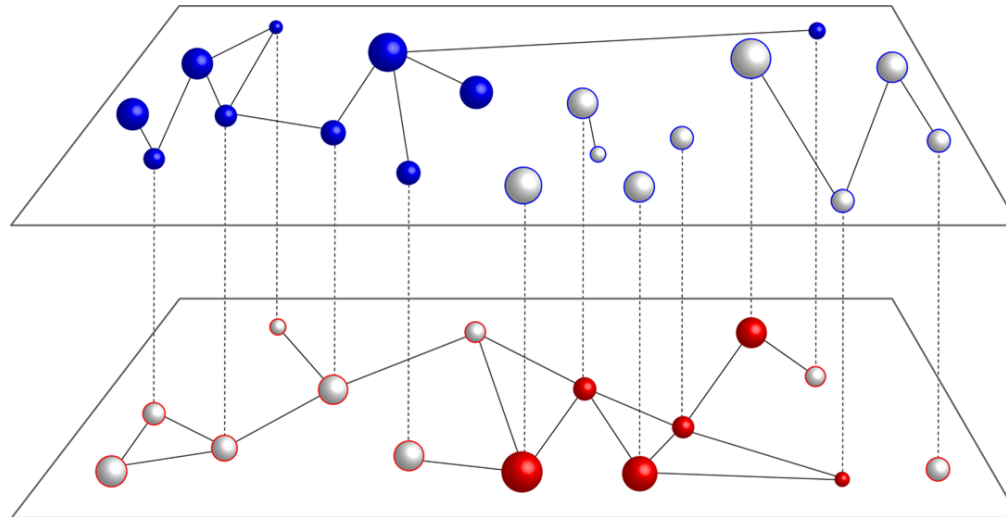
- What locations are particularly important for system management?
- How are the benefits of the system distributed by gender and age?
- How could subsidies and policies influence system outcomes?
- Are observations over time in line with goals for project monitoring and evaluation?



Structure of INA model

Socioeconomic network

Exchange of information among decision makers,
affecting variety/management adoption



Seed (and pathogen) movement network

Dispersal of a crop variety or pathogen/pest,
with establishment influenced by management adoption



Level and uses of INA

Level. Farm, village, country, or region

Users. People who design, implement or evaluate seed systems. INA may be used by people of different levels of experience with programming



Output and audience of INA

Output. Scenario analysis answering key questions identified by the research group, and new input for prioritizing field studies. Answers ‘what if’ questions about potential management and policy changes.

Audience. Seed intervention designers, implementers, evaluators, practitioners, researchers, donors and policy makers



Minimum sample size for INA

INA can be used to consider hypothetical scenarios, without any data collection

When precise estimates are needed for a particular system, enough data to characterize the system is needed



Resources and timing for using INA

If data are already in hand, or for a hypothetical scenario

Number of people: 1+ people to organize the data and define the scenarios of interest

Equipment: a computer with R software (R is free)

Expertise: 1+ team member needs experience evaluating biological/agricultural models in R

INA can be used at any point in a seed system project, when there are data or concepts available



Duration, INA

In a one-day workshop, an individual can provide a scenario, or a team can provide a group perspective, and evaluate outcomes

Estimating parameters for the model from a complicated data set may take a researcher a few weeks

If new variations on the existing code are needed, this may take an experienced R programmer several weeks



Steps for using INA

Step 1. Decide on the questions to be asked using INA (as an individual or as a group)

Step 2. Estimate model parameters from existing data (or define a hypothetical scenario)

Optional step 3. Collect new data describing seed systems in the field

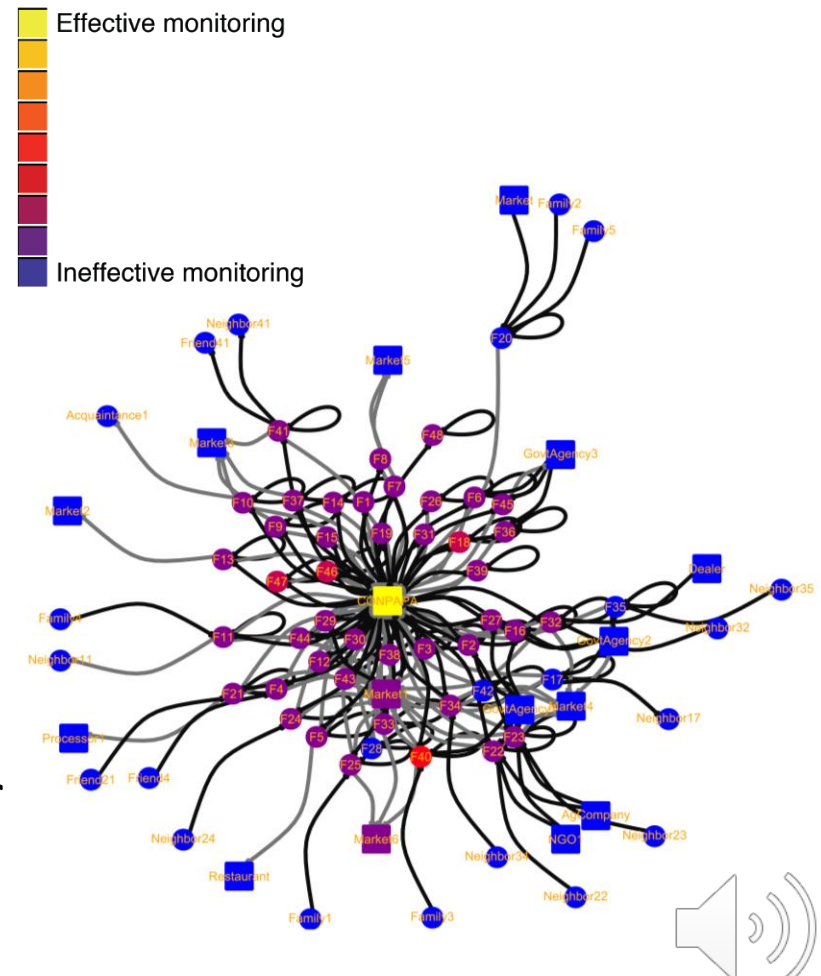


Steps (continued)

Step 4. Use the estimates (or scenario information) in the program in R to evaluate scenarios

Step 5. Evaluate the output of the model in light of the questions, and consider potential follow-up analyses

Step 6. Summarize the results for stakeholders and prepare a report and/or a journal article

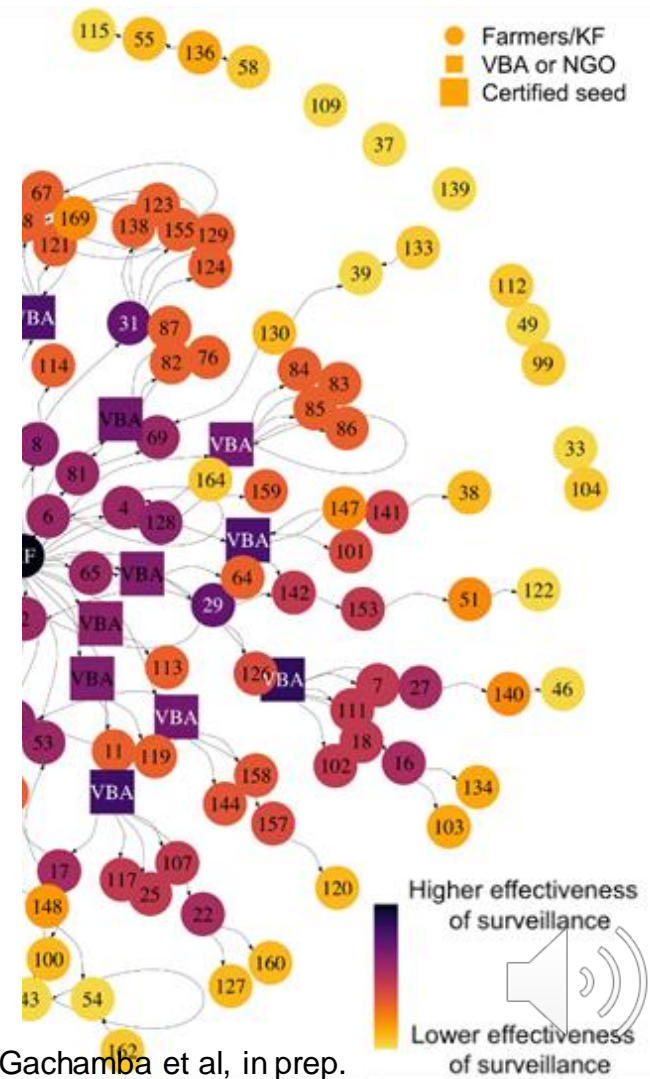


Methods that can be combined with INA

Literature review. Parameter estimates may come from published literature

Biological studies in the field. New data may be collected to characterize crops, pathogens, and field conditions

Social studies in the field. New data may be collected to characterize farmer decision making about management choices, and the structure of seed systems



Gender

Questions used with INA can incorporate gender – for example:

If gender influences access to management (e.g., resistant varieties, options for seed selection, purchase of clean seed), what are the implications for farmer success over time?

If gender influences a person's position in seed networks, what are the implications?

How would seed systems need to change to be equitable with regard to gender or other human traits?



Limitations of INA

It may be challenging to collect enough data about the structure of seed systems to give precise recommendations based on INA, so some analyses may be limited to discussion of general traits of systems.



Main advantages of INA

Improves understanding of how seed systems function and what strategies are likely to be more successful

Recent cases:

Introduction of the model and illustration of general scenarios for regional disease or crop variety management. *Methods in Ecology and Evolution*. [HERE](#)

Potato seed systems in Ecuador. *Phytopathology*. [HERE](#)

Sweetpotato seed systems in Uganda. *Phytopathology*. [HERE](#)

Potato seed systems in Republic of Georgia. *Ag. Systems*. [HERE](#)



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User guide: Garrett, K.A. 2021. User guide to impact network analysis (INA). Lima (Peru). CGIAR Research Program on Roots, Tubers and Bananas (RTB). RTB User Guide. No. 2021-4.

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