COMMUNITY SOCIAL DYNAMICS & ADOPTION OF AGRICULTURAL INNOVATIONS

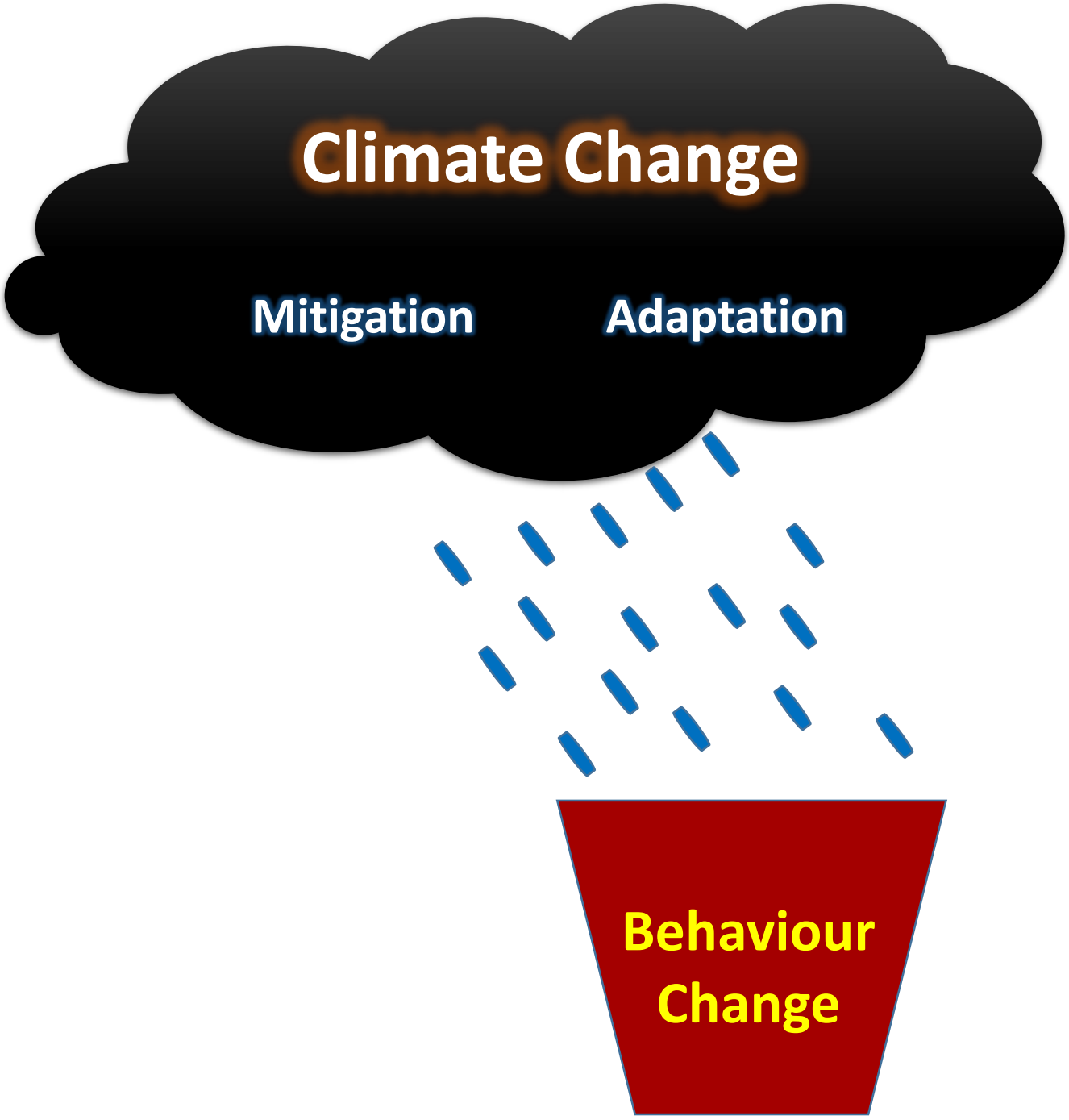
Ashiel Jumman

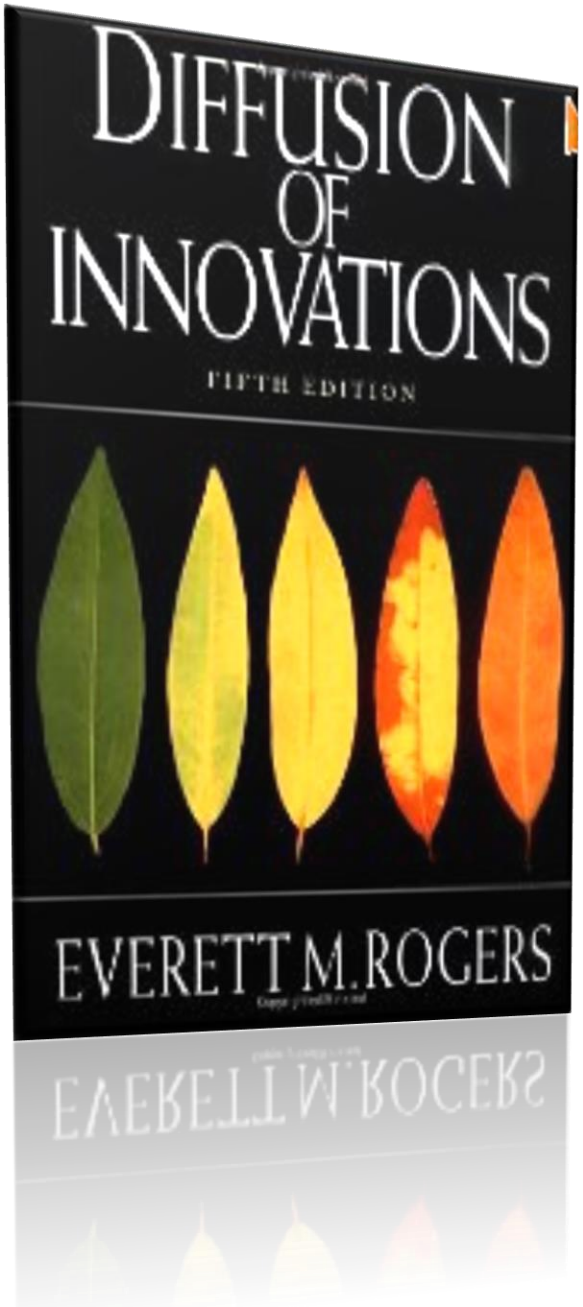
Prof C Bezuidenhout & Dr Mark Dent

University of
KWAZULU-NATAL

Road map

- Literature
- System Dynamics Model
  - Positive word of mouth
  - Negative word of mouth
- Model Simulation
- Conclusions


Climate Change
Mitigation
Adaptation
Behaviour Change



Rural Sociology

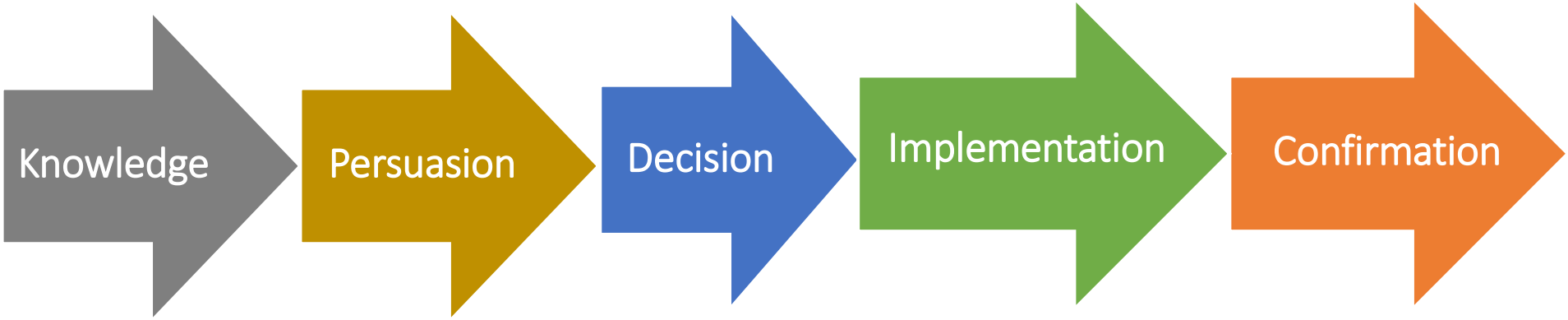
Diffusion of hybrid corn seed amongst farmers in Iowa, USA
(Ryan and Gross, 1943)

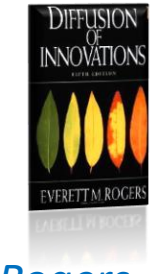
Most pioneering and influential study

1st Edition - 1962

5th Edition - 2003

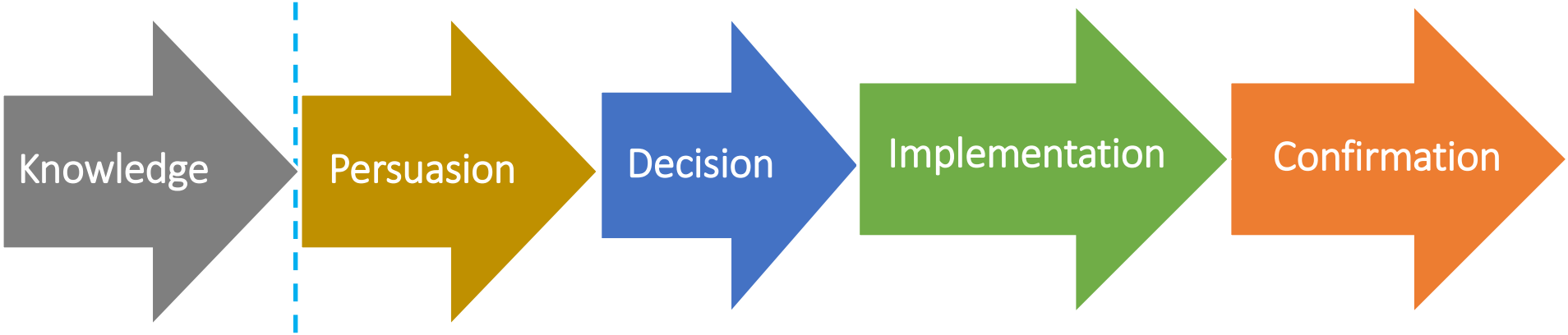
Stages in Adoption Process





Rogers, 2003

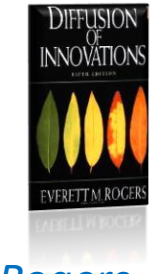
Stages in Adoption Process



Mass Media

Peer Interaction

External Agents



Rogers, 2003

Stages in Adoption Process

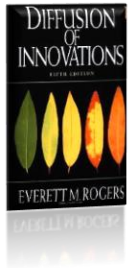
Knowledge → Persuasion → Decision → Implementation → Confirmation

Mass Media

*"Most studies illustrate that individuals **do not** evaluate an innovation based on objective scientific studies.*

Instead, information from subjective evaluations is sought from other individuals similar to themselves, who may have already adopted the innovation"

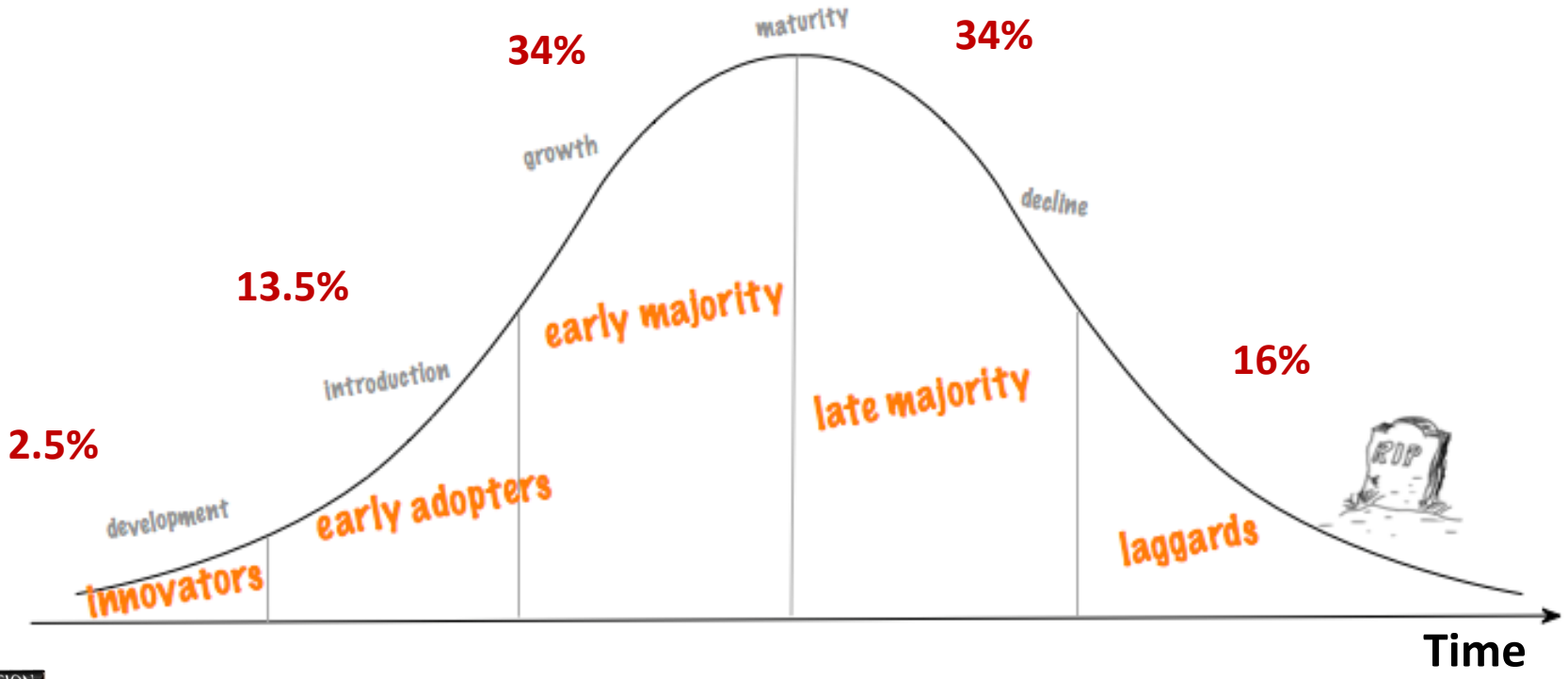
(Rogers, 2003)



Rogers, 2003

Logic versus Emotion

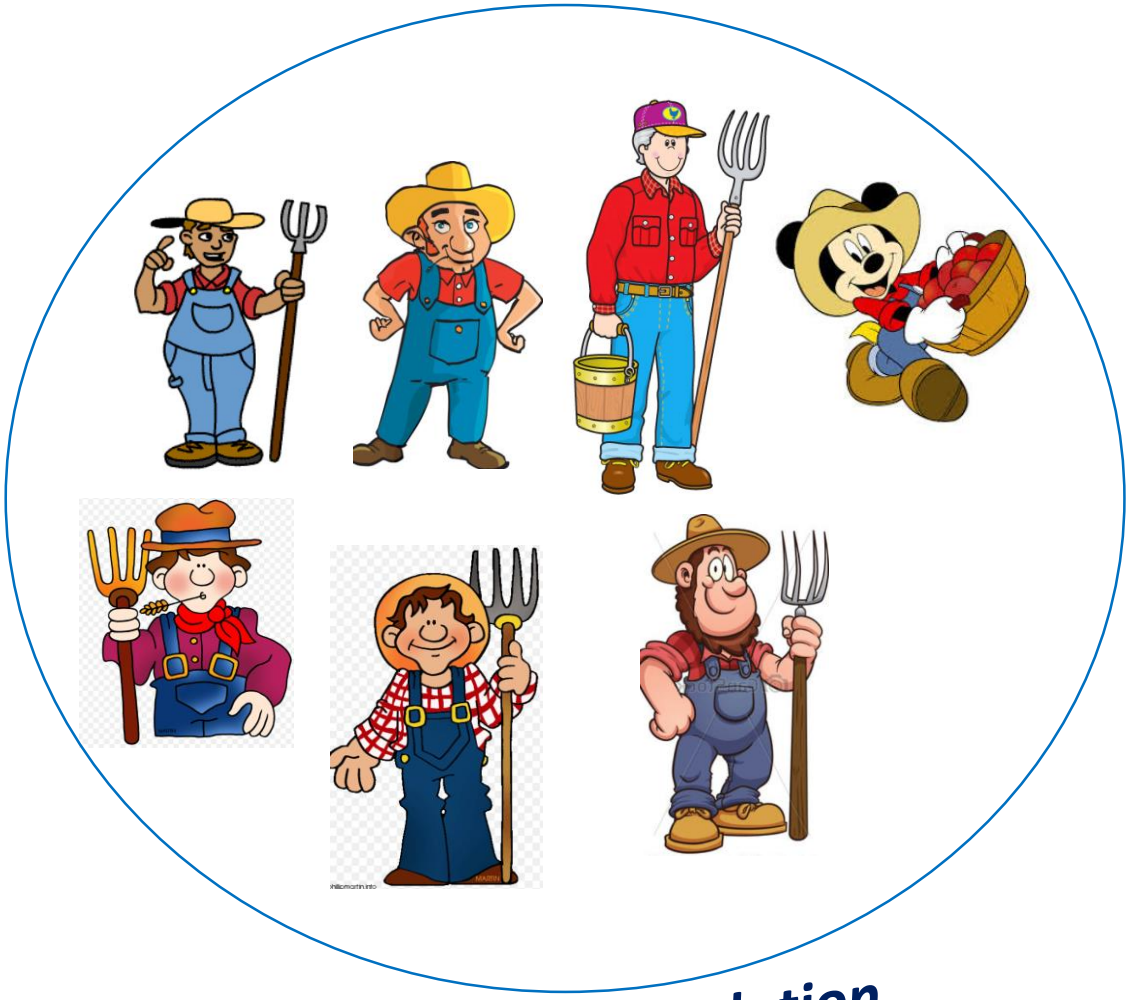
Social Structure



(Rogers, 2003)

Bass Diffusion Model

(Bass, 1969)



Farmer population

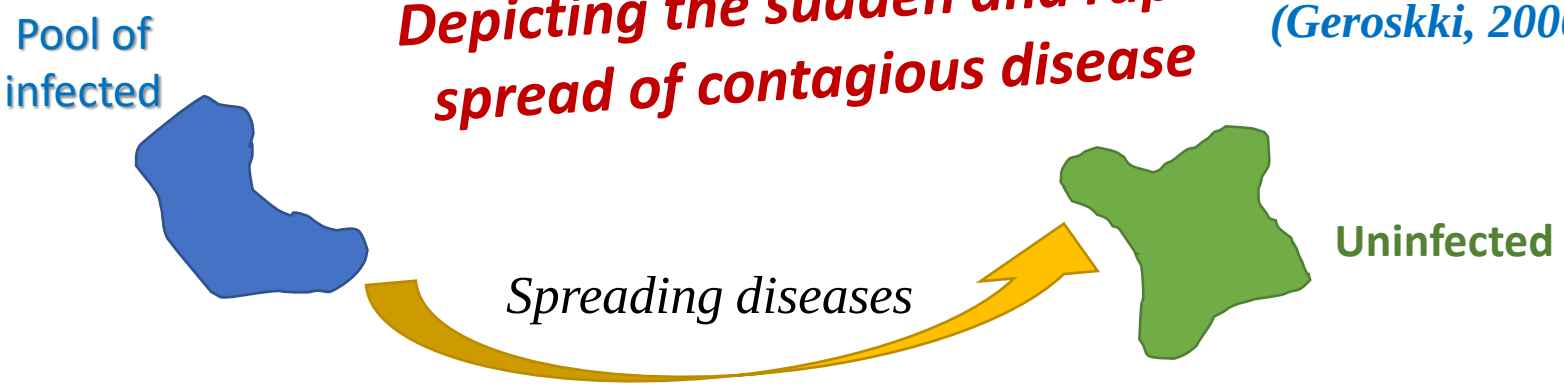
"Innovators"

"Imitators"

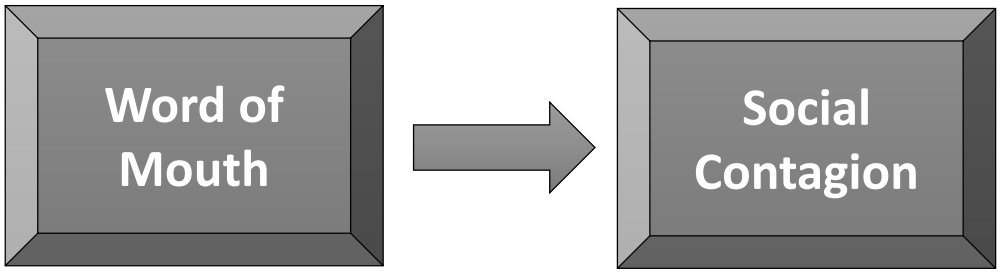
Foundation Mathematical Model

Epidemics Model

Depicting the sudden and rapid spread of contagious disease *(Geroskki, 2000)*



"Ideas, products, messages and behaviours spread like viruses do"
(Gladwell, 2000)



i.e. "contagious behaviour"
(Gladwell, 2000)

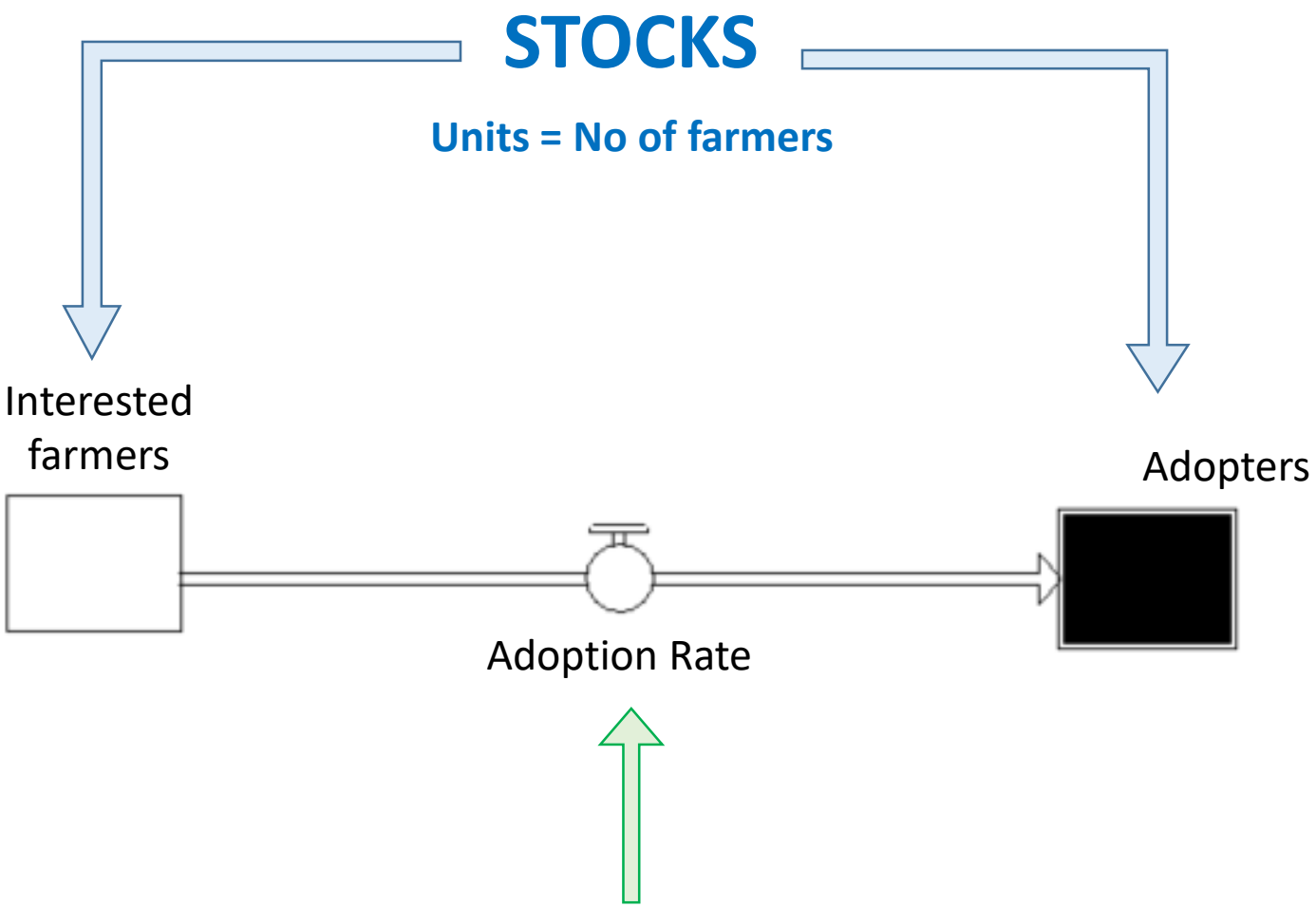
Aim

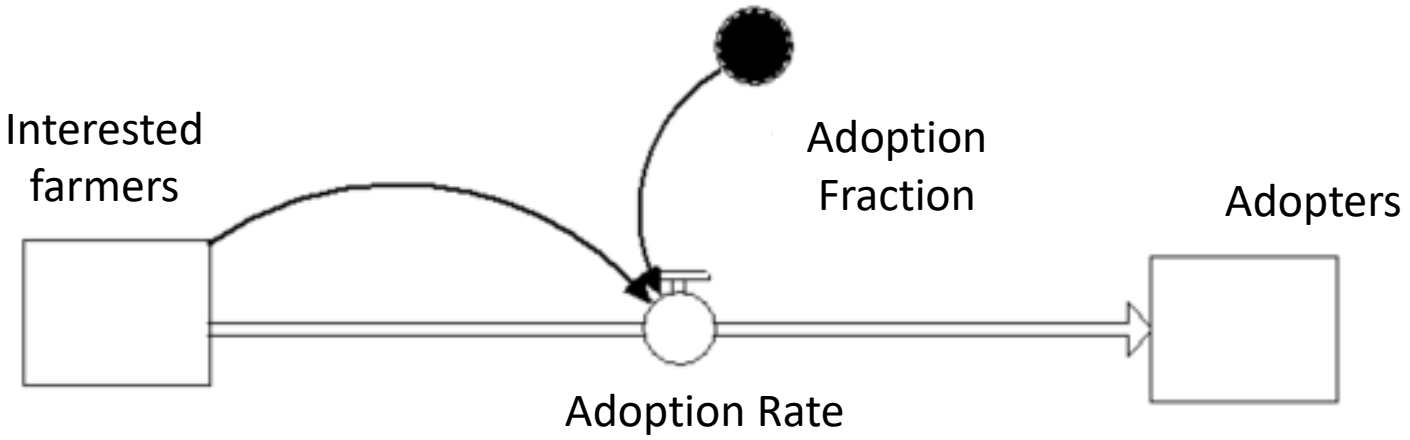
To demonstrate the effect of peer social influence on farmer adoption decision making processes using system dynamics modelling

Specific focus on Word of Mouth, Acknowledging that there are other factors that influence adoption

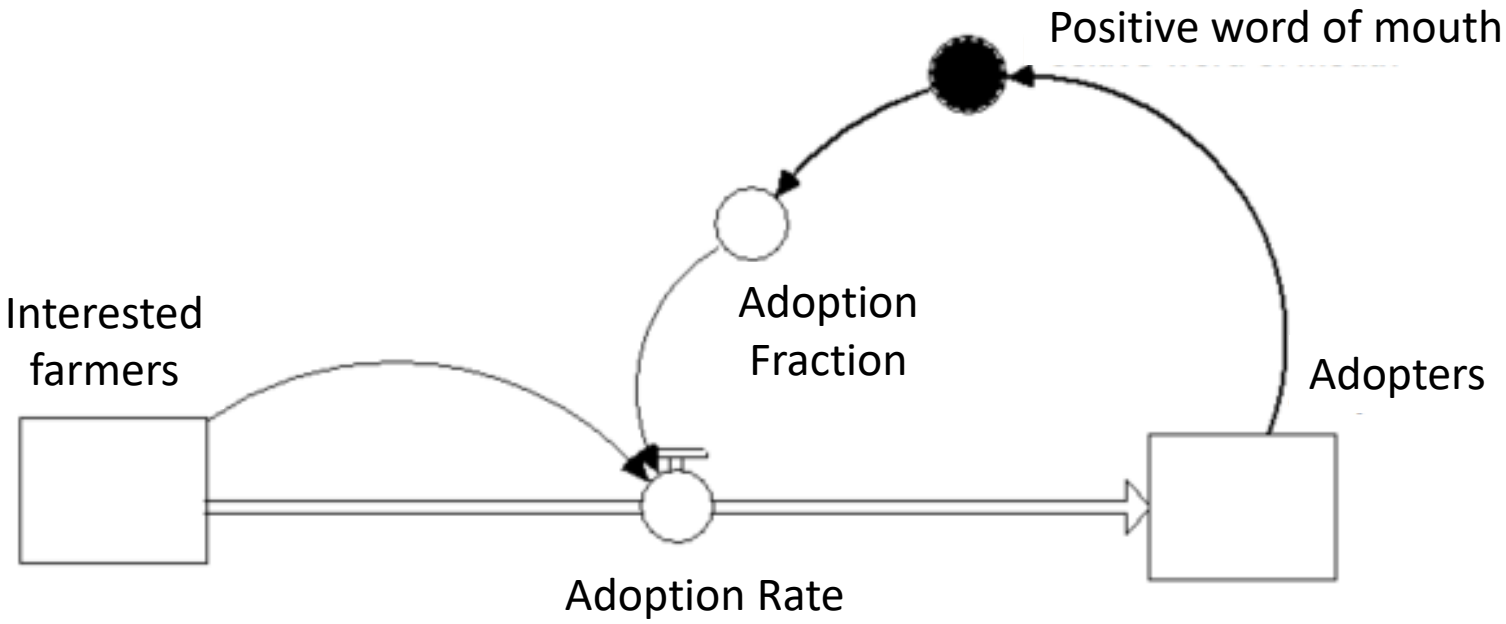
System Dynamics Model

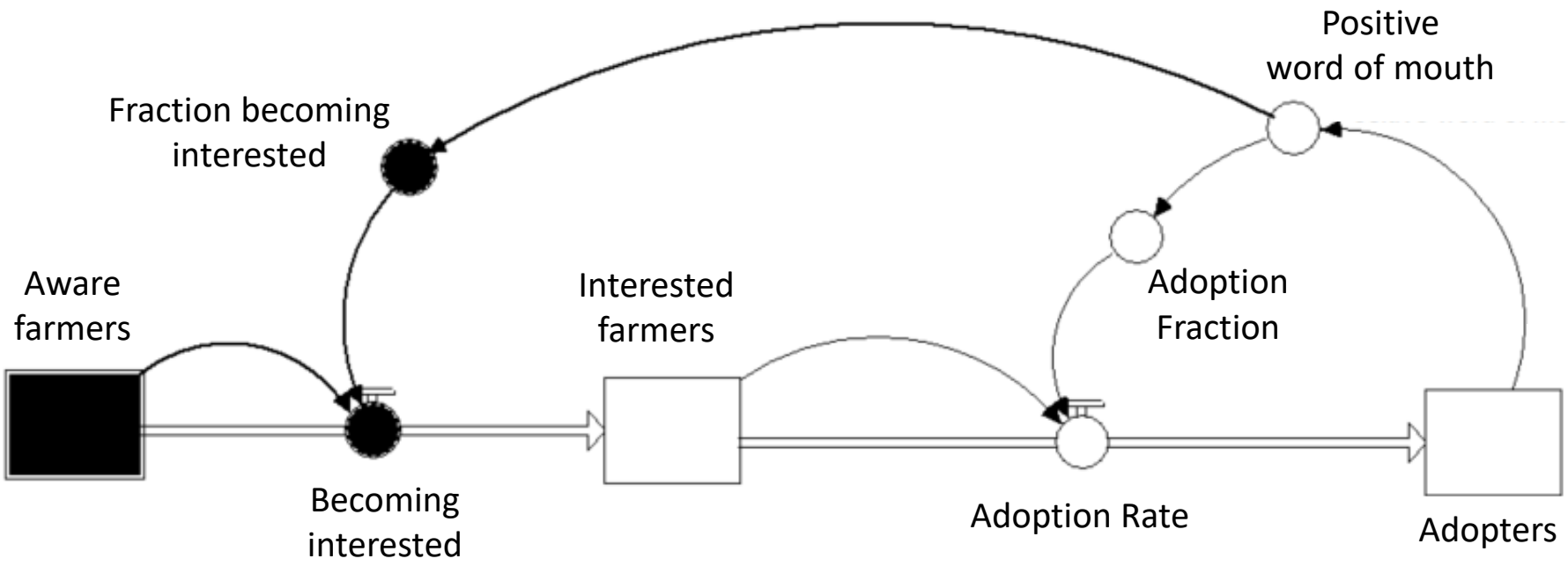
Positive Word of Mouth


STOCKS
Units = No of farmers
Interested farmers
Adopters
Adoption Rate
FLOW
Units = farmers per year



Adoption Rate = Interested farmers x Adoption fraction

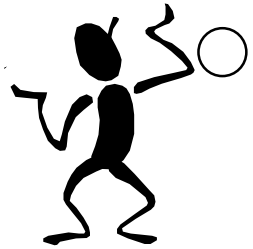

Positive word of mouth
Adoption
Fraction
Interested
farmers
Adopters
Adoption Rate


Positive
word of mouth
Fraction becoming
interested
Aware
farmers
Interested
farmers
Adoption
Fraction
Becoming
interested
Adoption Rate
Adopters

Narrative data – exploratory interviews

"Farmers tend to be very (pause). We call it in Afrikaans, **Tropdiere (herd animals)**, so if one guy, (he paused again). That's an important point. If one guy plants N41 and it works. And they talk at the golf club or whatever, some guys will plant it **without even thinking**. **Without doing a plan or research**. **They will just do it**. The other guys are doing it. If one guy says that Mazda is the best bakkie you can get and he buys it, and then another guy and another guy, then they all buy it."

"And the same with irrigation.
You get followers and leaders."



Farmer A

Question:

You like to test an innovation. Prove that it works. Are other farmers like you? How do they decide?

"You must do a fact finding mission. It's the same with these new systems. We must investigate. That's what I did with this guy (referring to an irrigation advisory consultant). I phoned him and said he must make me a proposition on how I must start with this new system. It's expensive."

Farmer C

Question:

What is the actual process when investigating irrigation scheduling probes with this consultant?

But, you know my friend, my neighbour, he has already used it, he will tell me and he is very happy with it. I phoned up my friend and said you have been with it now for a year and half, are you still happy? That's what I find out first. Is the system still up and running? Is it operating? Is it done properly? Is it done as it should be? Then I got the green light there – then I phone the consultant and say let's talk again."

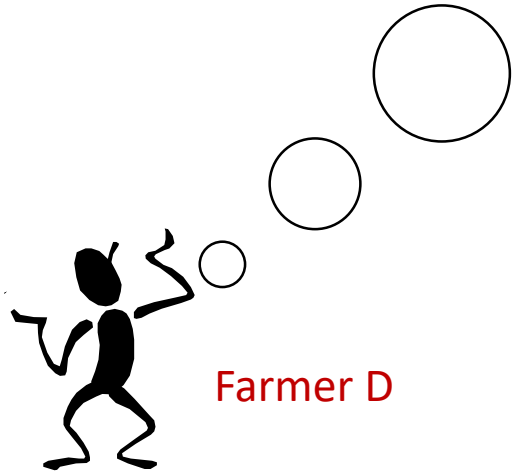
Farmer C

Question:

What is the actual process when investigating irrigation scheduling probes with this consultant?

Phone a friend. Mostly. Or talk to Extension.

Ya, **normally you would phone a guy who you know has a good business running. I won't ask one guy also, I will ask a couple of guys**.

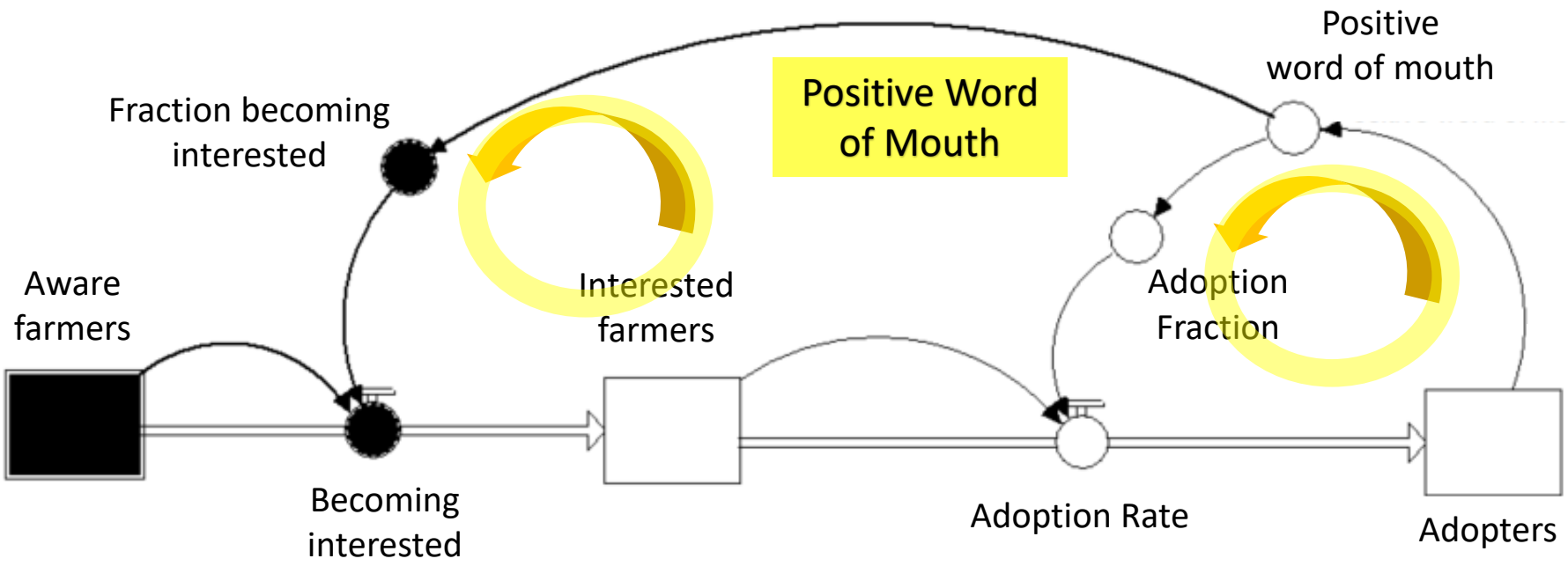


Farmer D

Question:

If you ever have some problems on the farm. Who do you seek advice from – how does it work?

Circular Feedback



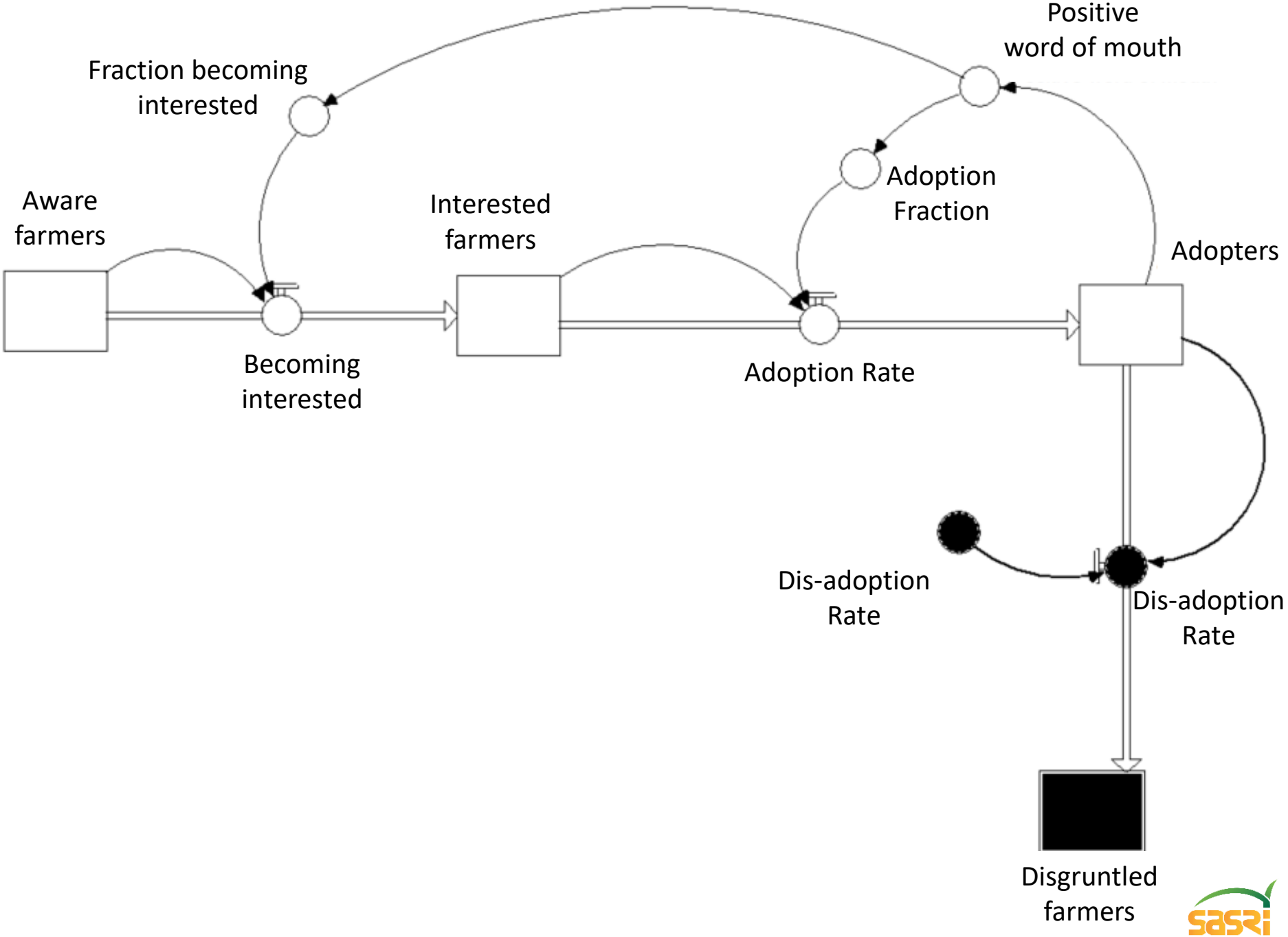
Structure

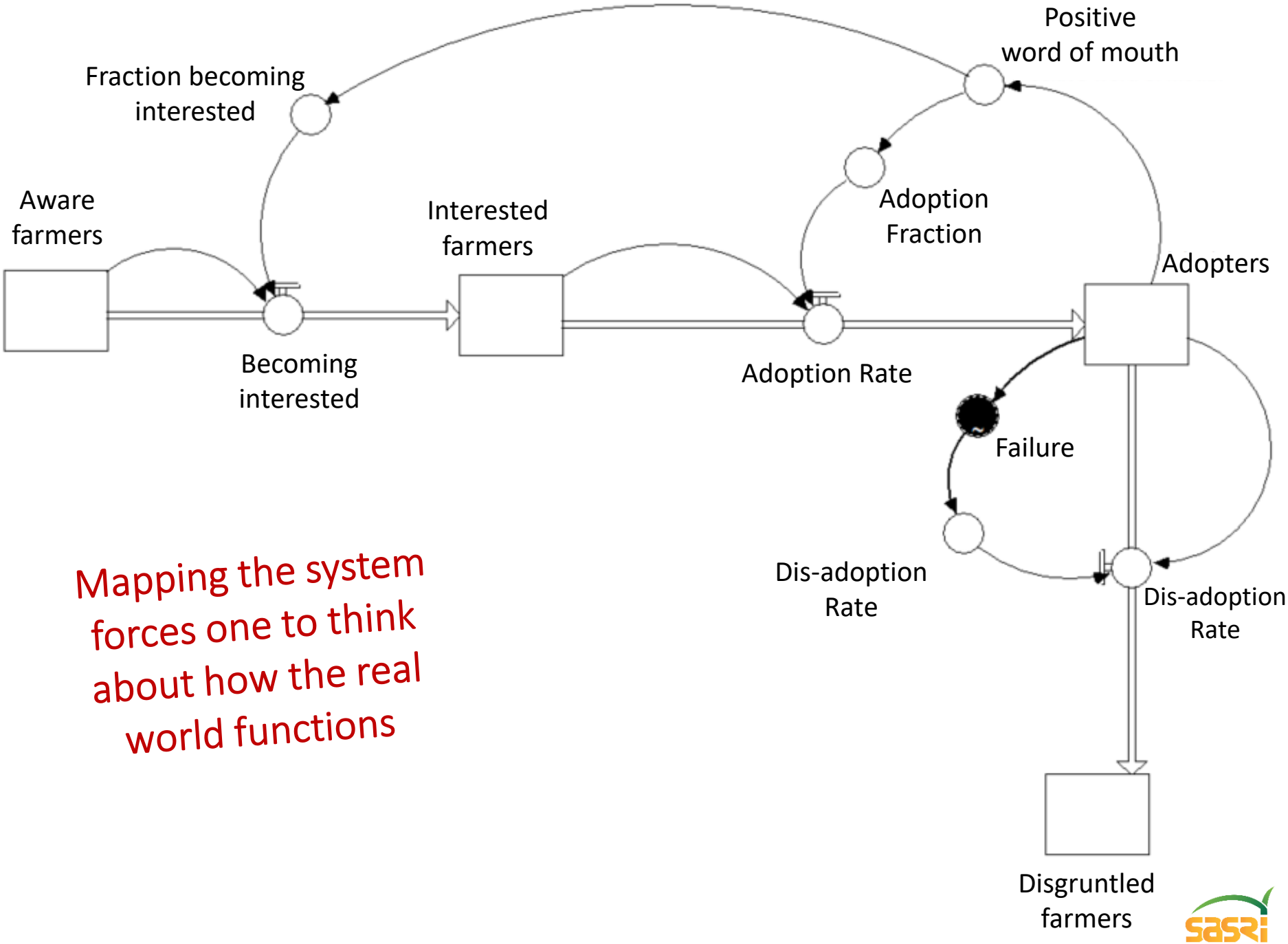
System

Causation

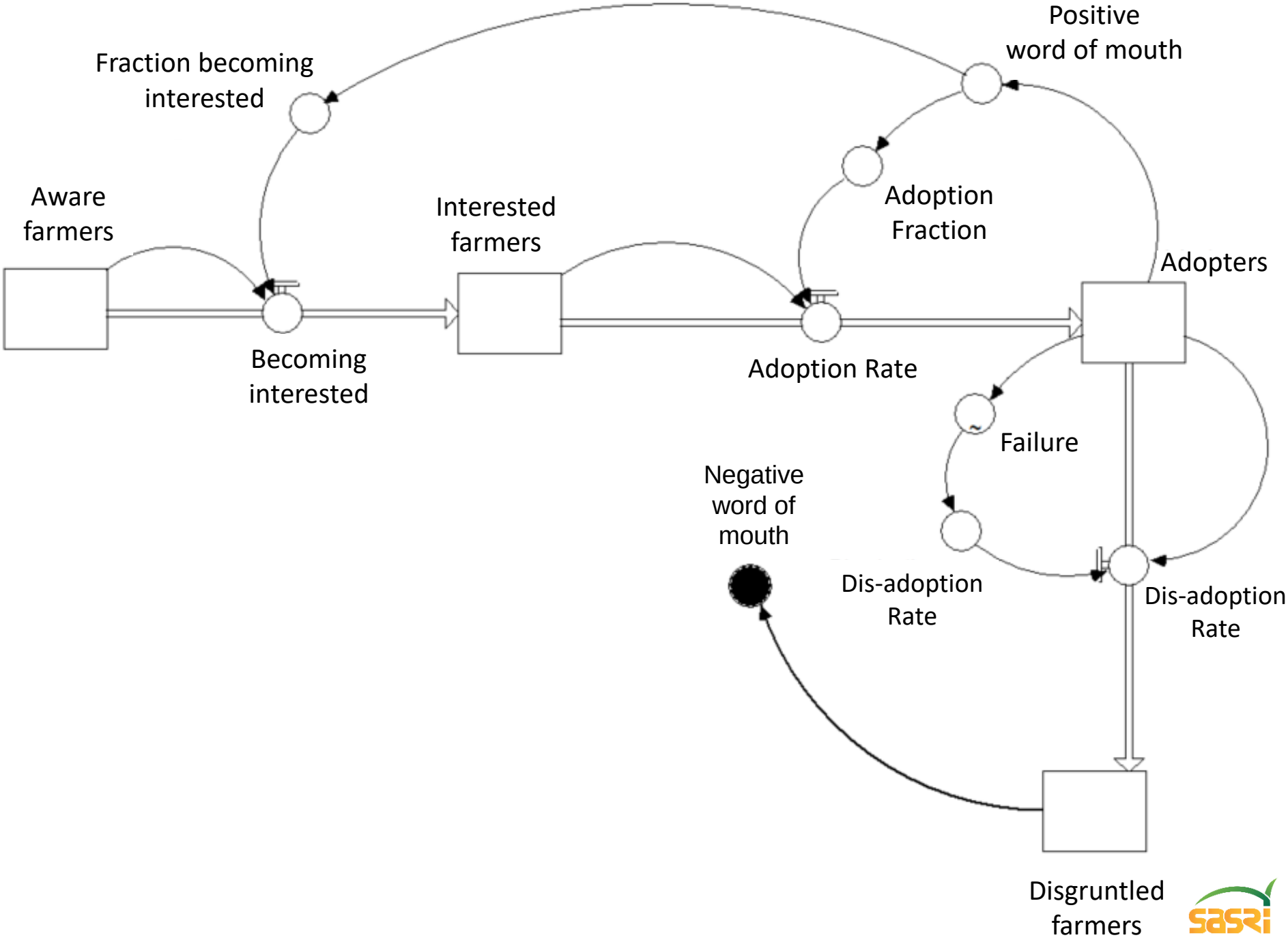
System Dynamics Model

Negative Word of Mouth


Positive
word of mouth
Fraction becoming
interested
Adoption
Fraction
Aware
farmers
Interested
farmers
Adopters
Becoming
interested
Adoption Rate
Dis-adoption
Rate
Dis-adoption
Rate
Disgruntled
farmers



Mapping the system forces one to think about how the real world functions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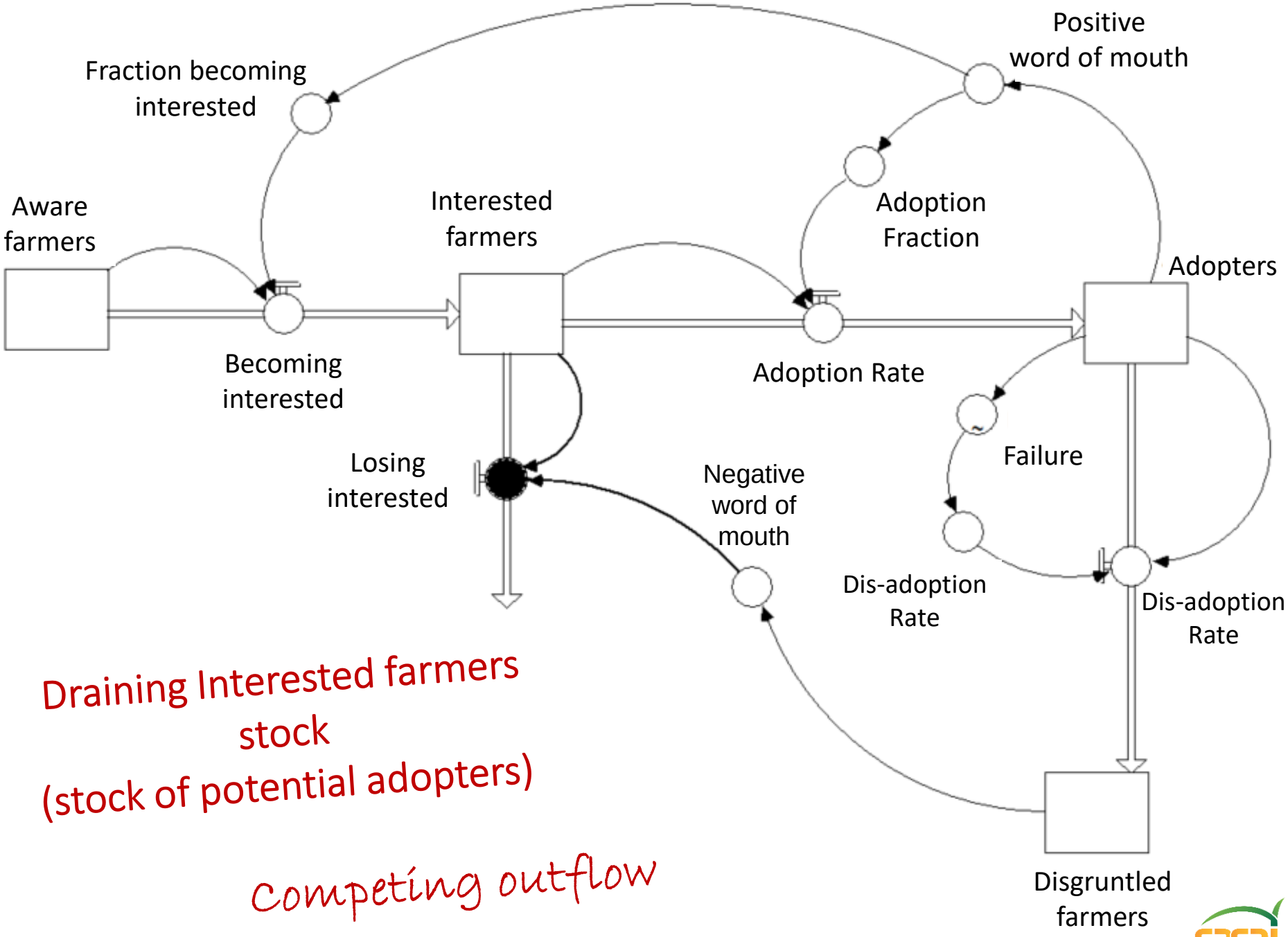
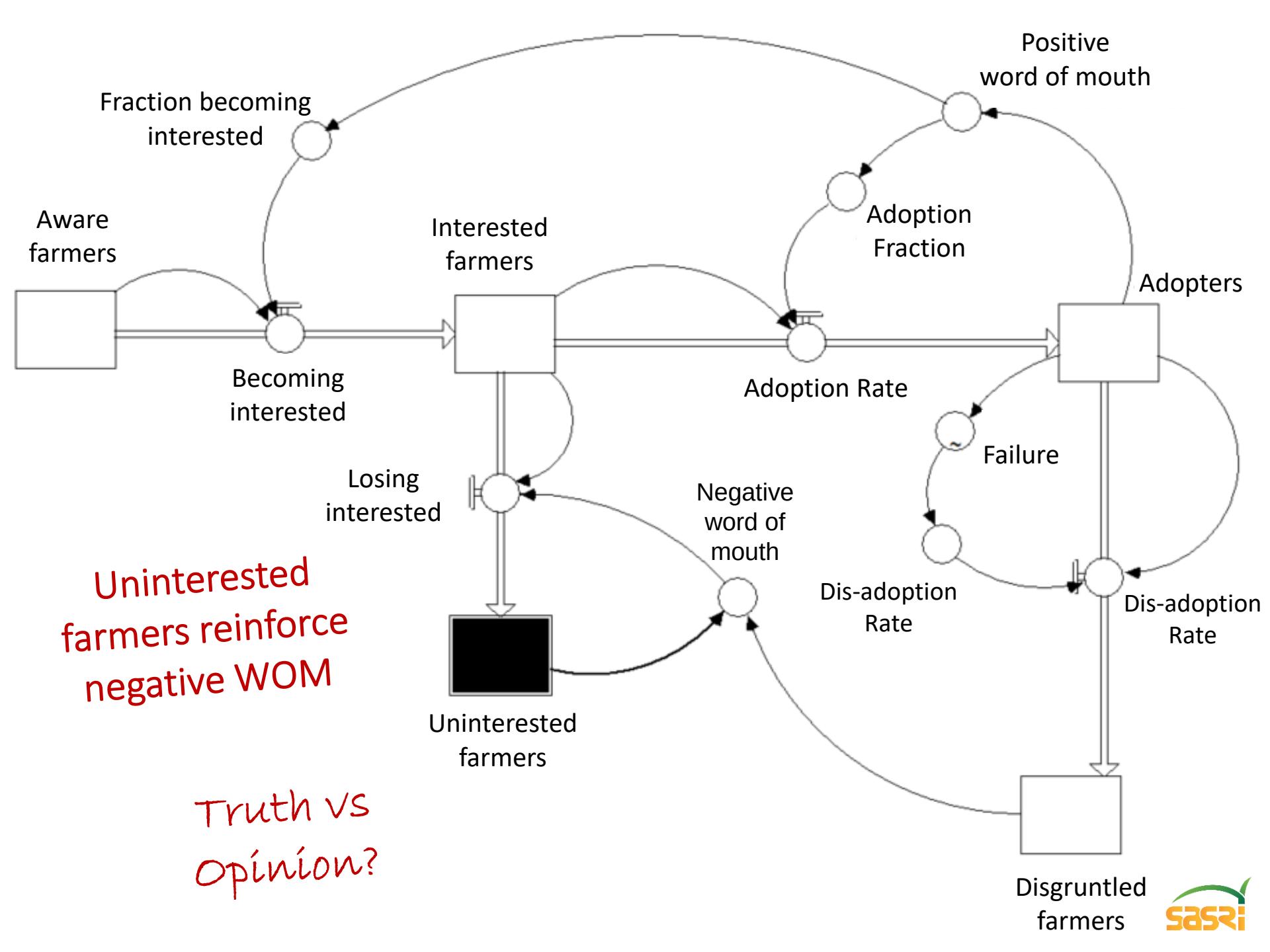
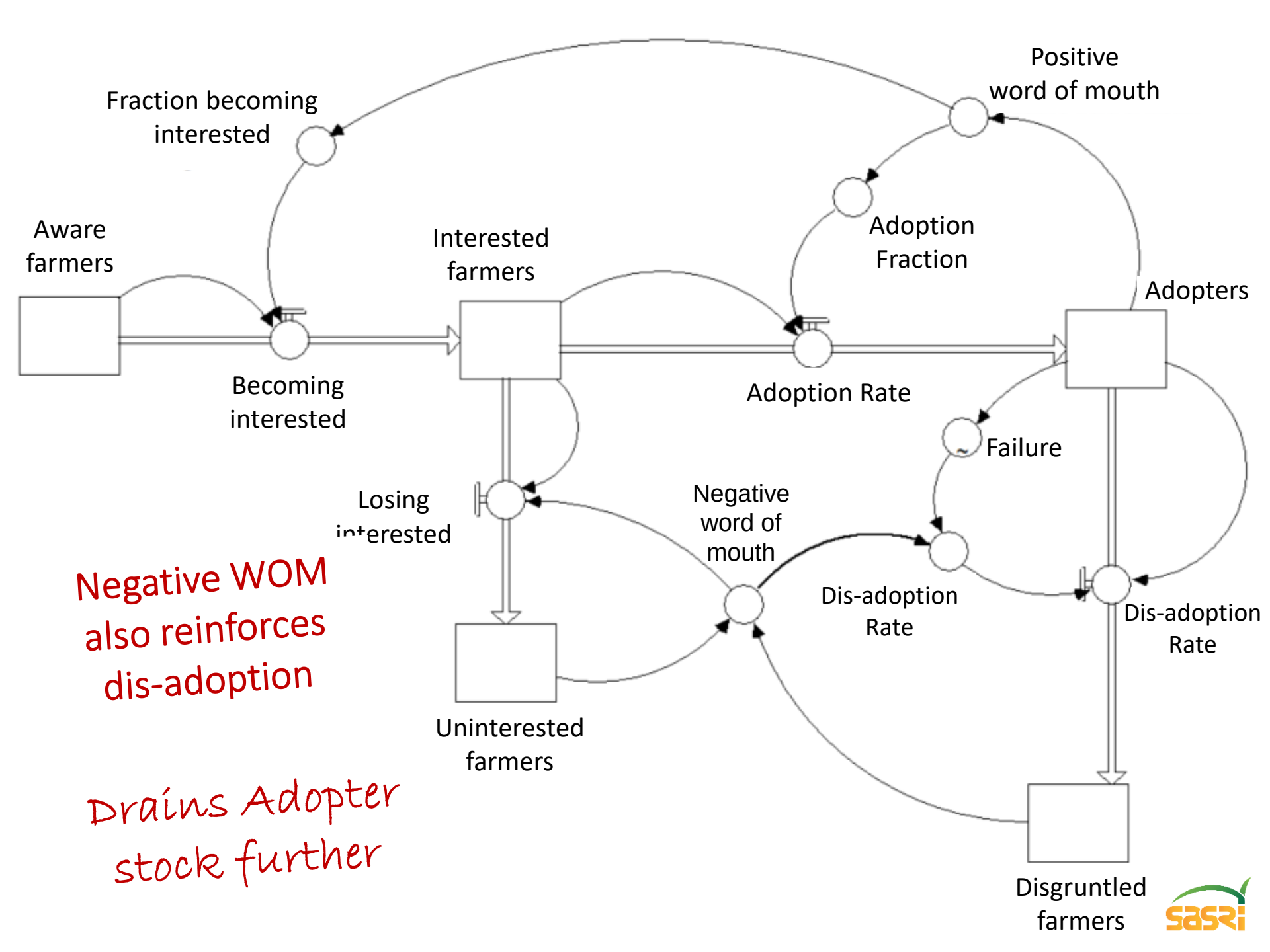
Adoption Rate
Failure
Negative
word of
mouth
Dis-adoption
Rate
Dis-adoption
Rate
Disgruntled
farmers

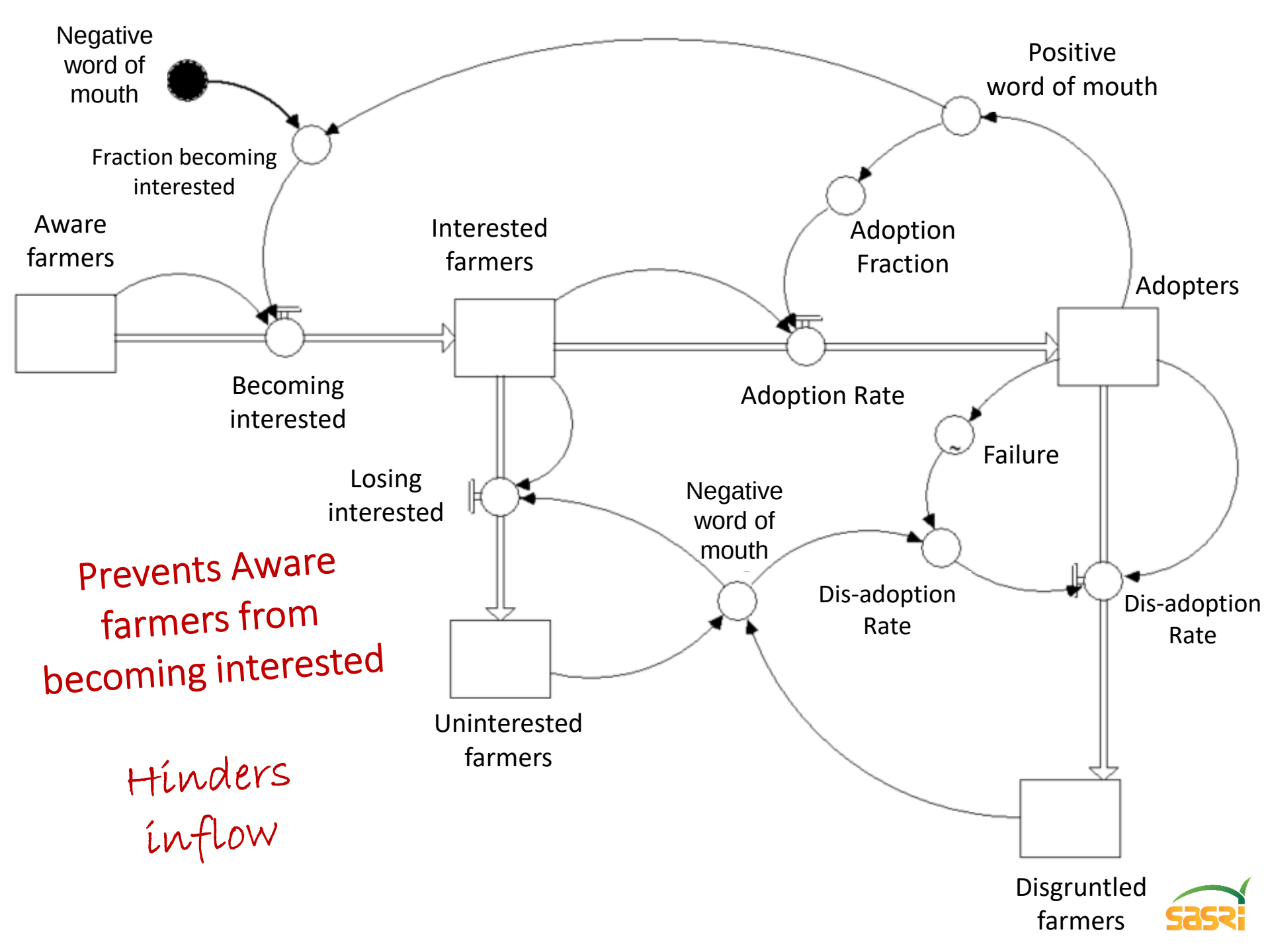


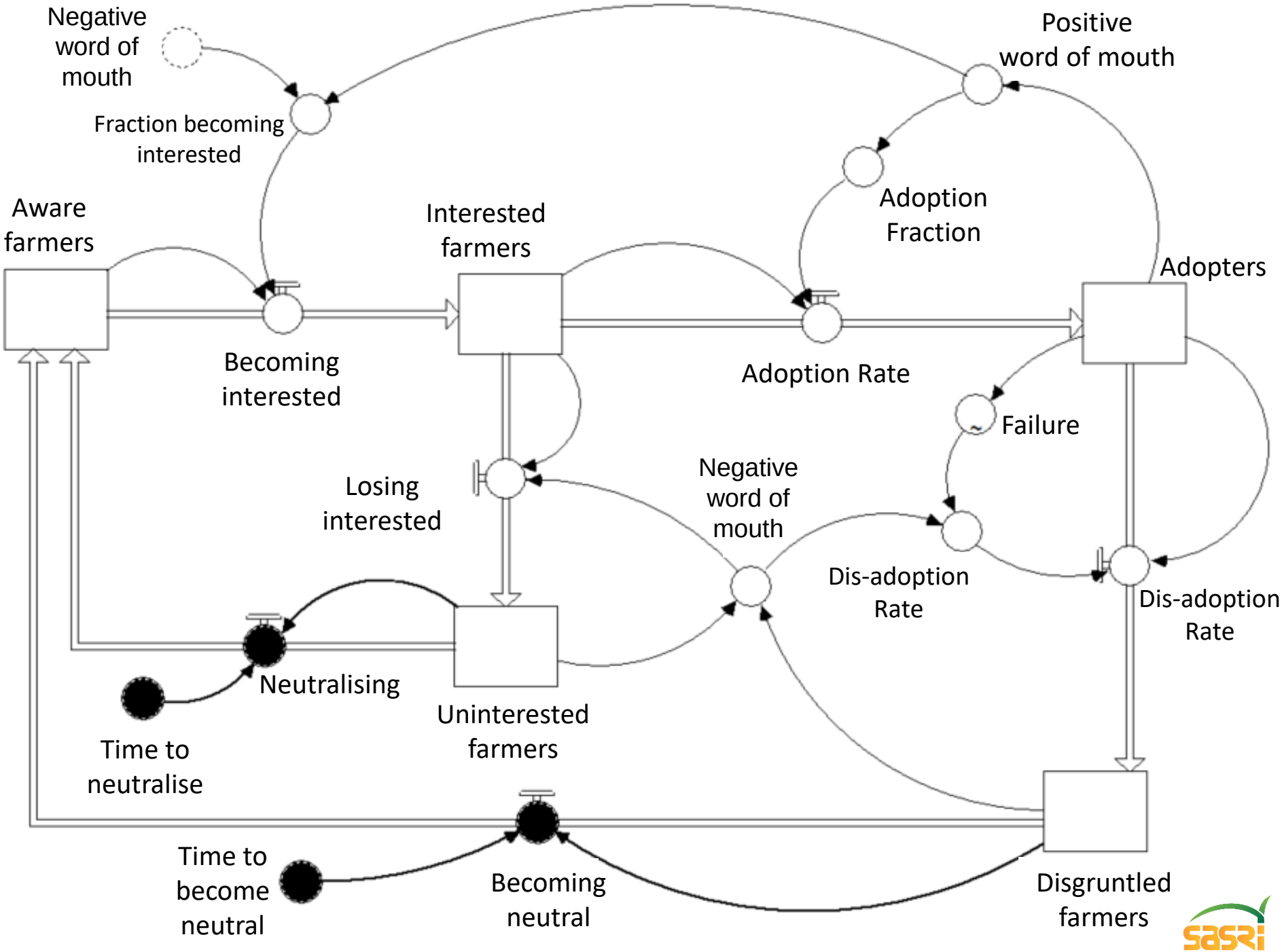
Draining Interested farmers stock
(stock of potential adopters)

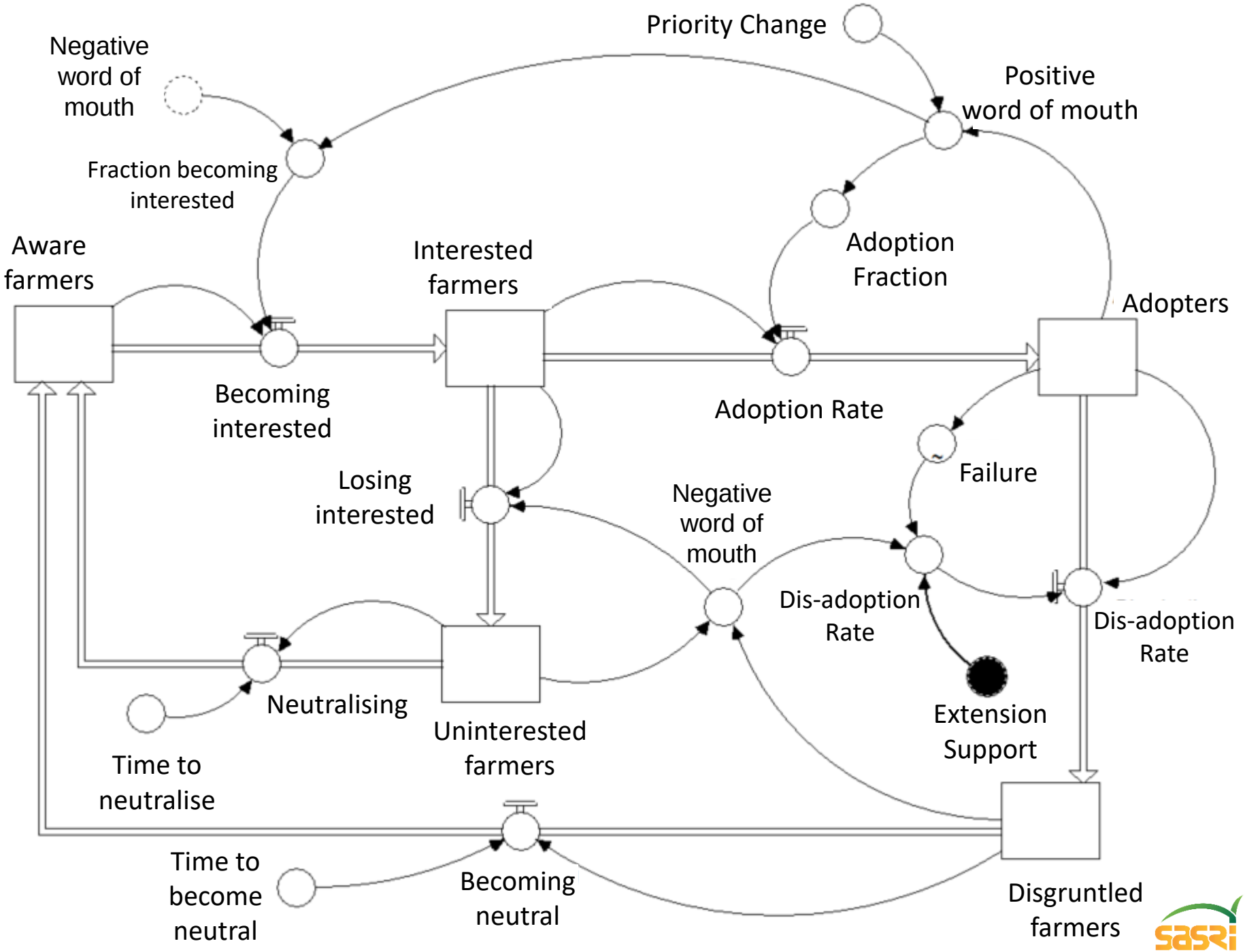
Competing outflow


Positive word of mouth
Fraction becoming interested
Aware farmers
Interested farmers
Adoption Fraction
Adopters
Becoming interested
Adoption Rate
Failure
Losing interested
Negative word of mouth
Dis-adoption Rate
Dis-adoption Rate
Uninterested farmers
Disgruntled farmers
Uninterested farmers reinforce negative WOM
Truth vs Opinion?


Positive word of mouth
Fraction becoming interested
Aware farmers
Interested farmers
Adoption Fraction
Adopters
Becoming interested
Adoption Rate
Failure
Losing interested
Negative word of mouth
Dis-adoption Rate
Dis-adoption Rate
Negative WOM also reinforces dis-adoption
Uninterested farmers
Drains Adopter stock further
Disgruntled farmers


Negative word of mouth
Positive word of mouth
Fraction becoming interested
Aware farmers
Interested farmers
Adoption Fraction
Adopters
Becoming interested
Adoption Rate
Failure
Losing interested
Negative word of mouth
Dis-adoption Rate
Dis-adoption Rate
Uninterested farmers
Disgruntled farmers
Prevents Aware farmers from becoming interested
Hinders inflow

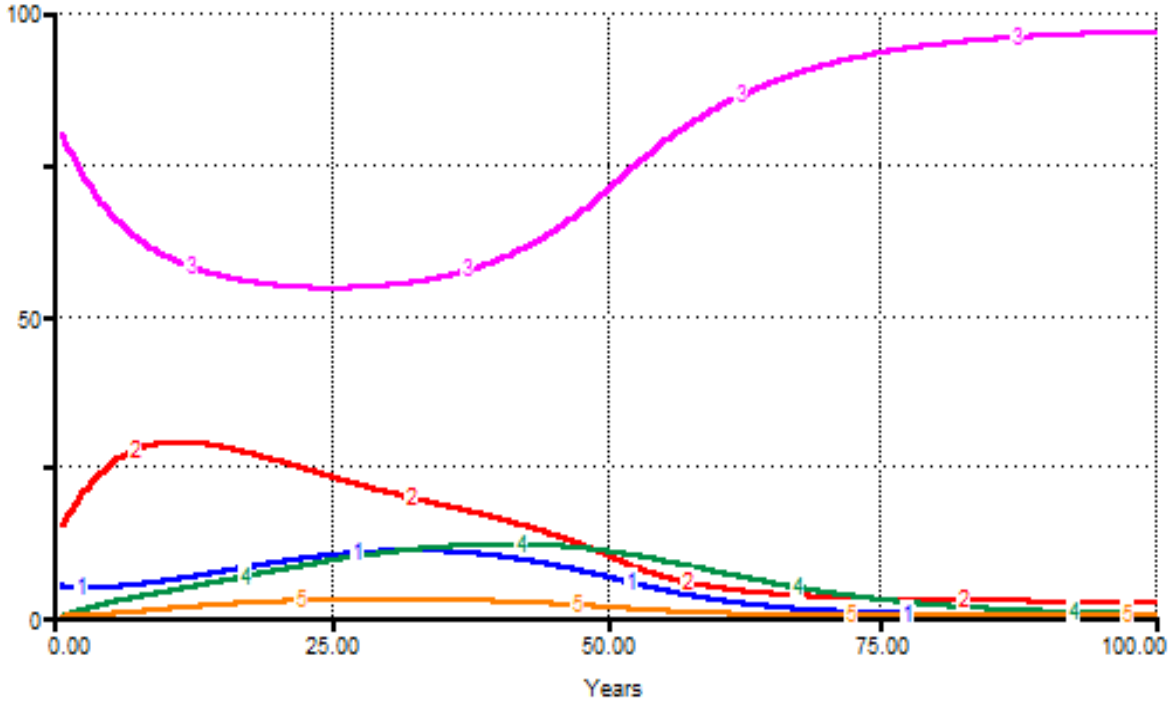

Negative word of mouth
Positive word of mouth
Fraction becoming interested
Adoption Fraction
Aware farmers
Interested farmers
Adopters
Becoming interested
Adoption Rate
Failure
Losing interested
Negative word of mouth
Dis-adoption Rate
Dis-adoption Rate
Neutralising
Uninterested farmers
Time to neutralise
Time to become neutral
Becoming neutral
Disgruntled farmers


Priority Change
Negative word of mouth
Positive word of mouth
Fraction becoming interested
Adoption Fraction
Aware farmers
Interested farmers
Adopters
Becoming interested
Adoption Rate
Failure
Losing interested
Negative word of mouth
Dis-adoption Rate
Dis-adoption Rate
Neutralising
Uninterested farmers
Extension Support
Time to neutralise
Time to become neutral
Becoming neutral
Disgruntled farmers

Model Simulation

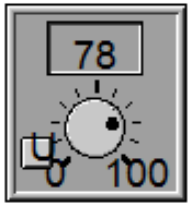
Model Initial Conditions

Aware Farmers	**= 80**	**Disgruntled farmers**	**= 0**
Interested farmers	**= 15**	**Uninterested farmers**	**= 0**
Adopters	**= 5**		



Adoption Failure Mode

Failure eliminated by extension support



Model Initial Conditions

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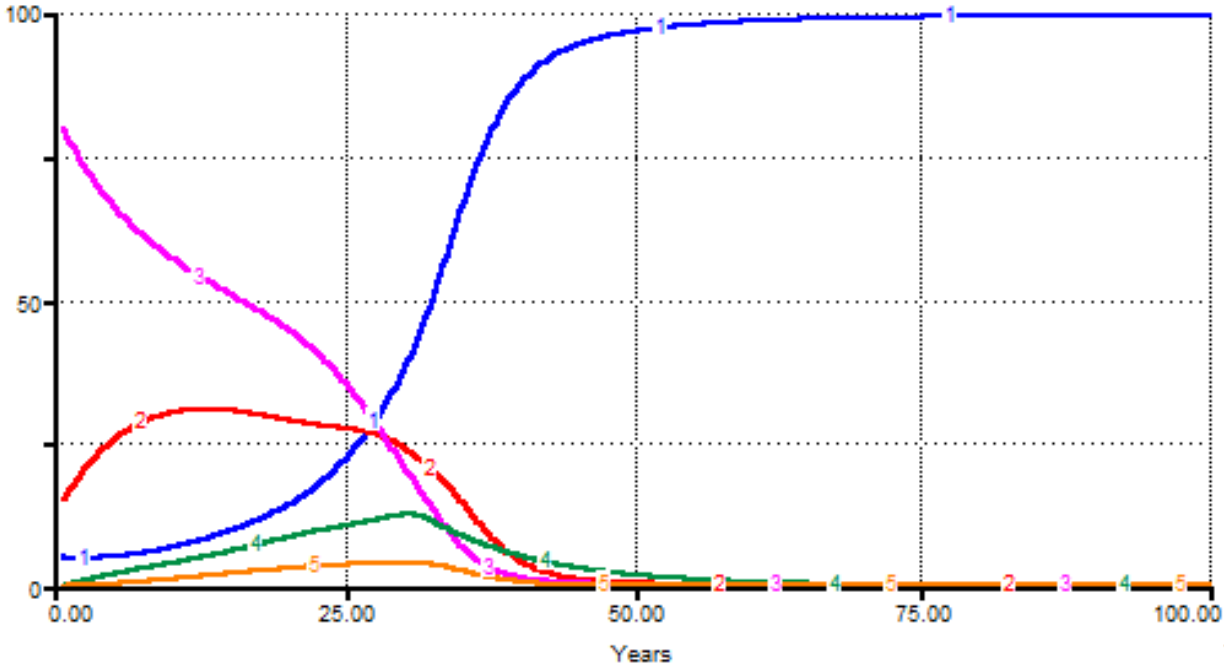

Adoption Success Mode

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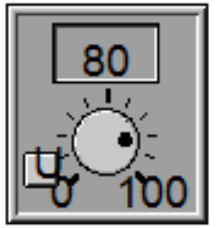
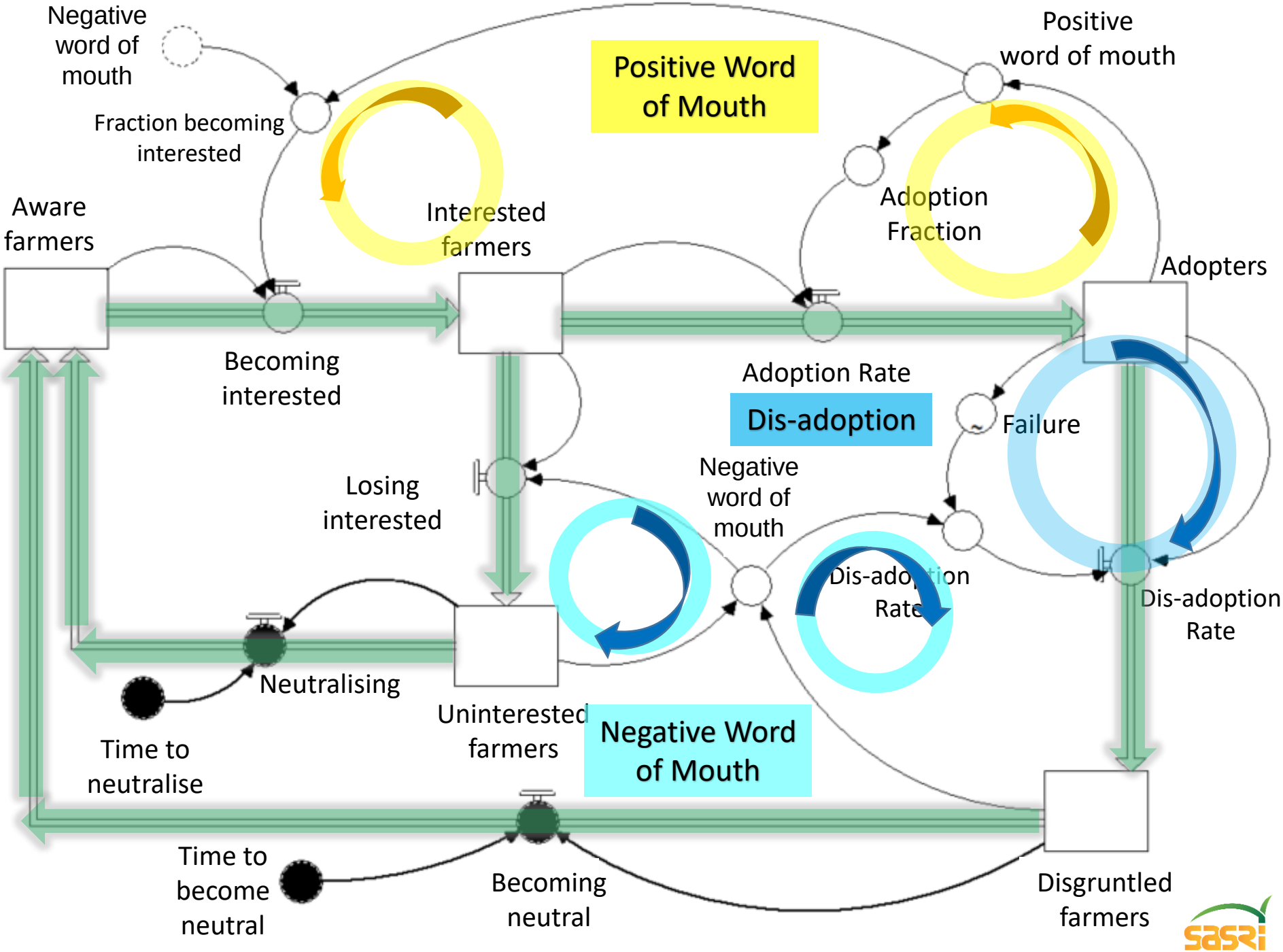


Conclusions


Negative word of mouth
Fraction becoming interested
Positive Word of Mouth
Positive word of mouth
Aware farmers
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Neutralising
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Time to neutralise
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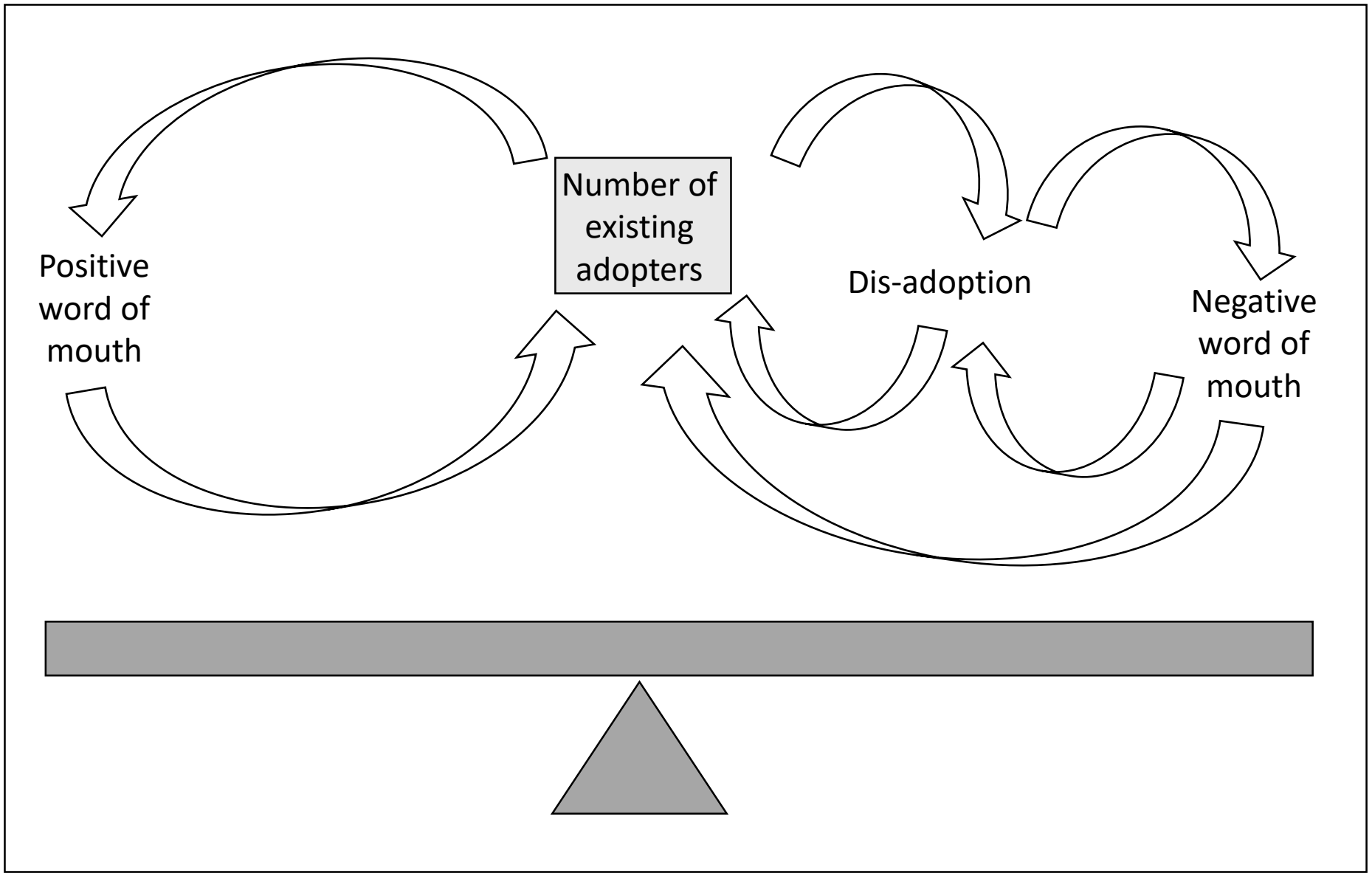
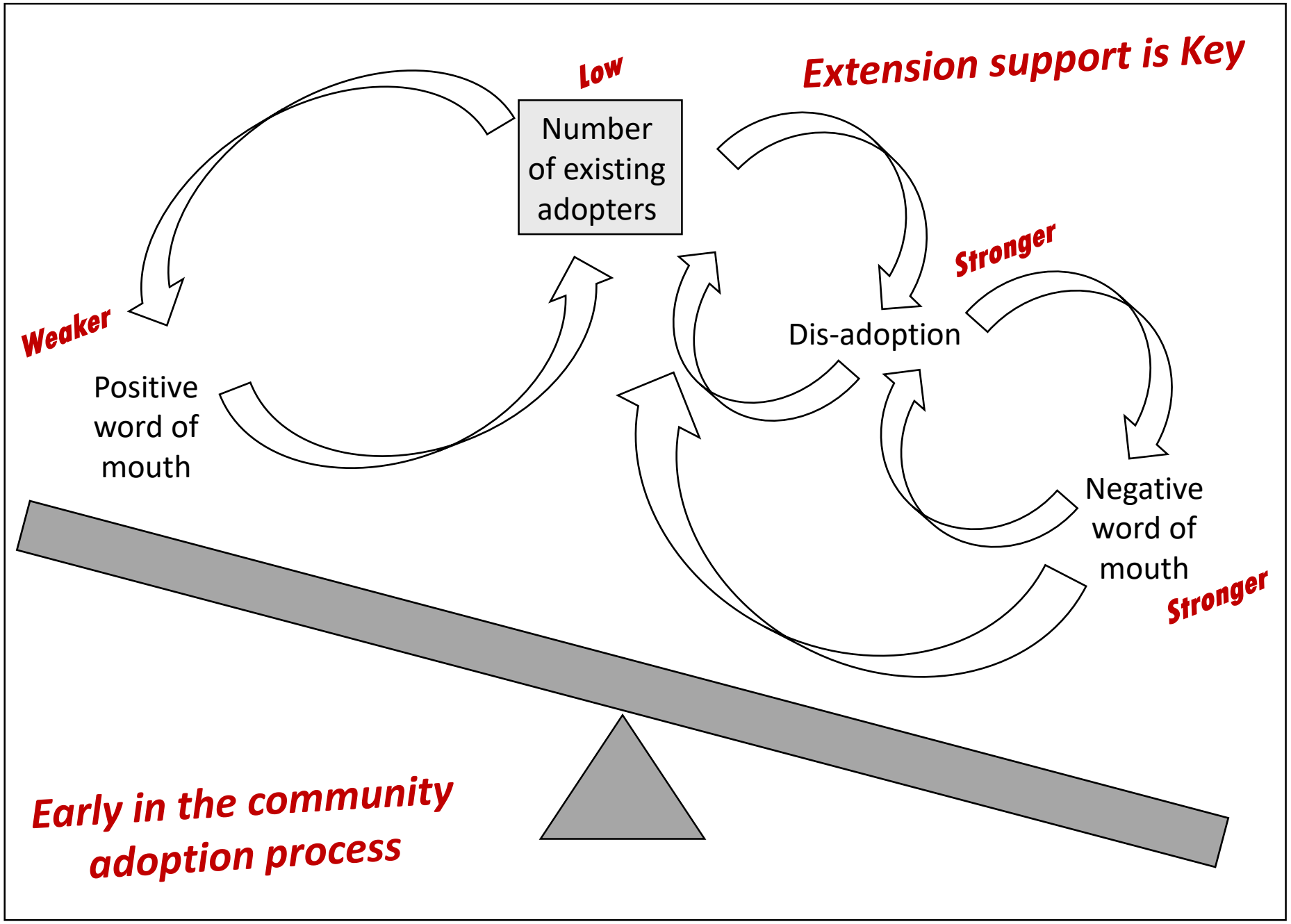
Disgruntled farmers


Positive word of mouth
Number of existing adopters
Dis-adoption
Negative word of mouth


Extension support is Key
Low
Number of existing adopters
Weaker
Positive word of mouth
Stronger
Dis-adoption
Negative word of mouth
Stronger
Early in the community adoption process

Outcomes

- Well received by Extension Specialists
- System Dynamics model resonated with their real world experiences
- Many further narratives were shared to corroborate model dynamics (e.g. adoption of varieties, IPM & intercrops)

Acknowledgements

- PhD Supervisors: Prof Carel Bezuidenhout & Dr Mark Dent
- Dr Shamim Bodhanya & UKZN Westville System Dynamics group
- SASRI project team, extension specialist & participating farmers

SASRI

University of KWAZULU-NATAL