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LA RECHERCHE AGRONOMIQUE
POUR LE DÉVELOPPEMENT

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Working
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Designing operational decision support systems in Participatory Guarantee Systems: the dicoop.app case

A few thoughts on the difficulty to develop meaningful, useful and legitimate DSS

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Meaningful, Useful and Legitimate Information in Decision Making Workshop

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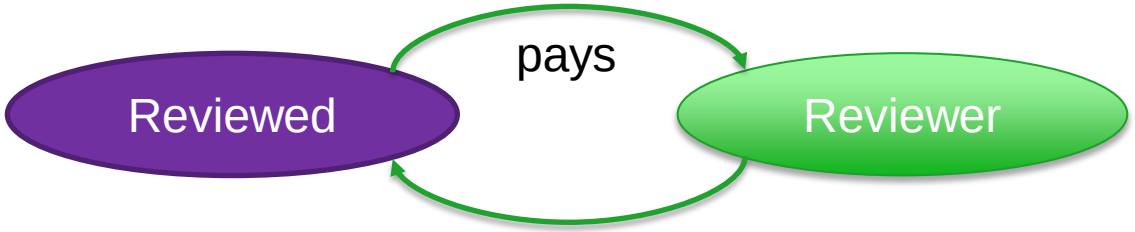
UMR INNOVATION

What are Participatory Guarantee Systems?

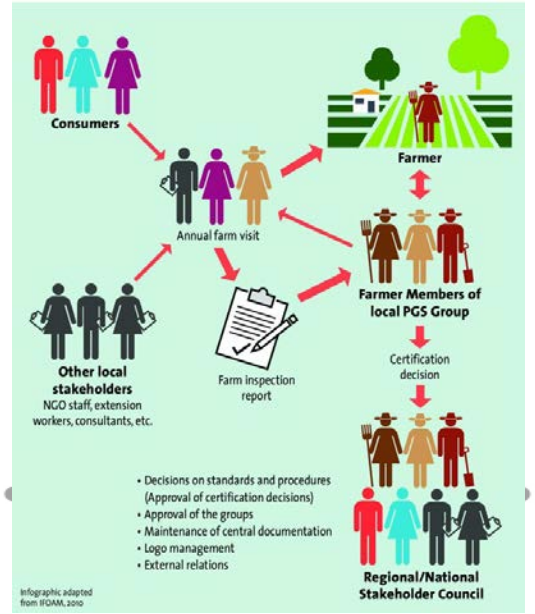
Certification

- Third party certification
  - → Independent organization
  - → Paid by reviewed



VS

- Participatory guarantee systems
  - → Peer reviewing
  - → See [IFOAM PGS]



What are Participatory Guarantee Systems?

- Main charateristics
  - Institutions linking producers and consumers
  - Peer reviewing and involvement of members

  - Producers define and follow constitutional rule → Production specification

- Need to follow certification process
  1. On-farm visits with peers
  2. Certification commissions

→ Collective organization
→ Time consuming
→ Evolving rules

More on the certification process

Principle: transparent, fair, constructive → Build internal and external legitimate and trustworthy certification process
Specifics depend on PGS

Individual attributes

- Member type (prod, consumer)
- Production type (veg, poultry, …)
- Skills in reviewing, in specific productions
- Localization
- Languages mastered
- Availability
- Vetos

Required rules (+/- negociable)

- For all prod certification visit each year
- Non-reciprocity (P→Q ➔ Not Q → P)
- Per certification group : p producers, c consumers
- Follow-up (or not)
- Rotations
- Commissions

Optimisation/objectives

- None
- Days of commission
- Max distance
- Knowledge exchange

The DSS (https://dicoop.app/)

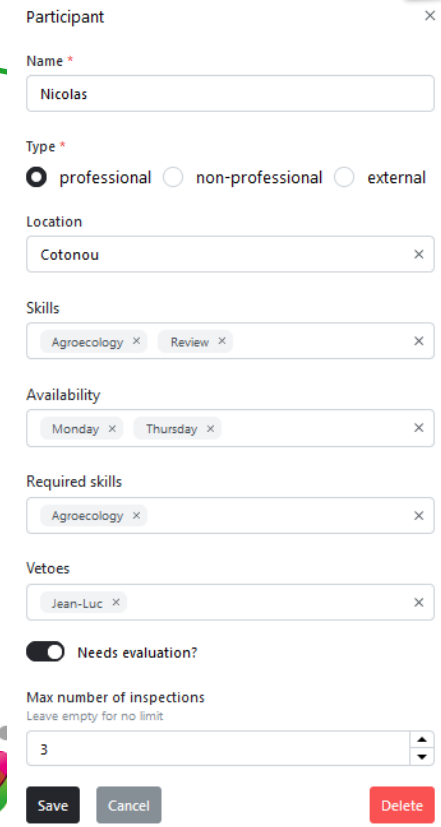
DICOOP
DIstribuer les évaluateurs dans une Certificati**O**n **O**rganisée par les **P**airs

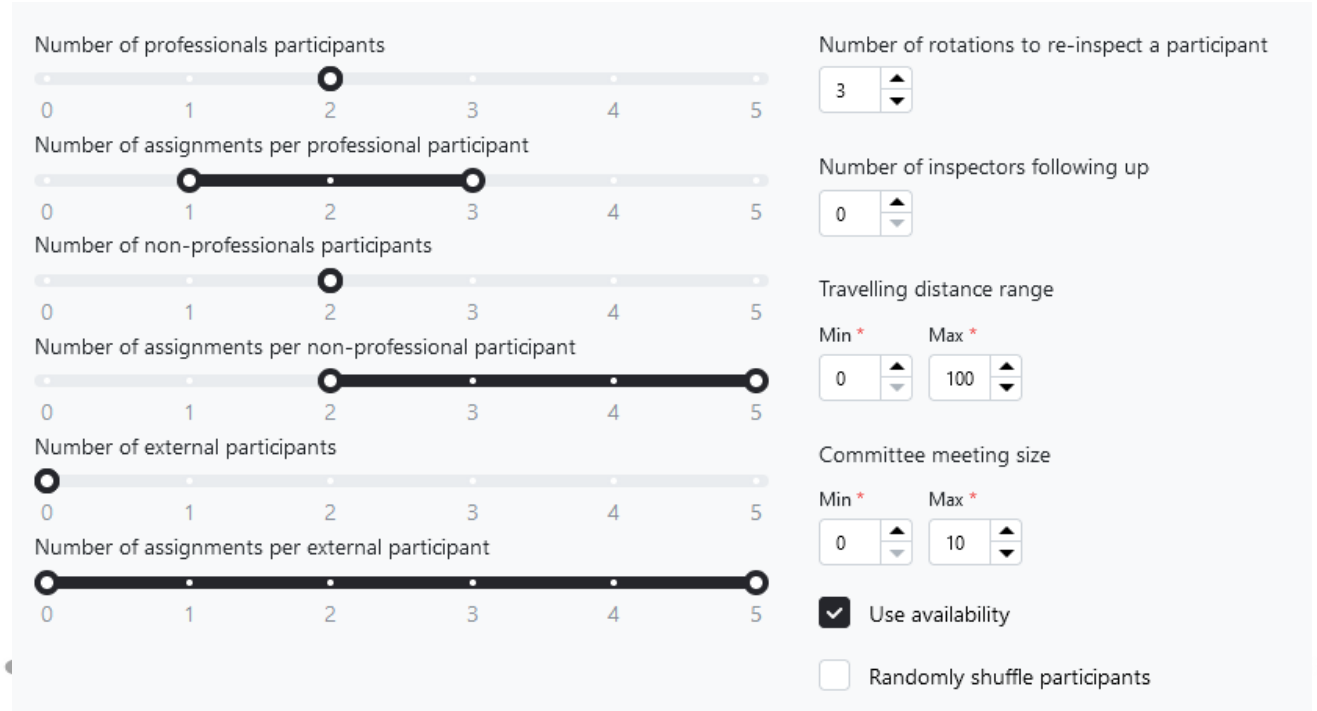
Individual attributes
Compulsory / desirable rules with parameters
Optimisation / objectives

Solve

One solution
- Respects rules, attibutes
- Individual assignments

Or no solution





The DSS (https://dicoop.app/)

DICOOP

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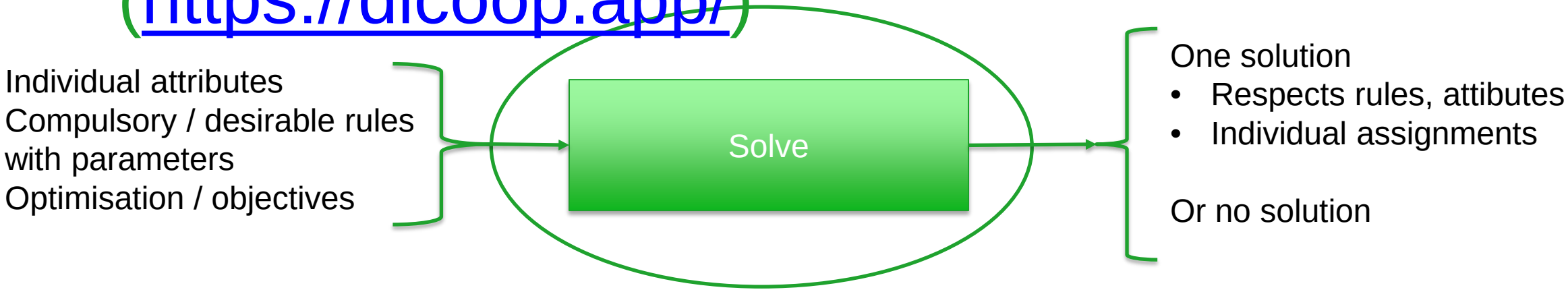

Answer Set Programming → Declarative logic
Give data and rules → Finds solution (set of edges in a graph)

Potassco, the Potsdam Answer Set Solving Collection

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(https://

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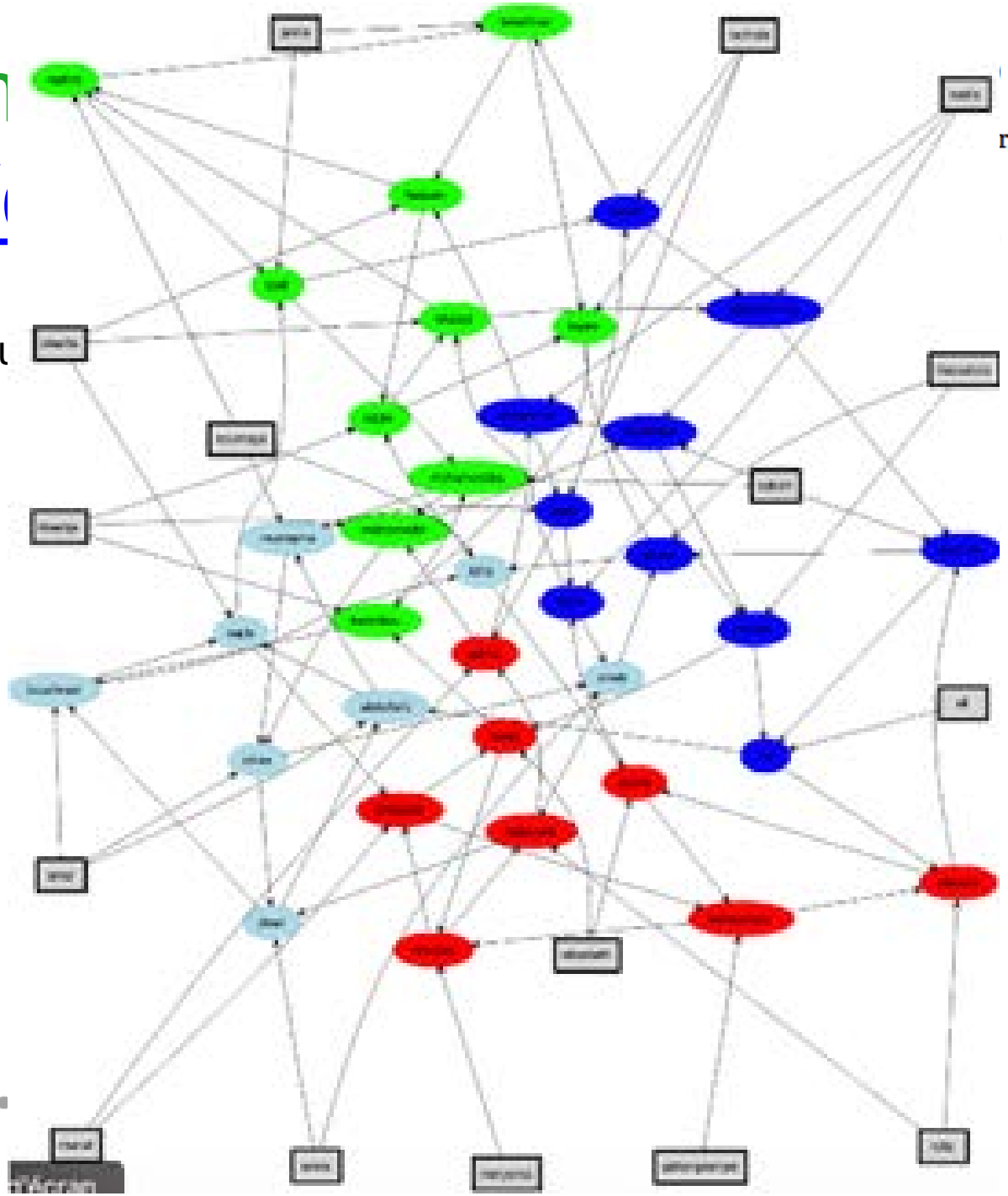

One solution
- Respects rules, attibutes
- Individual assignments

Or no solution

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Creation process

- PGS struggle to organize certification visits:
  - How to find a solution that respects all rules?
  - How to make sure everyone is available?
  - How to keep all involved and motivated?

  → Headaches, unequal involvment, errors, loosening rules
- Co-conception
  - Frame of a project on PGS with PGS in Morocco
  - Interactions between PGS members and researchers (economics, TCS)
  - Declarative logic programming paradigm
  - Hiring of a developer to make it user-friendly ($$)
- Many ways and back
  - Formalizing rules
  - Non explicit rules
  - Theoretical advances → Problem is computationnaly hard (Barrot at al. 2020)
  - New desires thanks to the power of the algorithm
  - Generalization in mind

Meaningful, Useful ?, Legitimate?

For the Morrocan PGS

→ Meaningful: Respect data, constraints and rules declared
No contradictions, no rules violated, allows relaxing rules

→Useful: much easier problem solving
optimization as desired: equal involvment of everyone

→Legitimate: no suspicion of cheating, focus on rules and individual caracteristics instead of solving
(focus switches from operational level to collective-choice)

A new case

In France: PGS = NP

Exchanges → New rules, new types of constraints and attributes

… New institution

Adapt rules with members

Work with researcher in TCS

Work with developer ($$)

Meaningful → Yes, but did not fit at first with new institution

Useful → Not that much before evolution, yes after work

Legitimate → Yes, members happy to externalize organization of peer-review process to an algorithm

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Another NP Case

Show our DSS to another PGS → Rejected!

Meaningful → Yes

Useful → Could have been since it included all rules followed by the group

Legitimate → No, rejection of algorithmic decision making.
What about human involvment?
Even though actual peer review quite unfair degrading meaningfulness

Back to Morocco

Evolutions in the institution
New realities, newcomers, new rules

Meaningful → Still yes

Useful → Not anymore, need to adapt the solver, more work and $$

Legitimate → Still Yes

Summary

Case	Meaningful	Useful	Legitimate
Morroco	Yes	Yes	Yes
NP1	Yes	Yes, with adaptation	Yes
NP2	Yes	Could have been	No
Morroco after	Yes	Not adapted anymore, needed adaptation	Yes

Discussion

Meaningful

→Yes in all cases. Based on a logic programming paradigm. Algorithm ensures consistency
→ Without DSS, negociations with meaningful (finding a solution is hard)

Legitimate → Same algorithm

Yes
No cheating, fair etc
(Algorithm appreciation (Logg et al. 2019))

No
Human decision and involvement, participation
Take part
(Algorithm aversion (Dievorst et al. 2015/8))

Useful
→ Yes while fitted to the institution
→ Very hard to make a one-size-fits-all solution: many local differences
→ A lot of work (and money) to adapt to institutional reality
→ Co-evolution or no evolution?

Conclusion

- A case of DSS co-developed with actors and researchers supposed to help many institutions
- When associated with various institutions and cases, meaningfulness remains, but usefulness and legitimacy varies
- Algorithmic decision making may appear more or less legitimate
- Keeping usefulness implies work or freezes institution (agenteity of DSS)
- Quite hard to make a DSS that is general enough to be useful in complex and varying situations
- Using the DSS implies involvement of new actors (developers)
- Necessary compromise / trade-off between the three notions