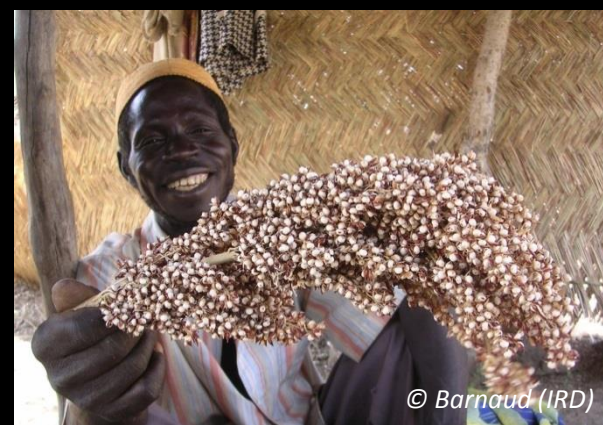


Studying seed circulation using social network analysis: lessons from the NETSEED project



Sophie Caillon

CNRS

For NetSeed and MIREs consortium



Atelier Agrobiodiversity Monitoring
Agropolis International, Montpellier, 24 mars 2015



Diffusion of diversity

- Pollen
- Seeds

Natural diffusion

Human-drive diffusion
(and with domesticated animals)

↪ Conscious diffusion



Informal seed systems



Farmers' seed systems



Custom ceremony, Tanna island, Vanuatu @McKey (Montpellier2)

Farmers' seed systems

Social networks / Seed circulation



Conserve / Evolution of agrobiodiversity



Custom ceremony, Tanna island, Vanuatu @McKey (Montpellier2)

Farmers' seed systems

Misconceptions (Coomes, McGuire et al. submitted) :

1. Inefficient for seed dissemination
2. Closed and conservative systems
3. Provide ready and egalitarian access to seed



Farmers' seed systems

1. They are vibrant, dynamic and constantly changing
2. They provide seed for over 80 % of smallholder farmers today
3. They are structured by social and cultural norms

(Coomes, McGuire et al. submitted)



Custom ceremony, Tanna island, Vanuatu @McKey (Montpellier2)

NETSEED

Agrobiodiversity and social network

NETSEED / CESAB-FRB

In France



In the world



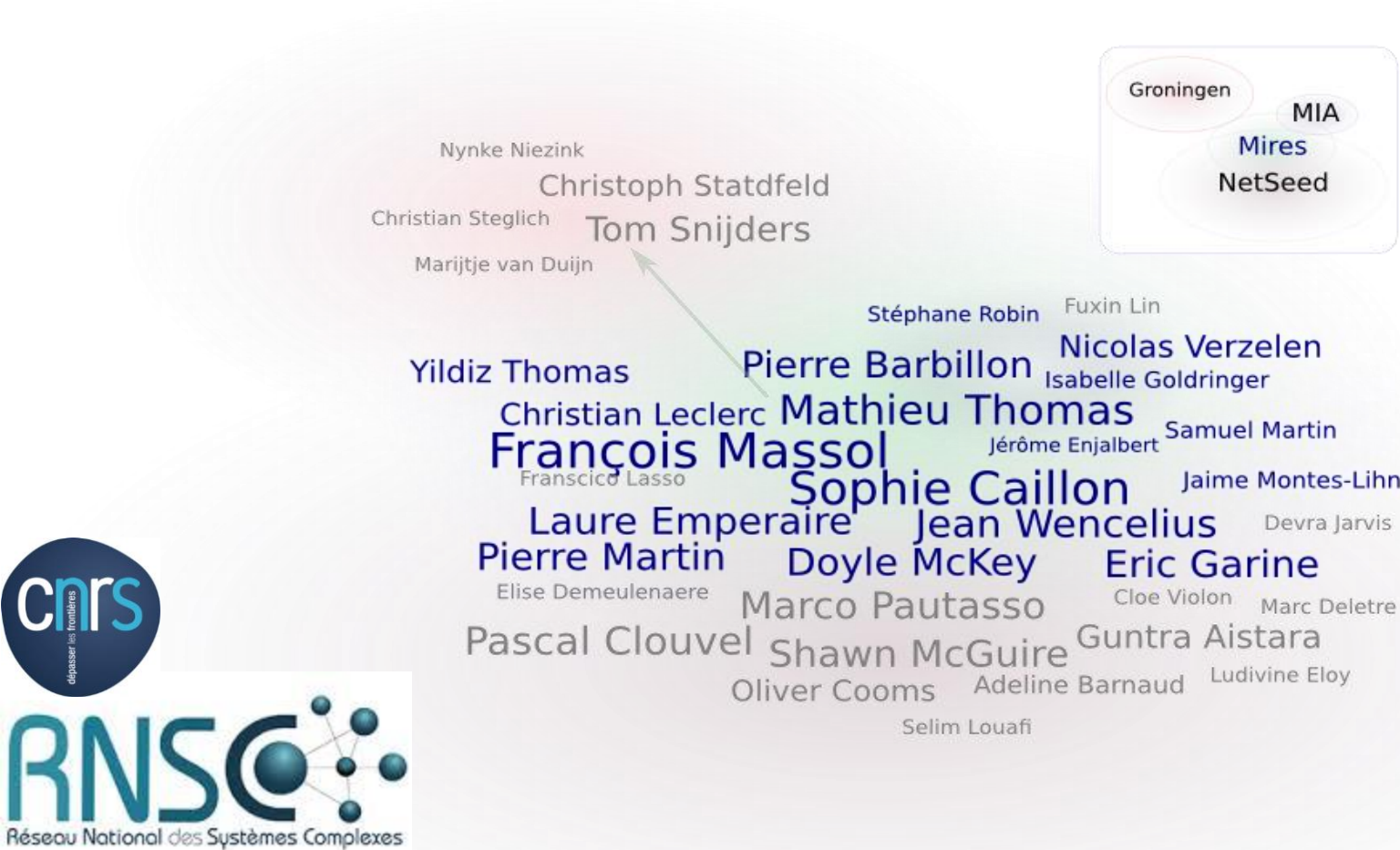
Centre de synthèse et d'analyse sur la biodiversité



Seed social network analysis

Facilitator: Mathieu Thomas

(PI: S. Martin, P. Barbillon, S. Caillon, F. Massol, P. Barbillon and N. Verzelen)



Researchers in SSH: anthropologists, geographers, ethnobiologists

Researchers in biology: ecologists, population dynamic scientists

Researchers in mathematics: statisticians, modelers, computer scientists



What unites us:

- Interest for ABD
- Data on seed circulation
- No knowledge in statistics of social networks

What differentiate us:

- Vocabulary
- Research questions
- Methods to collect data



Thesaurus and Ontology

Pierre Martin & Pascal Clouvel (CIRAD)

- Common vocabulary
- Contextualize our data
- Compare our data
- Establish a standard protocol to sample

Farmers' seed systems

Lesson n°1: not question most reachable informants

Jean Wencélius (Laboratoire d'Ethnologie et de Sociologie Comparative, Université Paris Ouest-Nanterre)

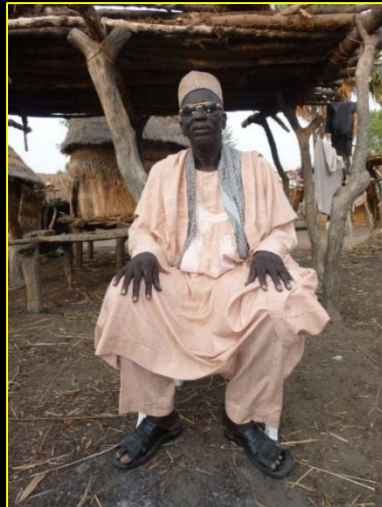
Sorghum farmers in northern Cameroon

Whom should we interview to understand seed exchange?



The household head? All members of the household?

‘most knowledgeable actors’,
‘key informants’



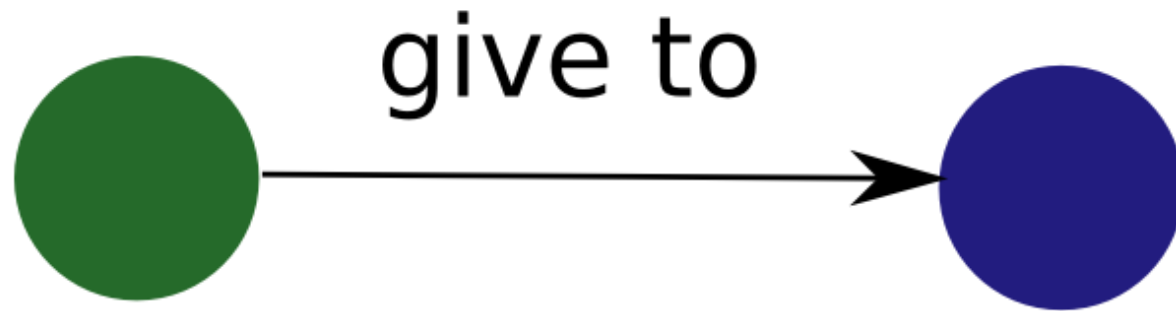
reduces the number of households that can be sampled

Which sampling strategy is preferable?

Is the behavior of the household-head representative of that of all the household's members ?

Farmer A

Farmer B



Sender

Receiver

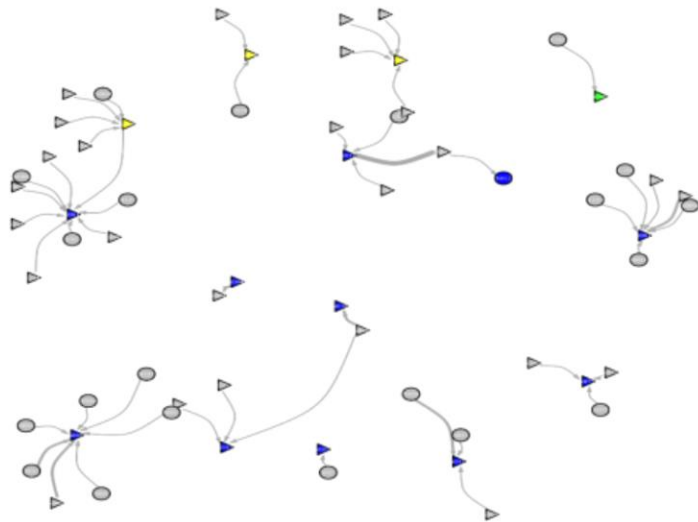
mentioned people

Interviewed people

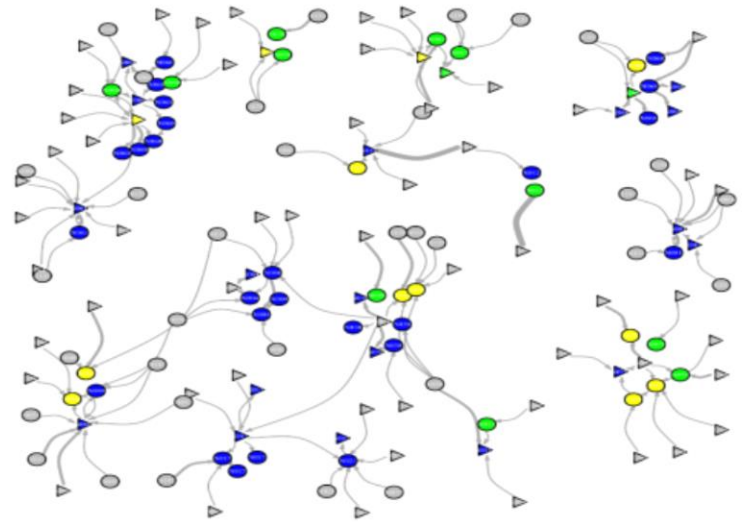
Dyadic relation

Whom should we interview to understand seed exchange?

Household-heads (nodes = individuals)



All events (nodes = individuals)



Most frequent type of source

- Within-village
- Other villages
- Both
- Not surveyed

Gender

- Women
- ▷ Men

Choice of units
of analysis



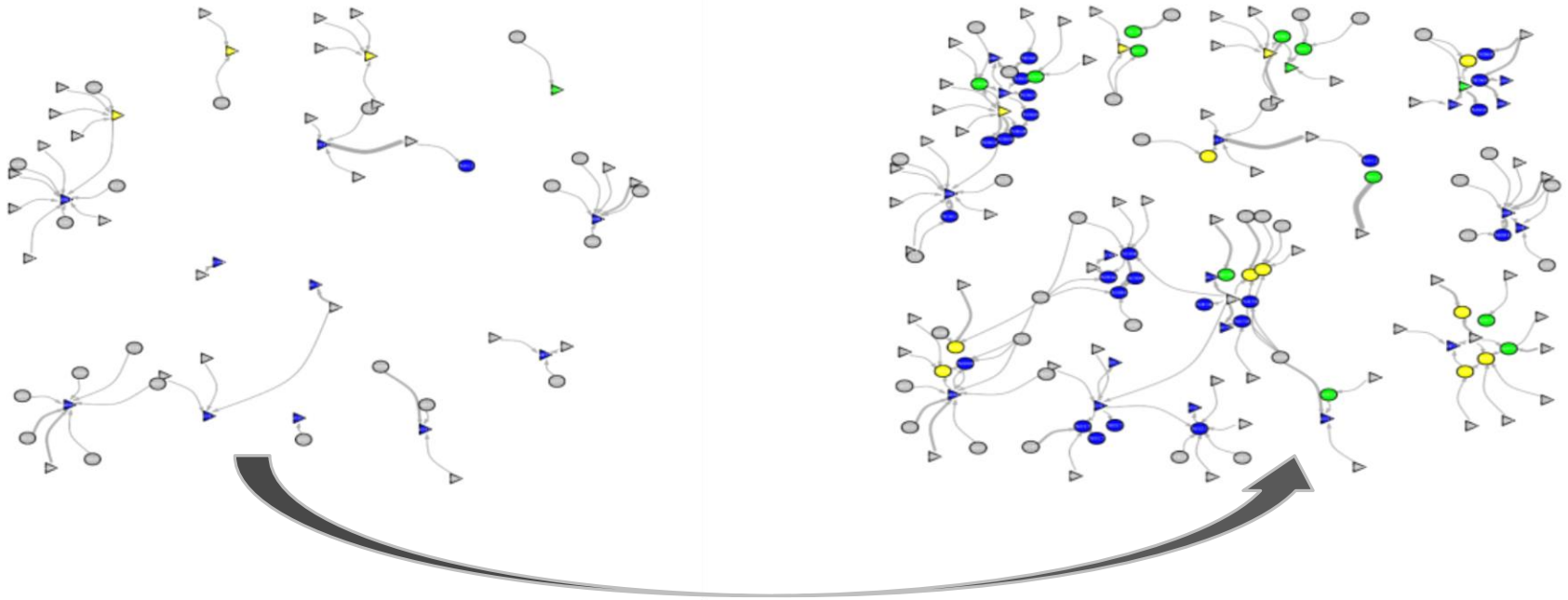
Different pictures of the
structure and dynamics of
exchange

Wencélius, Garine, Thomas, *in prep*

Whom should we interview to understand seed exchange?

Household-heads (nodes = individuals)

All events (nodes = individuals)



Household-head behaviour is not representative of the diversity of behaviours within the household

Misrepresentation of the system's dynamics and complexities

Wencélius, Garine, Thomas, *in prep*

Farmers' seed systems

Misconceptions (Coomes, McGuire et al. submitted) :

1. Inefficient for seed dissemination
2. Closed and conservative systems
3. Provide ready and egalitarian access to seed

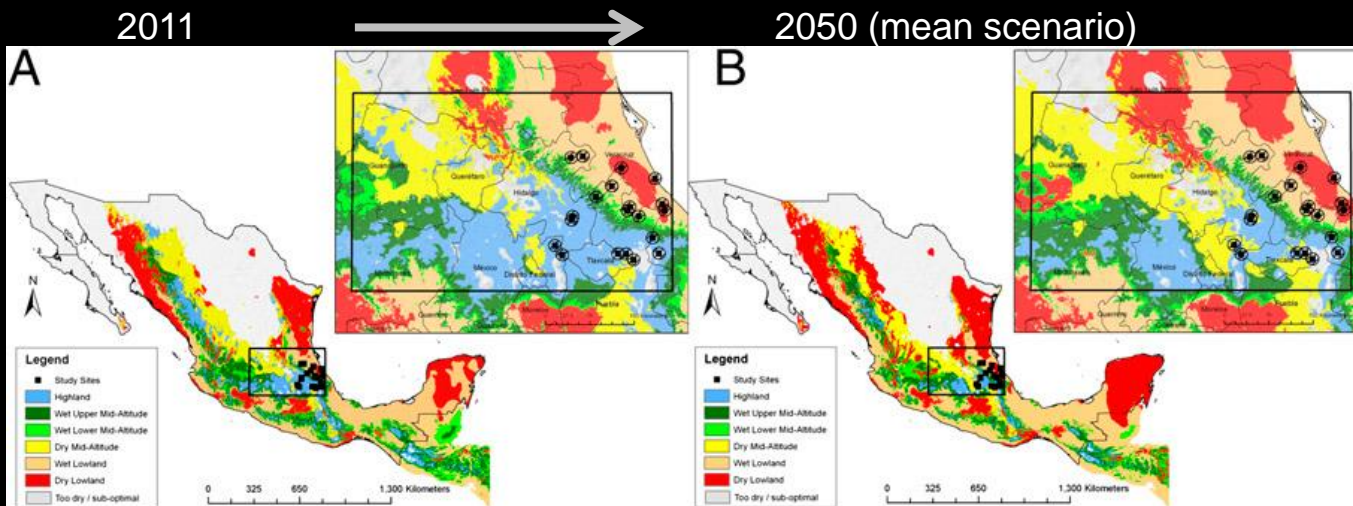
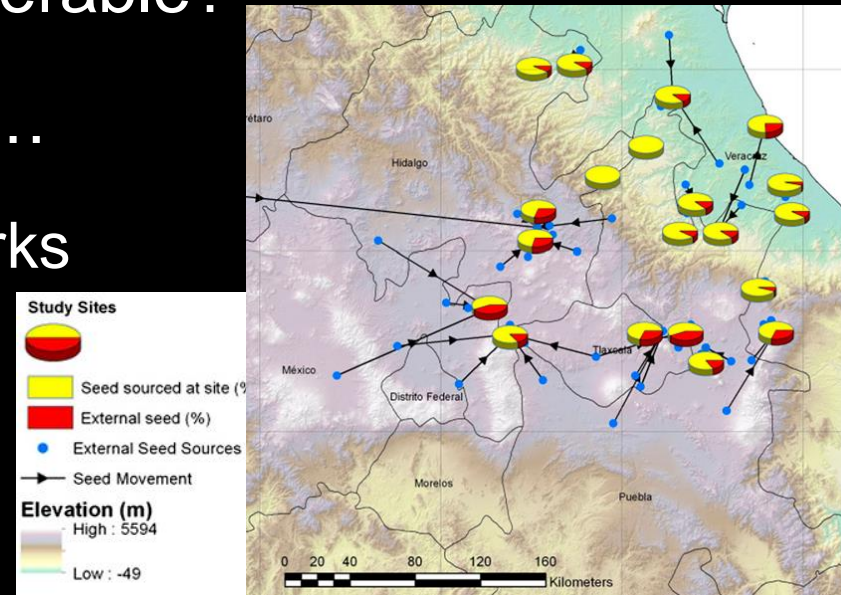


Custom ceremony, Tanna island, Vanuatu @McKey (Montpellier2)

Are they vulnerable?

Depend on the relation between...

- The spatial scales of social networks
- and the spatial scales of climatic events



Bellon et al.,
PNAS (2011)

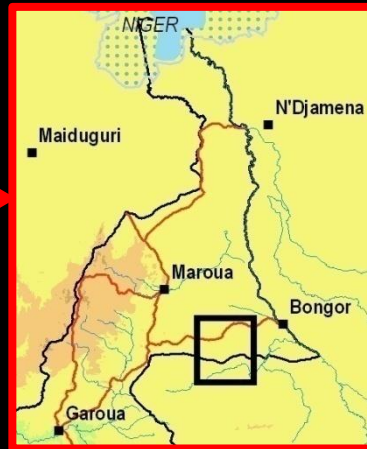
Farmers' seed systems

Lesson n°1: not question most reachable informants

Lesson n°2: a snap-shot is not appropriate

Chloé Violon (Laboratoire d'Ethnologie et de Sociologie Comparative, Université Paris Ouest-Nanterre)

Fieldwork among Tupuri farmers, northern Cameroon



Great inter-annual variation in rainfall

Late rains → First planting fails → Shortage of seeds

How does climatic variation affect
modalities of seed exchange?

“Who gave you some seeds during the last cropping season ?”
(63 persons)

Violon, Garine, Thomas, *in prep*

What happens in a bad year?



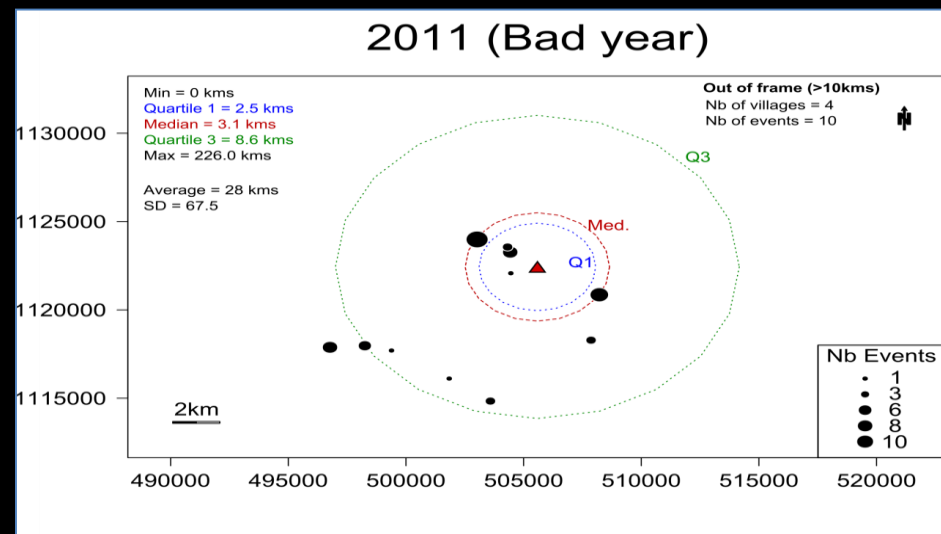
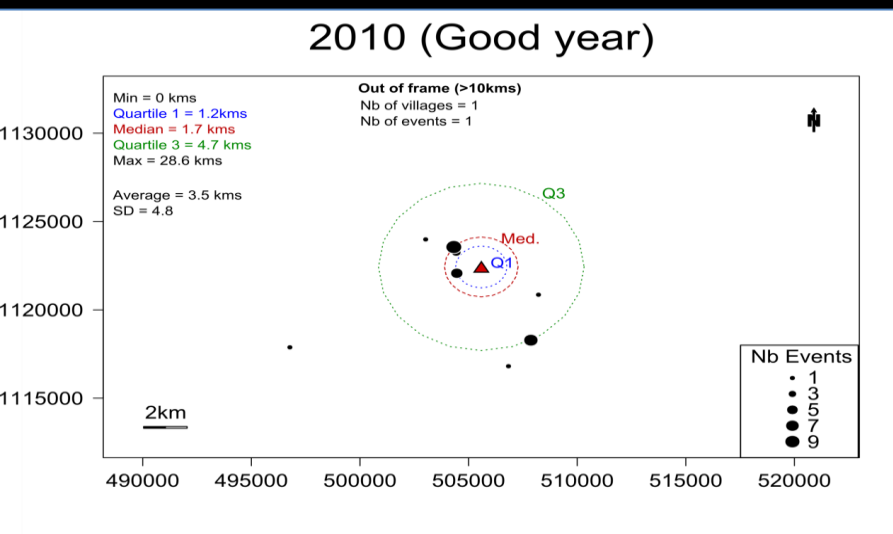
	Number of events	Number of givers	Number of giving households	Quantities (in cups)
2010 (good year)	128	82	62	280
2011 (bad year)	177	92	74	411

More frequent exchanges, larger quantities exchanged, more givers

What happens in a bad year?



- More frequent exchanges, larger quantities exchanged
- Geographic extension of the exchange network



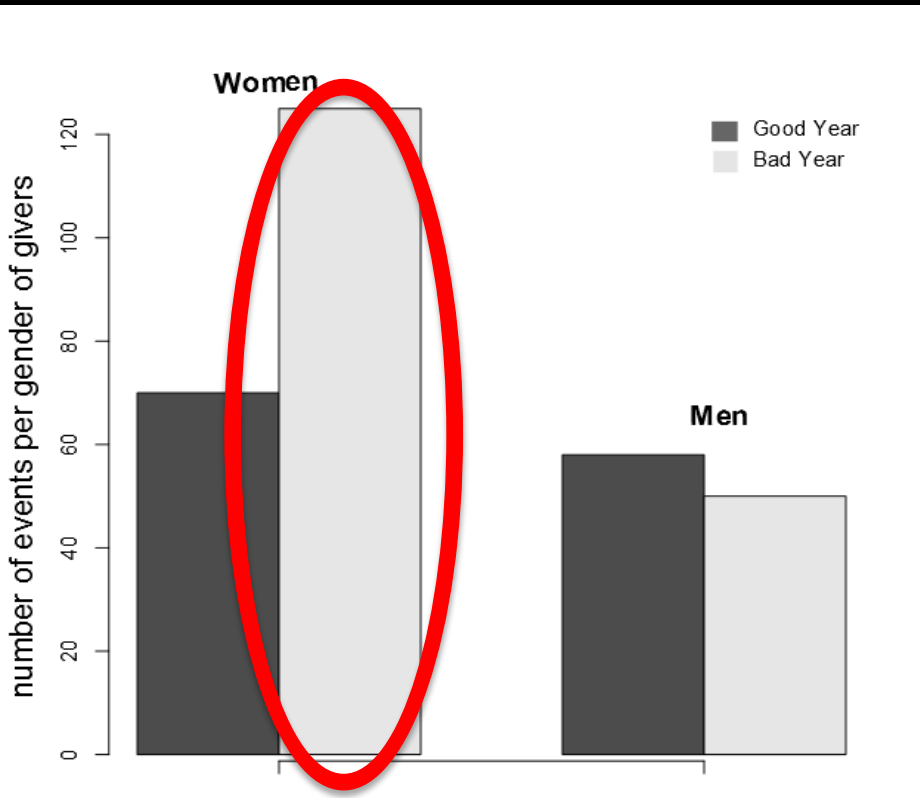
What happens in a bad year?



- More frequent exchanges, larger quantities exchanged
- Geographic extension of the exchange network
- Increased role of women

Women: Lead actors in crisis situations

For the longest distances
As givers and as receivers



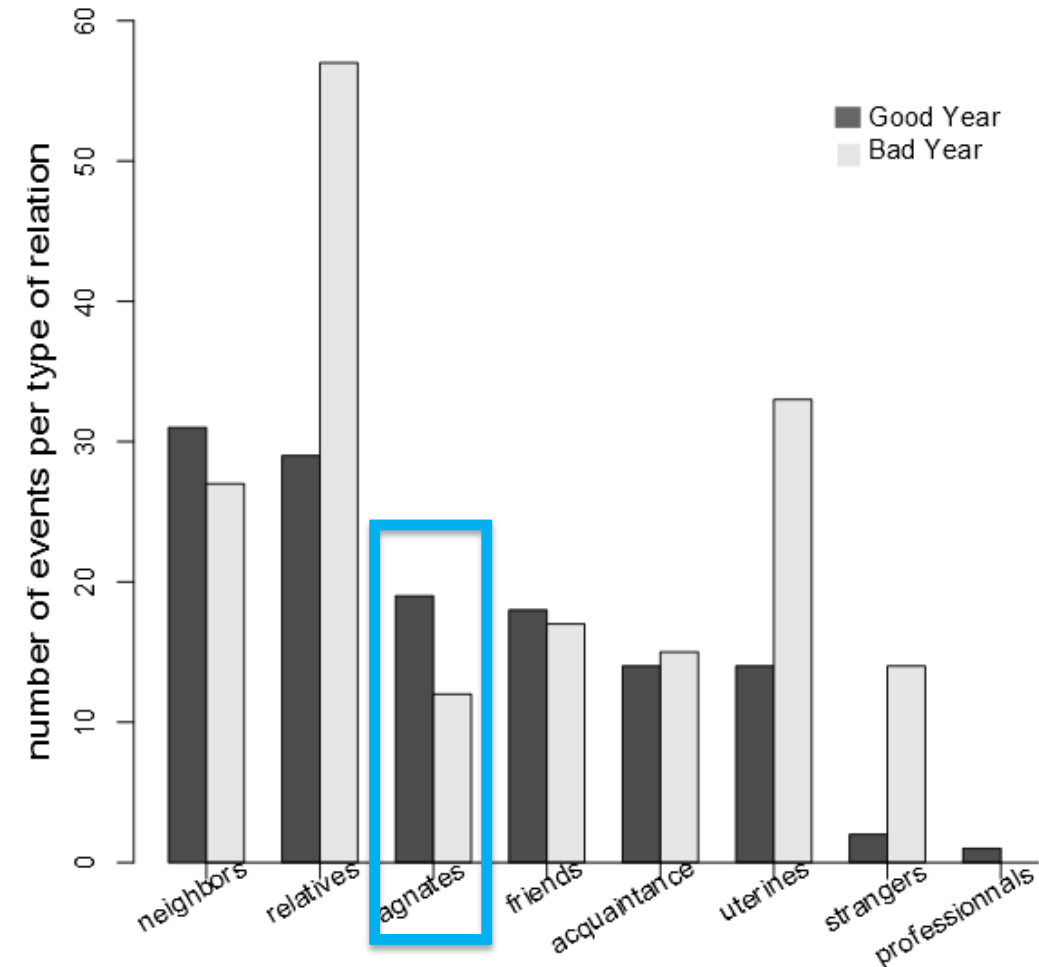
What happens in a bad year?



- More frequent exchanges, larger quantities exchanged
- Geographic extension of the exchange network
- Increased role of women
- Crucial contribution of relatives by marriage

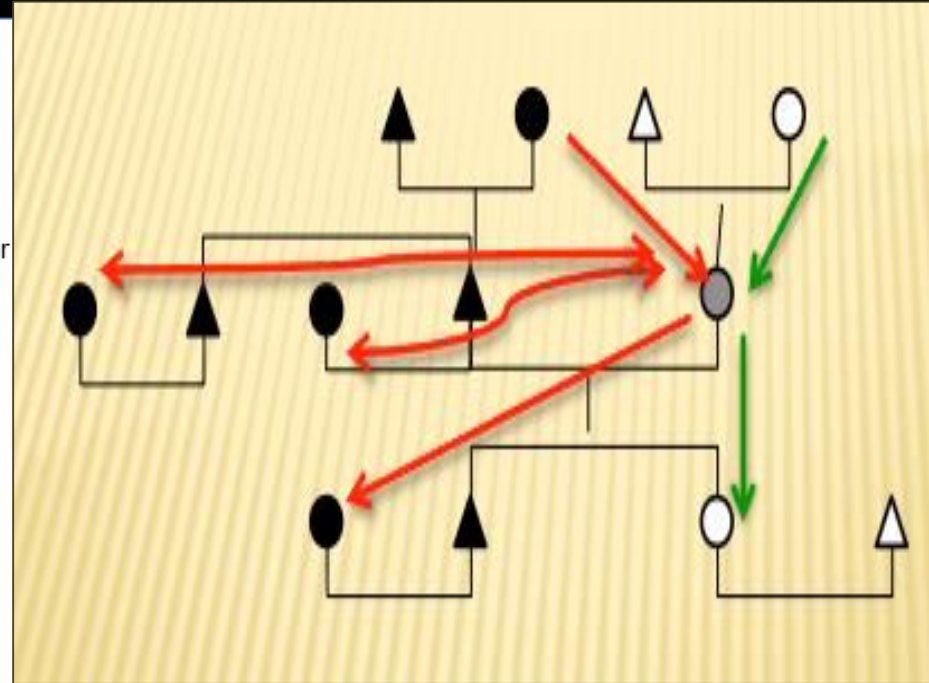
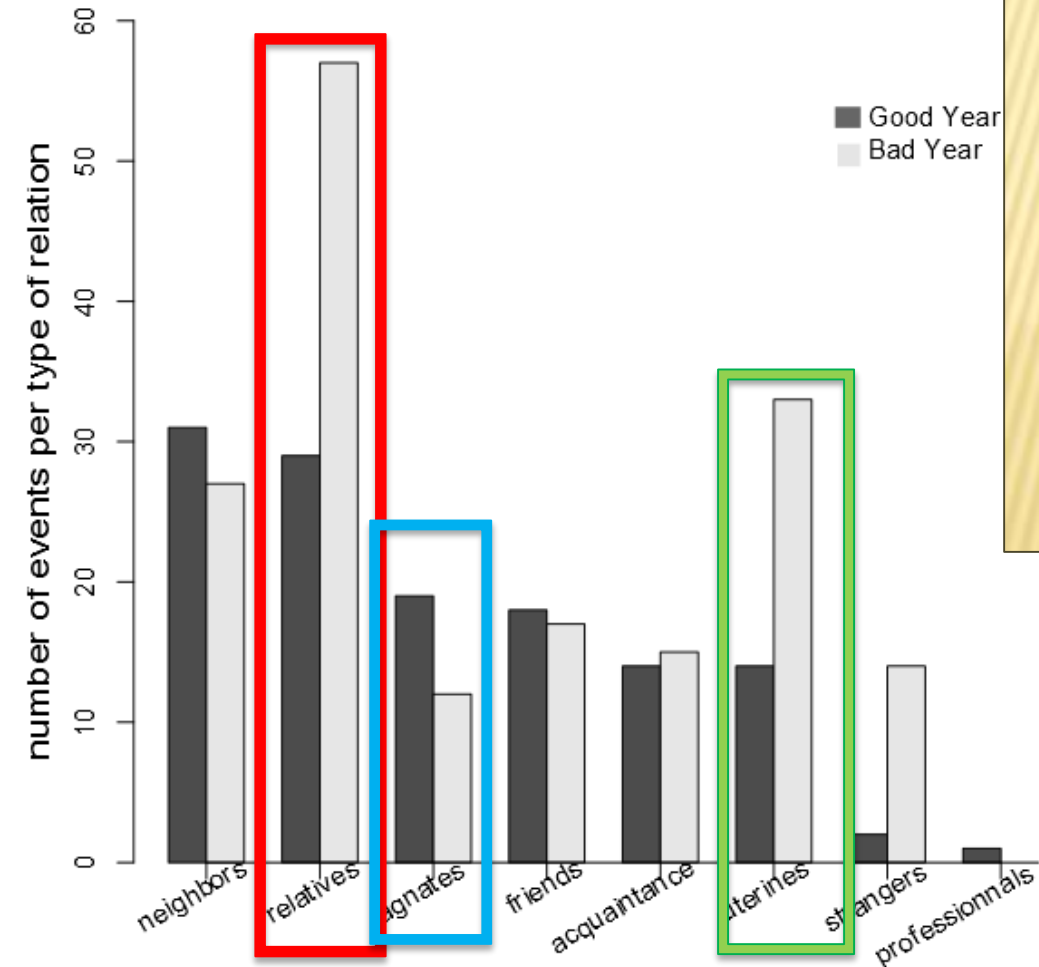
Relying on kin. But which ones?

✗ Not on agnates, as might be expected



Relying on kin. But which ones?

✗ Not on agnates, as might be expected



✗ But, on uterines from outside the village

✗ And women relatives by marriage living in the village

Violon, Garine, Thomas, *in prep*

Farmers' seed systems

Lesson n°1: not question most reachable informants

Lesson n°2: a snap-shot is not appropriate

Lesson n°3: Be aware of the biocultural status of plants in circulation

Role of the status of the object

Different spheres of exchange

Each sphere is a different universe of objects associated with a different set of moral values and different behaviors (Bohannan and Bohannan 1968)

Different contexts of exchange

Everyday life / ceremonial life

Exchange of subsistence products / valued objects

Different types of objects in circulation

Material / immaterial

Status of the food plants

Etic categories
(storage/diffusion/ reproduction)



Emic categories
(use and representations)

Categories: entities that the human mind creates in order to make sense of the diversity of experience, by grouping things, attributes and phenomena on the basis of similarity and difference

Status of the food plants

Etic categories
(storage/diffusion/ reproduction)



Emic categories
(use and representations)

=

Food plant classification



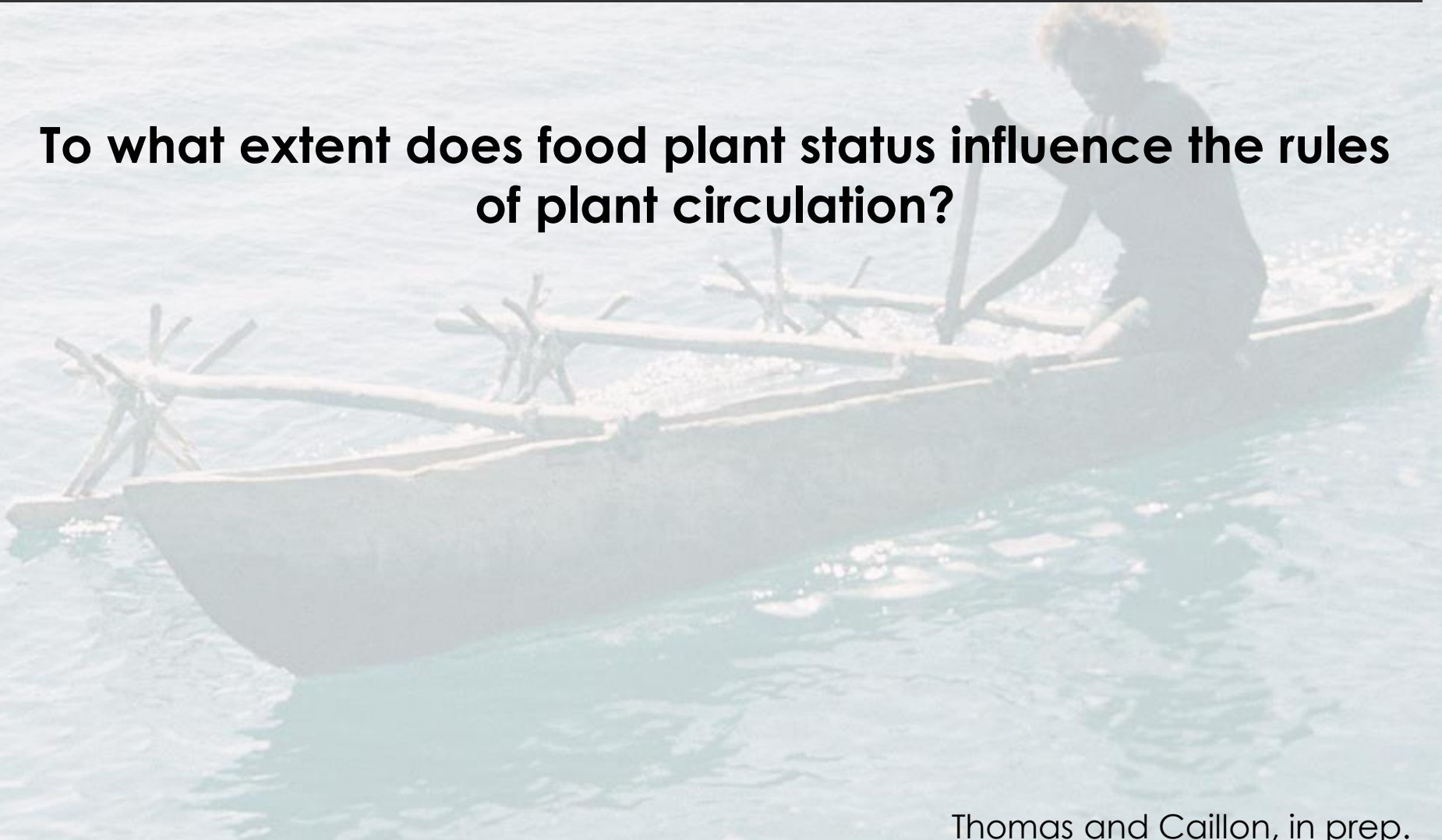
Food plant status

Categories: entities that the human mind creates in order to make sense of the diversity of experience, by grouping things, attributes and phenomena on the basis of similarity and difference

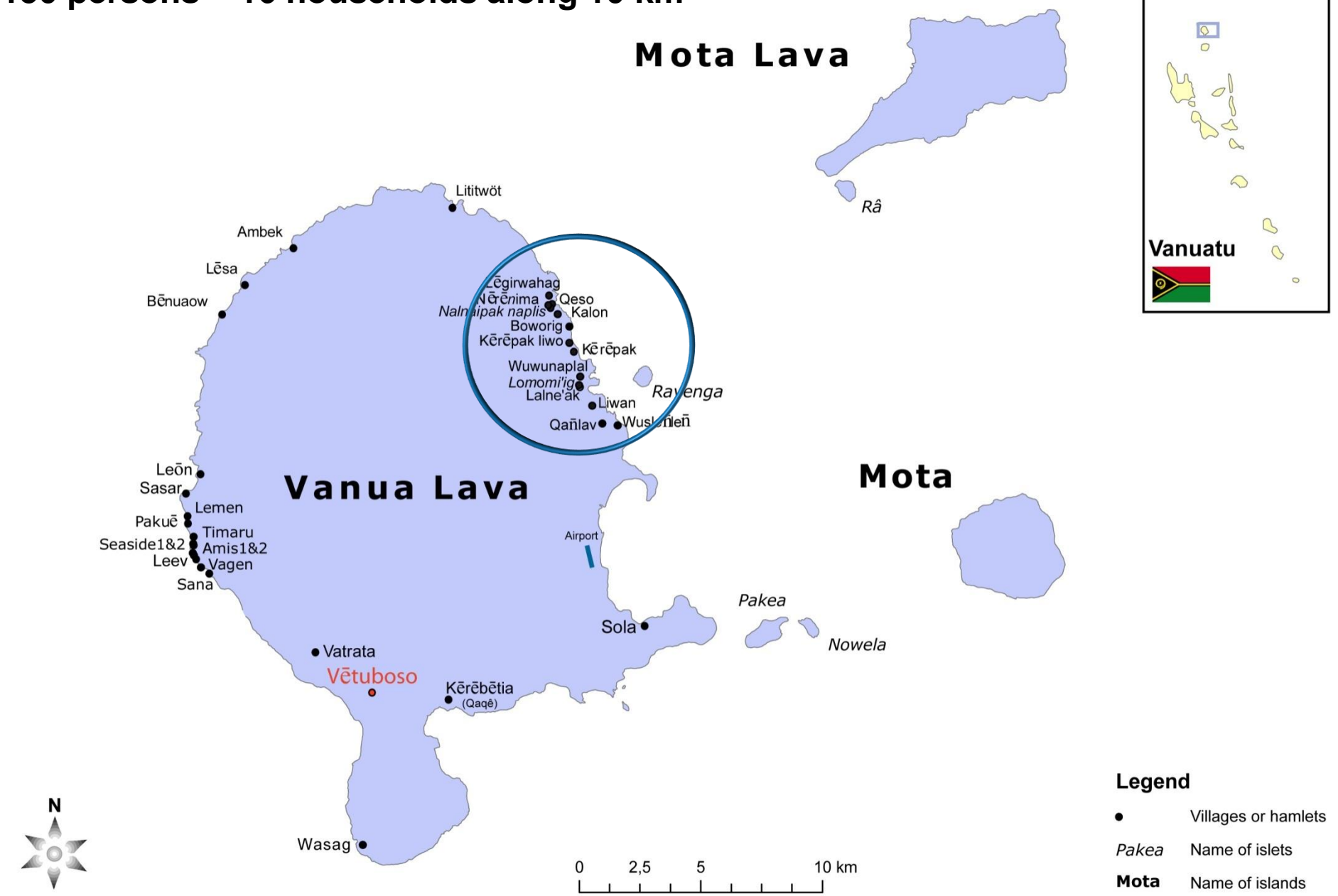
Classification: the ways in which categories are related to each other
(Ellen 2005)

Questions

To what extent does food plant status influence the rules of plant circulation?



150 persons = 16 households along 10 km



Method

16 households = 30 persons
33 species / 286 plants



Kastom ceremony, Tanna, Vanuatu
@McKey (Montpellier2)

Thomas and Caillon, in prep.

Classification of food plants



@S. Caillon (CNRS)

Traditional dish



@S. Caillon (CNRS)

Staple food

starch-based food



@S. Caillon (CNRS)

Side dish food

vegetable, sauce



@S. Caillon (CNRS)

Snack food

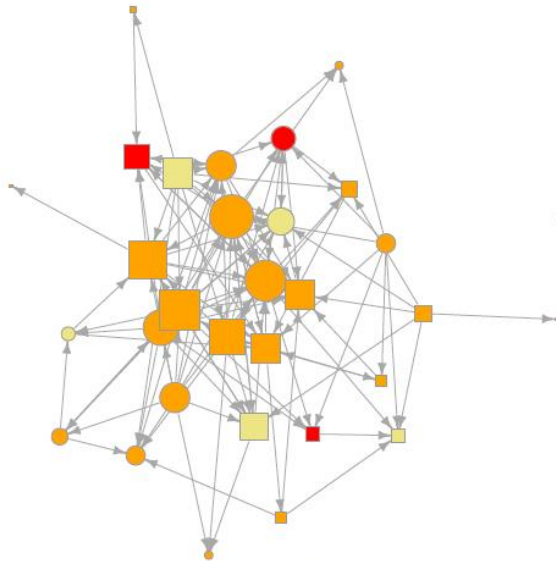
fruits, nuts

Thomas and Caillon, in prep.

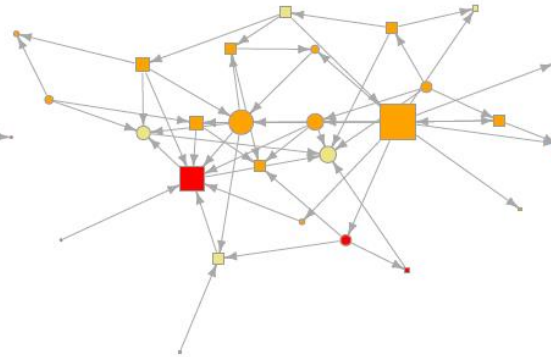
SOCIAL VALUE



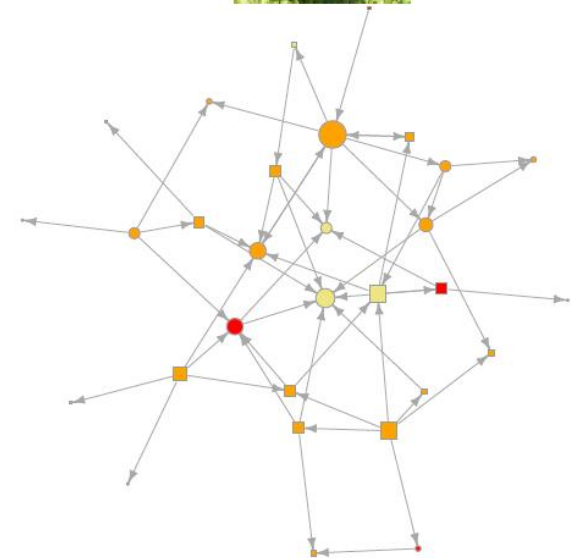
Sub-networks per use



Staple food
 $d=0.14$



Side dish food
 $d=0.06$



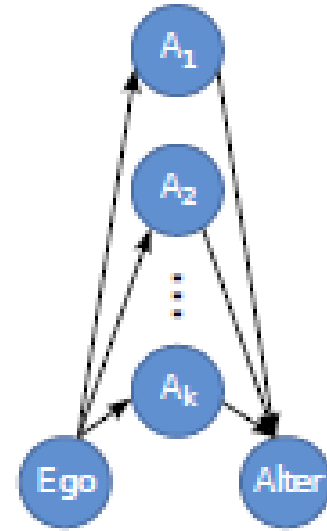
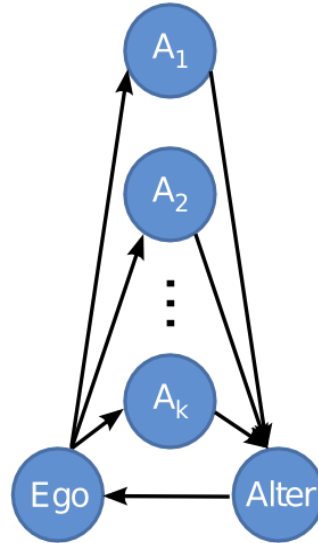
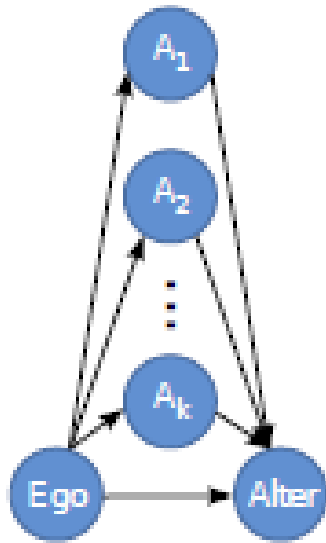
Snack food
 $d=0.06$

Number of exchanges

Thomas and Caillon, in prep.

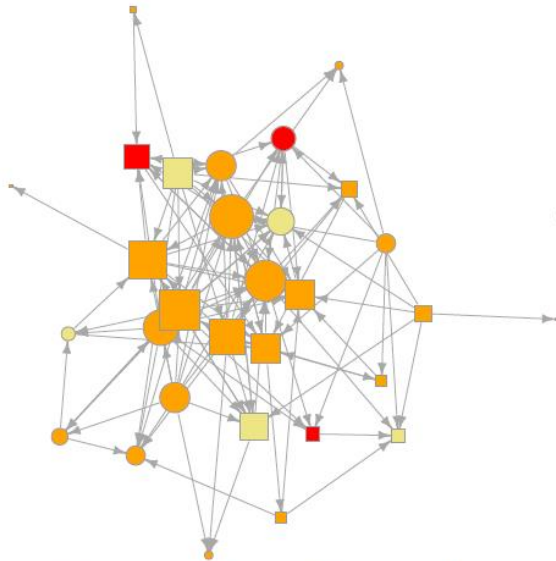


Exponential Random Graph Model (ERGM)

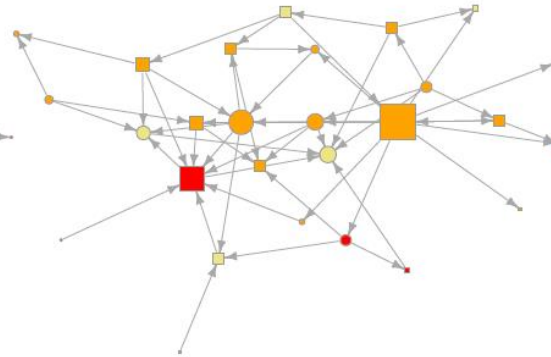


Triadic relations

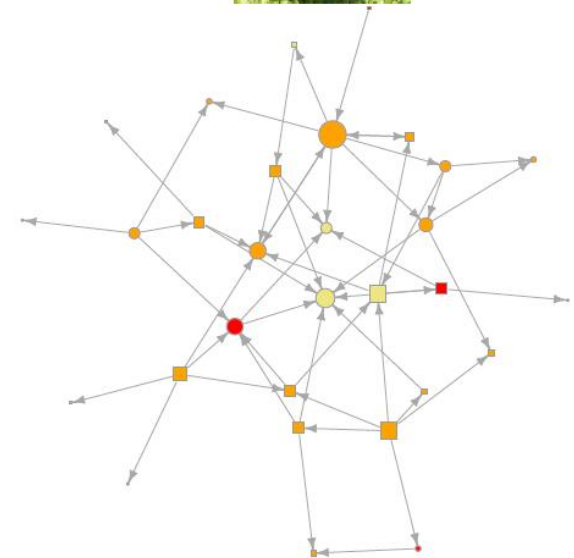
Sub-networks per use



Staple food
 $d=0.14$



Side dish food
 $d=0.06$



Snack food
 $d=0.06$

Social constraints on exchange



Thematic results

- ❑ Specific social rules are mobilized according to the value associated to the circulation good
- ❑ It is important to consider local classification to disentangle the social rules shaping seed circulation

Conclusion

- ▣ Lesson n1 : WHO
- ▣ Lesson n2 : WHEN
- ▣ Lesson n3 : WHAT



"we concluded that the time had indeed come for the comprehensive **mathematical analysis** of social life conceived as a **system of relation**" (Hage and Harary 1991: 275)

Need a formalized and systematized approach **but** quantitative and qualitative approaches should be associated (we have to integrate the **cultural dimensions**)

Conclusion

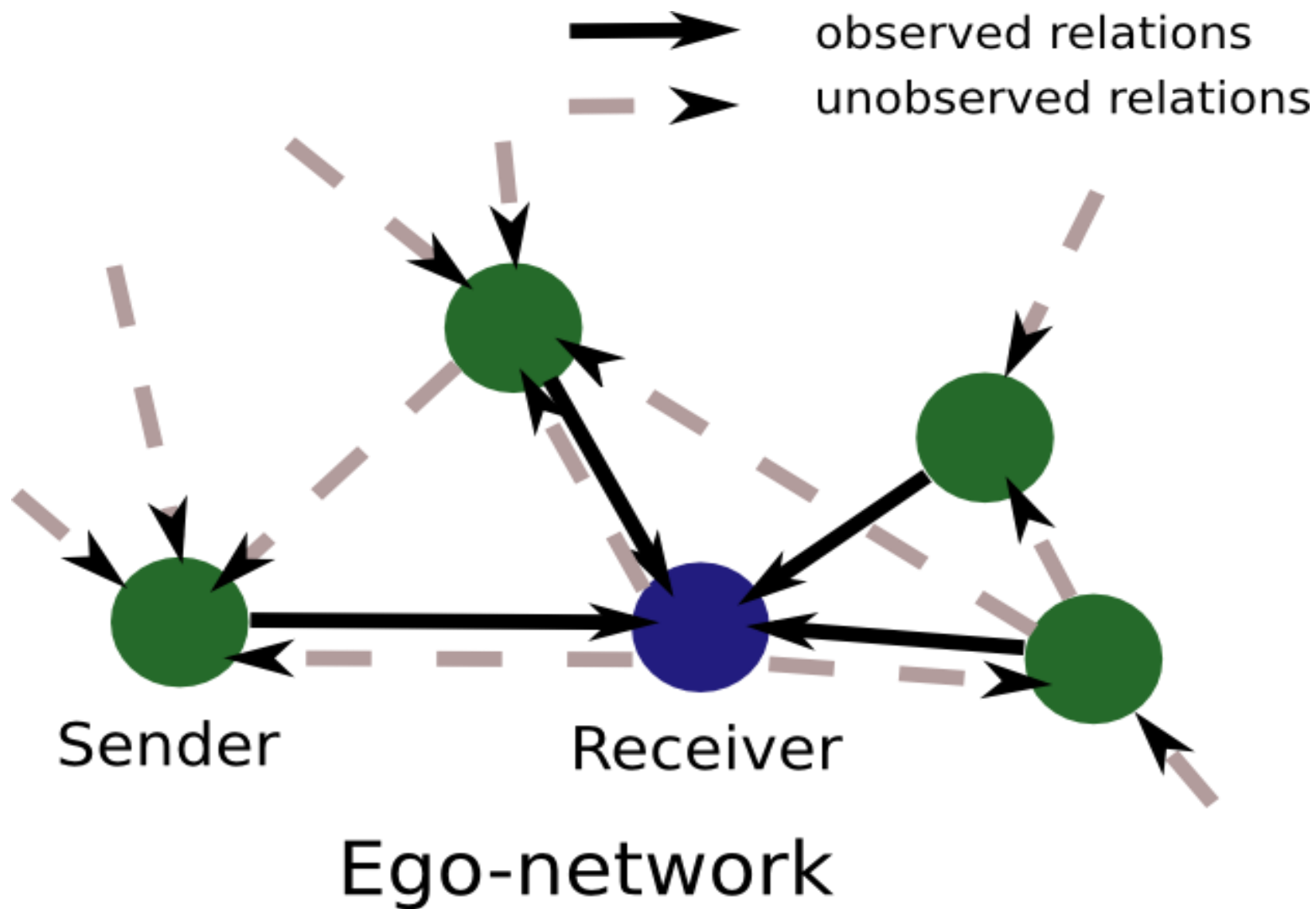
Monnerie (2014) in regard of Hage and Harary (1991)

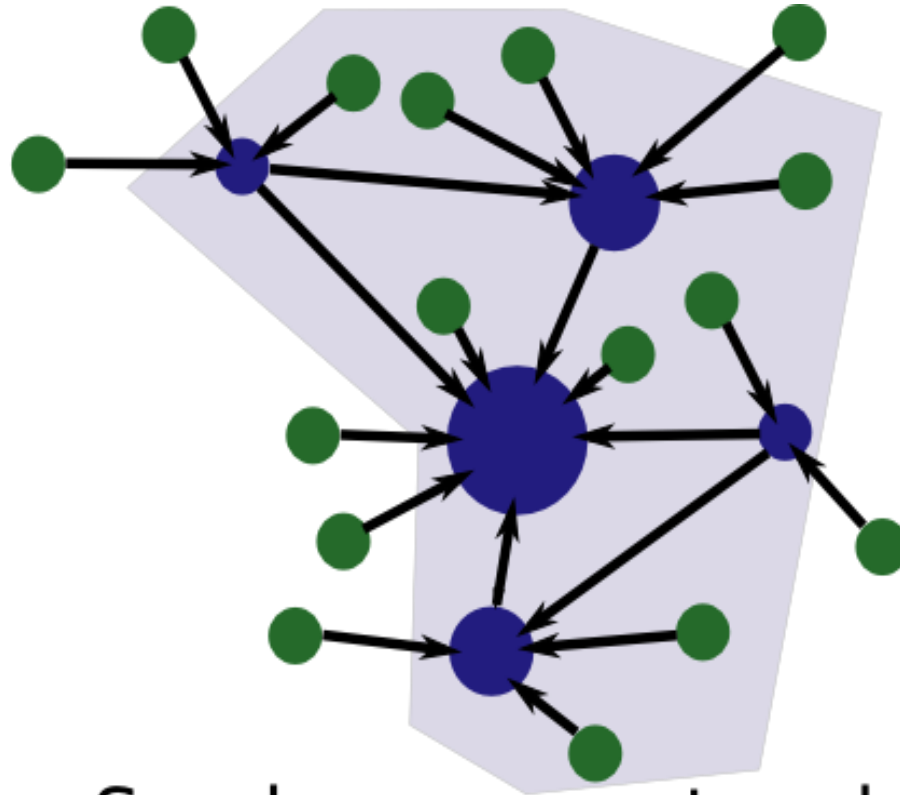
- ❑ Setting theory (mathematical or others) implies an ethnographic purification
- ❑ Bias of arbitrary loss of data in relation to social facts: have we included the most important phenomena?
- ❑ Important to clearly problematize and explain what is modeled and what we leave out

Conclusion

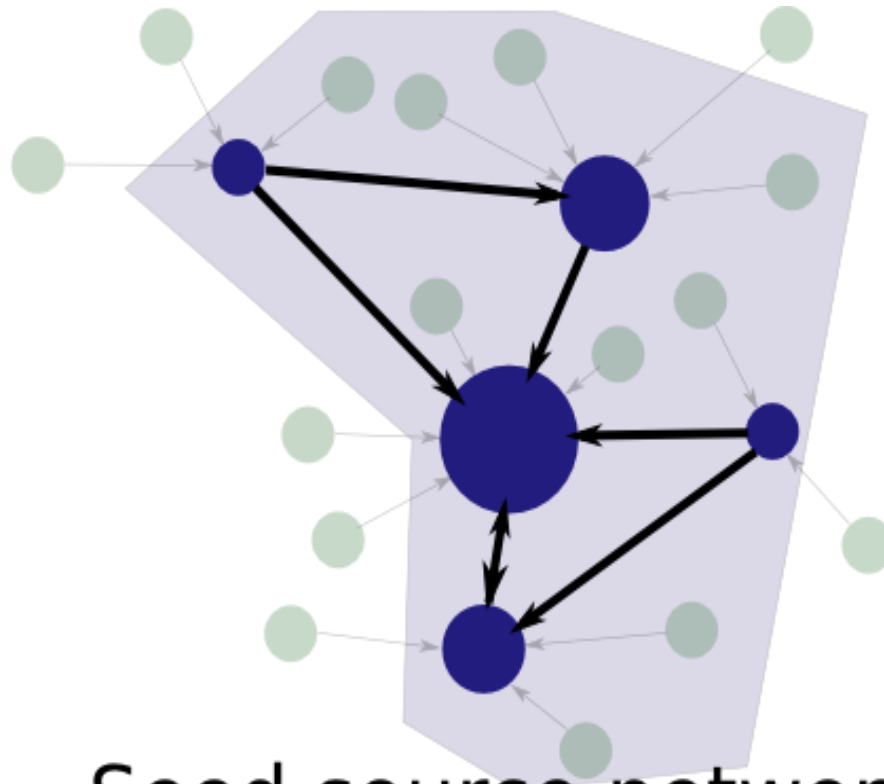
- ❑ Plant circulation networks are embedded within other networks
- ❑ Can we integrate the circulation of every types of objects and performances/acts/discourse which are associated with the act of giving, receiving and repaying.
Is it feasible in the field?

Methodological issues



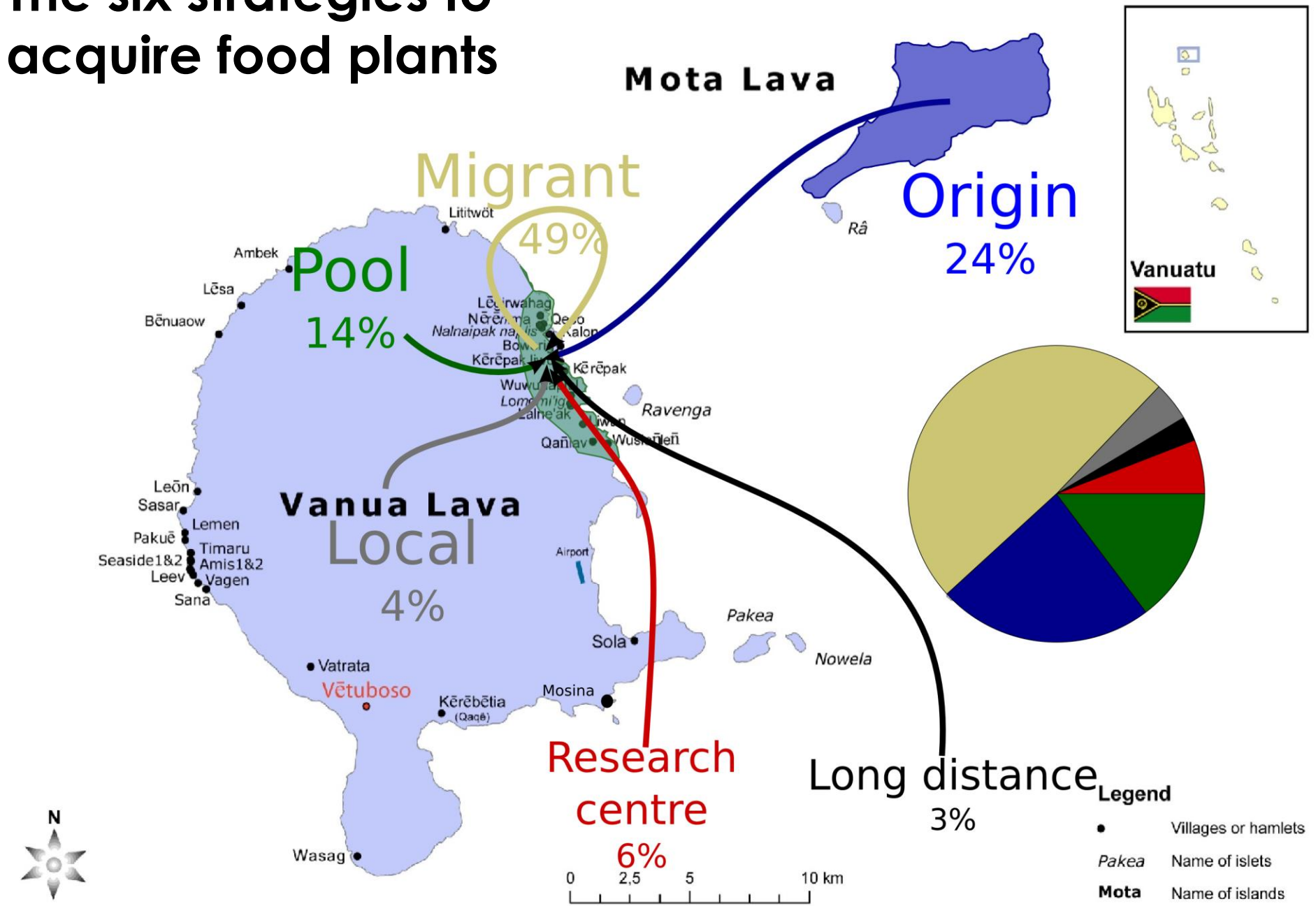


Seed source network
within and among communities
(all observed events)

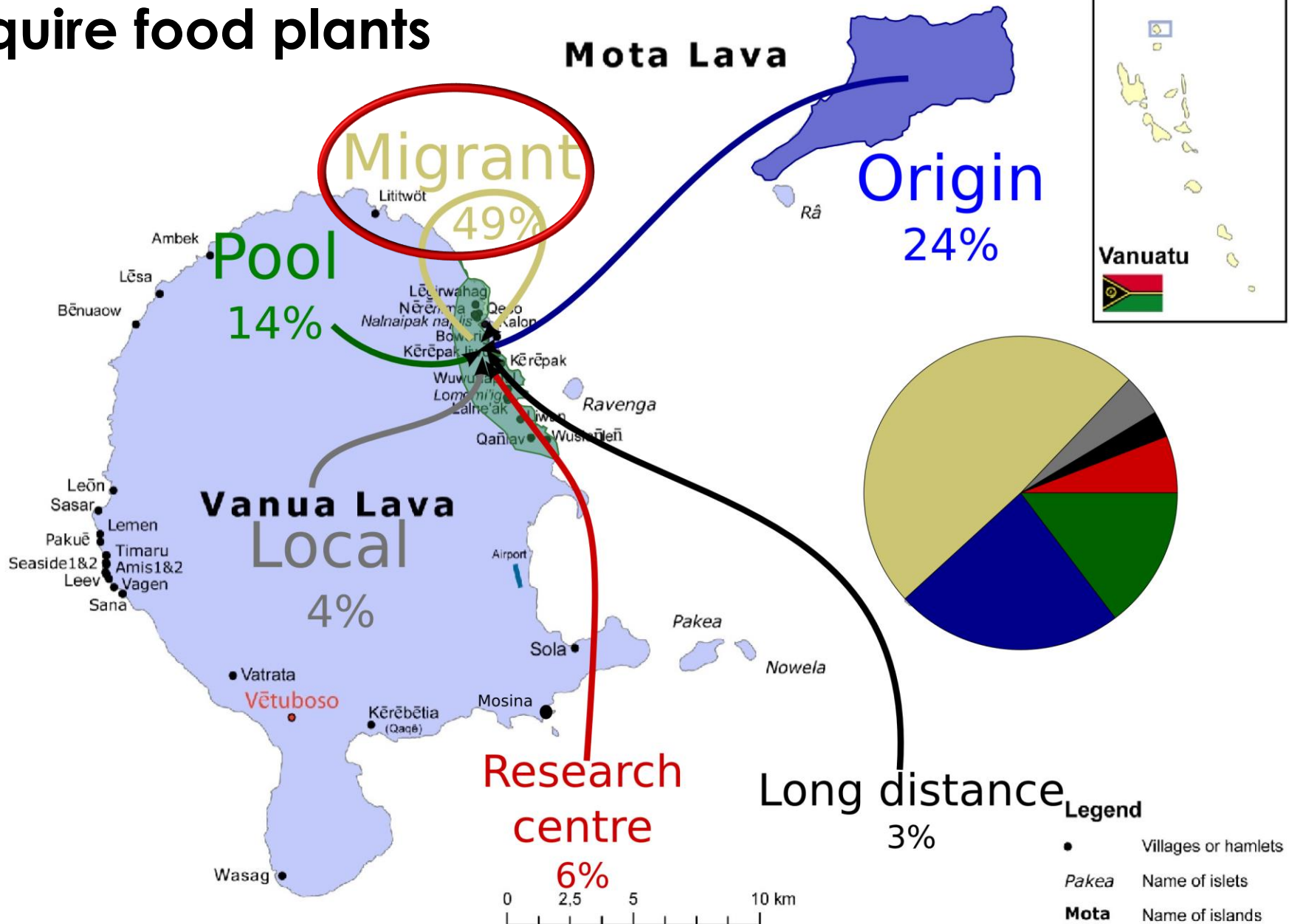


Seed source network
within community
(only among interviewed people)

The six strategies to acquire food plants



The six strategies to acquire food plants



Methodological issues

- ❑ Open networks: not compatible with methods generally in use
- ❑ Incomplete data: only the acts of receiving (not giving)



Need to adapt social network analysis methods to field work constraints in ethnobiology/anthropology

+

A question of scale:
close networks with high quality qualitative information

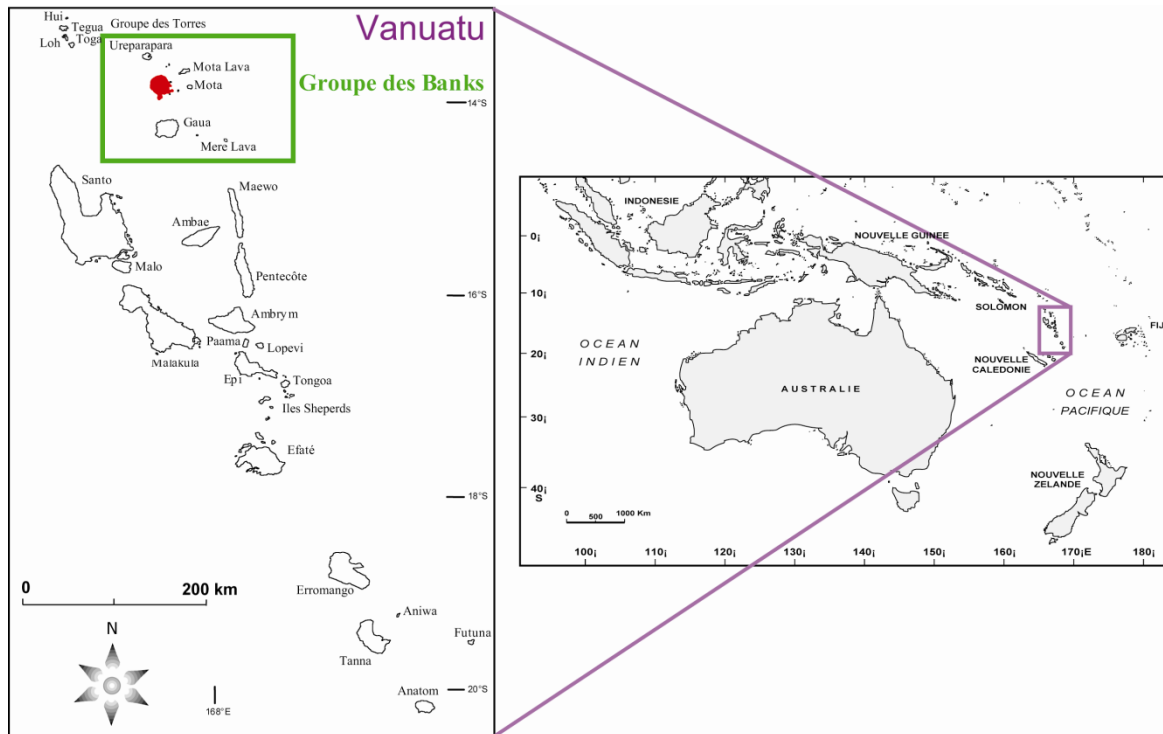


How to theorize/generalize/compare local results?

Why doing all this?



A topical example: the cyclone disaster in Vanuatu



BEFORE



AFTER



@ Joël Jimmy

@ Oscar Mathison Joseph (Save the children)



@ Joël Jimmy

@ Oscar Mathison Joseph (Save the children)

Are local practices adapted to all types of events?



- ☐ A diversity of species and varieties
- ☐ A diversity of landscapes (agrosystems)
- ☐ A diversity of rescue practices
- ☐ An efficient vertical and horizontal transmission of knowledge

@ Oscar Mathison Joseph (Save the children)

- ☐ How will they face the next 3 months?
- ☐ What is the scale of aid networks?
- ☐ How will they recover their ABD loss?




@ Oscar Mathison Joseph (Save the children)

Why doing all this?

- What is the most efficient strategy to diffuse plant material in normal and crisis period? (Who, When and What)
- How to strengthen farmers' seed sector?
- How to combine farmers' and formal seed sectors in regards with seed policy at the international and national levels?

Thank you



To farmers with who we have worked with
To NETSEED & MIRES colleagues, and funders of these programs
(CESAB/FRB, RNSC, INRA, CNRS) and other research
To the organizers of this workshop