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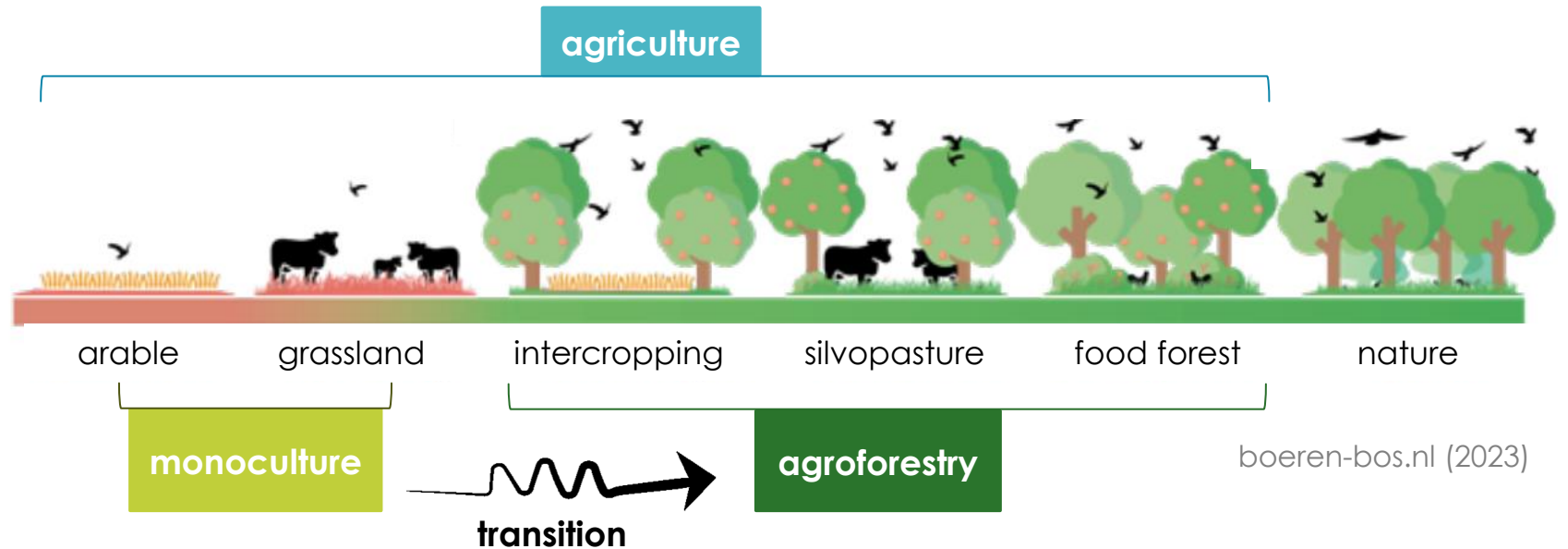
Master Sustainable Development Management

March 5, 2024

An aerial photograph of a vast, golden-brown agricultural field, likely a cornfield, under a clear sky. In the foreground, a green tractor is pulling a yellow and green harrow, moving across the field. The field is divided into sections by narrow paths and small trees scattered throughout. The overall scene depicts a typical agricultural landscape in the Netherlands.

From Monoculture Farming to Agroforestry Systems: Exploring Transition Barriers and Solutions for Farmers in the Netherlands

Background



- Short-term productivity, scalable, simple management & harvesting and globalization
- Soil exhaustion, pests and diseases, pesticides and synthetic fertilizer, loss of biodiversity, and food insecurity

- Soil regeneration, increased and prolonged yield, carbon capture, water retention, storm resilience, fire prevention, increasing biodiversity, and decrease in poverty
- Adoption of agroforestry remains low

Problem statement



Limited research on agroforestry adoption barriers for traditional farmers in the Netherlands

Research objective

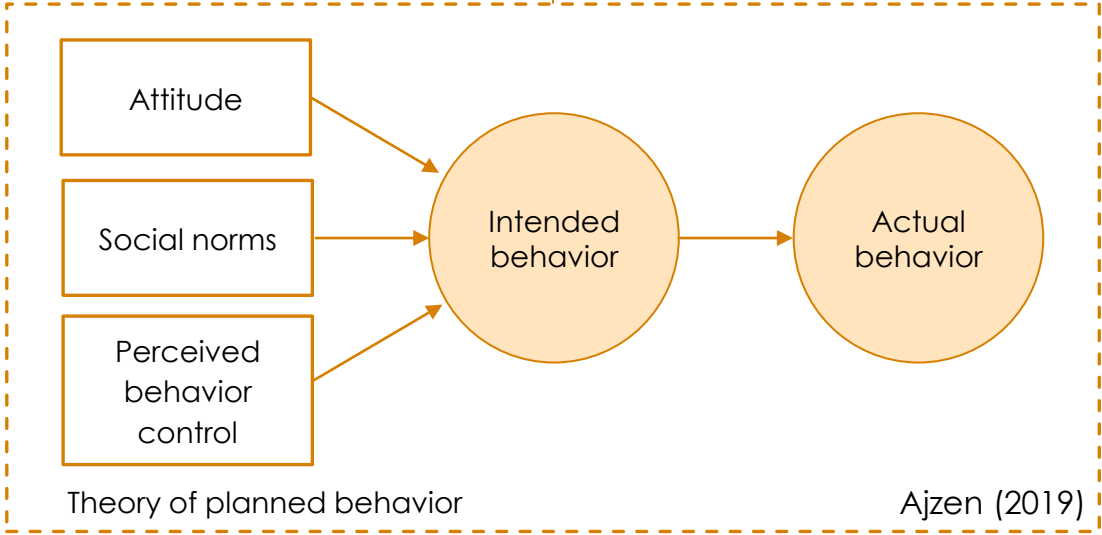
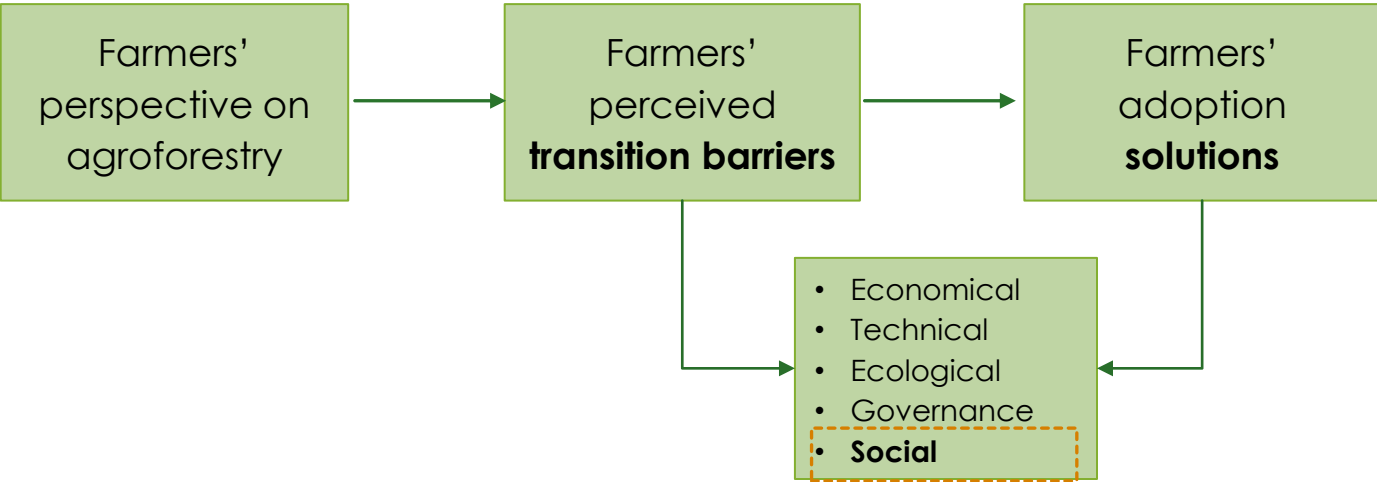


Explore transition barriers and solutions for Dutch farmers from monoculture farming to agroforestry

Research Questions

1. What are farmers' perceived barriers when transitioning from monoculture to agroforestry systems in the Netherlands?
2. What do Dutch farmers need to overcome these barriers to adopt agroforestry?

Conceptual Framework



Methodology



Research philosophy
Constructivism



Approach
Qualitative research



Method
Interviews



Sampling (N=12)
Dutch farmers



Data analysis
Delve

Sample Demographics

Farmer type



6 dairy
2 meat
4 arable

Avg farm size



60 ha
Range:
17-200 ha

Agroforestry?



Planted >3y ago



Planted <3y ago



Plans



No plans

AF type*



4 intercropping



3 silvopasture



4 food forest

*farms could adopt multiple types



Data analysis and validation



17

Transcript ▾

biodiversiteit effecten AF/RA mineralen dieper uit de bodem schaduw

Nadelen?

Het is wel werk. Het is wel weer iets extra's wat je moet doen, extra dingen die je moet regelen. Dat maakt het ook weer ingewikkelder, investeringen die je moet doen. Het is leuk al die walnootbomen maar wie gaat al die walnoten pellen.

economische barrières onderhoud technische barrières tijdsafstand verwerking

Q4

Welke uitdagingen ervaar (heb) je bij het maken van de overstap?

Het verdienmodel, dat kan wel, maar je moet het wel bedenken en uitvoeren en op een slimme manier en helemaal in onze voedselproductie hoe die in NL ingericht is dat klopt niet. Dus dan moet jouw vernieuwende idee dan neerzetten in een markt die niet klopt en dat maakt het moeilijk. Want als je dan een aantal van die singels hebt waar af en toe een walnoot in staat, dan heb je eigenlijk niet zoveel productie. Maar je moet er wel iets mee. En wij zijn in NL gericht op massa, en dat heb je niet. Dus je moet het direct verkopen aan de klant.

afzet business case / verdienmodel economische barrières systeem gericht op massa zekerheid / pioneren

Dat bedoel je ook dat klopt aan het systeem, import?

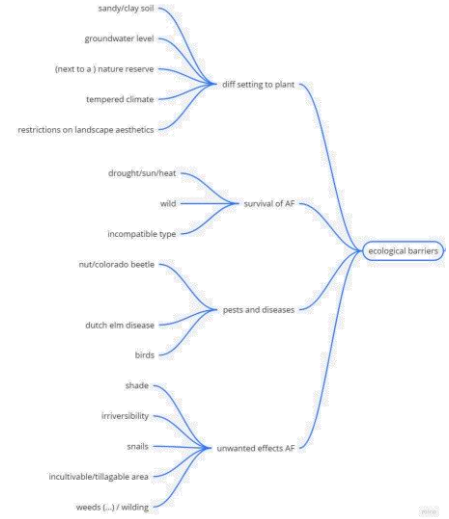
Ja import en je moet massa produceren. Je moet gigantische velden met iets produceren en dan kan het uit. En als jij zegt dat je 10 kratten appels hebt, wat dan

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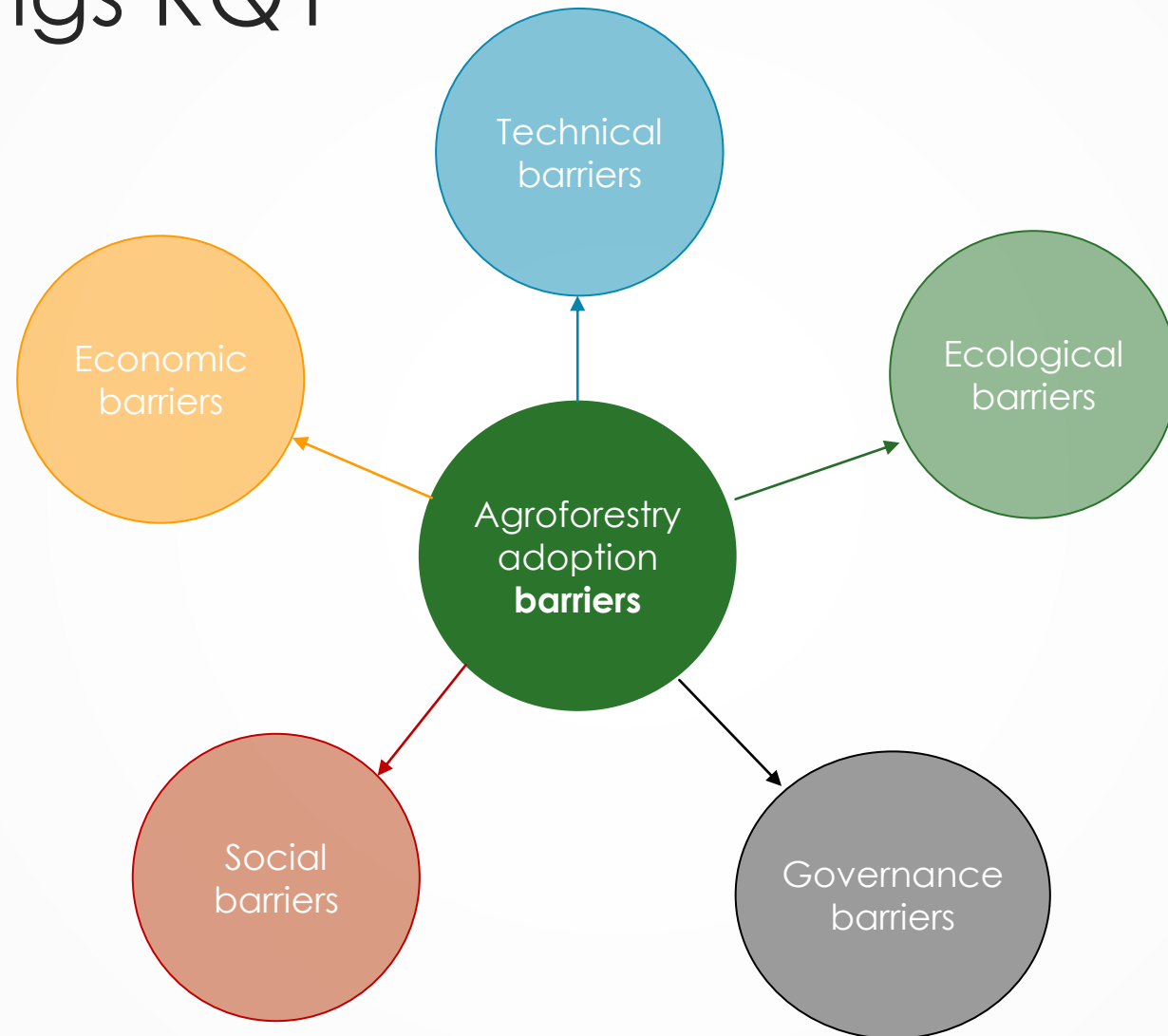
Codes

Search or Add Codes

- ▶ bestuurlijke barrières (61)
- ▼ economische barrières (99)
 - zekerheid / pioneren (11)
 - subsidie criteria (5)
 - lening (3)
 - tijdsafstand (30)
 - financing (20)
 - ▶ business case / verdie... (17)
 - hoge kosten (6)
 - ▶ afzet (25)



Findings RQ1



Economic barriers

post-planting financing

"You have a transition period, that's a big investment without harvest for 5 years" [4]

absence of a proven business model

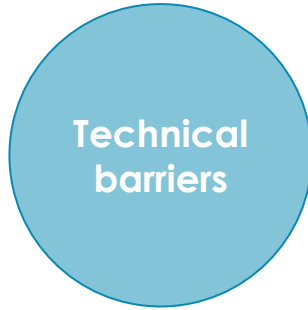
"The concerns are mainly in the area of returns, will we be able to make this profitable, and sales, and that is of course interrelated." [3]

system designed for mass production & low awareness

"If you ask people on the street, do you want food from a food forest? Supporting sustainable local food, yes that's what I want. When you're standing in front of the store shelf, it's often different." [11]

additional time and effort

"We like to go outside, give workshops, lectures, tours; that keeps the PR machine running. Then you can continue to exist, but if you just want to milk cows and be on your farm, you can't. That's a bit crazy because it's 2 jobs that you must be able to do." [7]

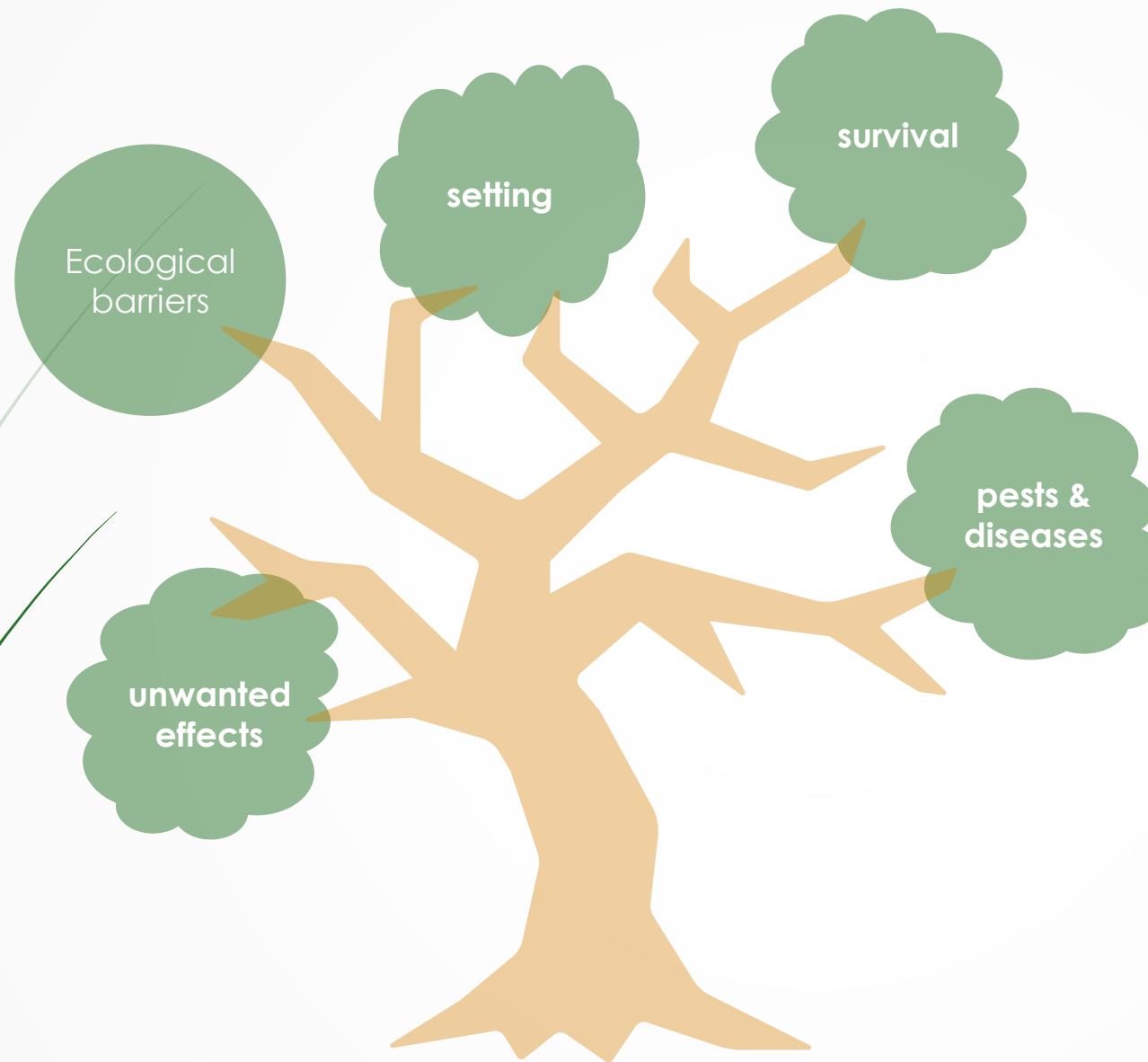


lack of knowledge & expertise

challenges with planting, maintenance, harvesting, and processing

"We rented a crane to plant the largest trees, but we sent them away because the ground was destroyed. You could immediately see that completely compacted puddles remained, while we do this for the soil." [1]

"And if there is grain next to it which still needs time to grow, while some of the produce of the trees need to be harvested immediately, which of them is going to win?" [8]



"The first two years went well, but from what we planted last winter a lot has died last spring in that very dry period. As a result, I am now a bit reluctant to order another batch of trees and start planting again" [3]

Governance
barriers

Laws and
regulations

*"The municipality
thought it was too
intense. Very long rows
of trees would be
planted and that
would have too much
impact on the
landscape." [3]*

Bureaucracy
& dependency

Ownership

*"I don't have any
certainty of leased land
next year. I haven't
looked more than 1
year ahead for the past
20 years." [11]*

Social
barriers

attitude

Social norms
and opinions

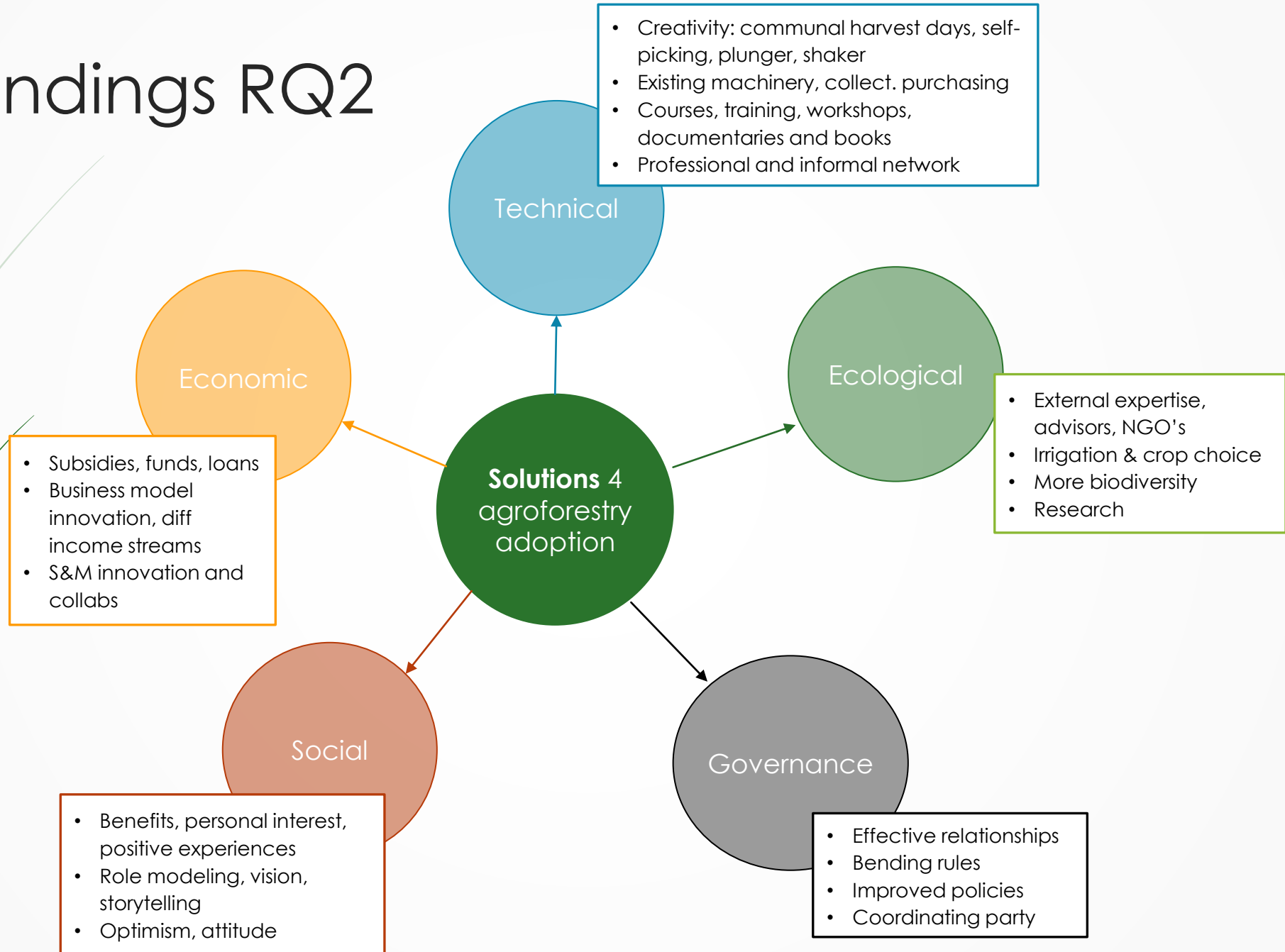
Perceived behavior
control

"Our company has a history of more than 100 years. We've taken that a generation further, the next generation must decide for themselves, but for me, it's a piece of family heritage that I want to continue." [12]

"Often, they have a son or daughter who wants it differently. But in the end, they don't do it because it's shame for the neighborhood, people will talk about you." [9]

"We have always been able to produce everything because we were going to do more for cheaper. You can't get that to change so quickly; it just takes a while." [5]

Findings RQ2





"Next week we will have a group of more than 30 people visiting, from RVO, schools, and the ministry, ultimately to learn. That is the role we have as pioneers" [2]

"I see that it gets more and more beautiful over time. That has multiple elements: the visual aspect, but also that you are more in nature, with birds and insect life of all kinds." [6]





- Distinct findings
- Meaningful implications
- TPB

- Bias
- Themes
- Language



From Monoculture Farming to Agroforestry Systems: Exploring Transition Barriers and Solutions for Farmers in the Netherlands



Quotes

Economical

Financing

"There are landowners who always lease their land to cow farmers or arable farmers, then it's ultimately about the financial picture, what can I get the most from? And a food forest doesn't fit in with that" [11]

"I think we haven't made a profit for 4-5 years. You can't grow if you're in the red. We must go back to basics." [6]

Business model

"The concerns are mainly in the area of returns, will we be able to make this profitable, and sales, and that is of course interrelated." [3]

"But I must benefit financially. You can't just do beautiful things and get nothing in return. It just doesn't work that way." [11]

"You have a transition period, that's a big investment without harvest for 5

"It's very hard work and it doesn't pay off (laughs). Yes. That's it. Because if you always put the earth at number 1, you are not in a very good place in terms of

"As soon as there is more certainty, things will also change." [2]

Marketing and Sales

"With food forests, you also farm in a certain way, which involves crop failures, and you cannot deliver certain species, quantities, and quality that the large-scale food industry or retail business asks for on a certain date. Then you end up with a specialism of the short chain, local stores, or in regional sales." [11]

If you ask people on the street, do you want food from a food forest? Supporting sustainable local food, yes that's what I want. When you're standing in front of the store shelf, it's often

"I also don't want to sell it in the Randstad, that stuff I make here is sold here, that's my idea and that's important. Those sales are

Time and labor intensive

"There is now a course for nature-inclusive agriculture, from the HAS in Den Bosch is also co-financed by the province, but I

"It is further away and quite a few trees have died there. Because you don't walk past it and spray some water.

"We can do that, so that's a big advantage, we like to go outside, give workshops, lectures, tours, and that keeps the PR machine running. And then you can continue to exist, but if you just want to milk cows and be on your farm, you can't. That's a bit crazy because it's two jobs that you must be able to do." [7]

Governance

Ownership

"I don't have any certainty of leased land next year. I haven't looked more than 1 year ahead for the past 20 years." [11]

"If you want to lease land from an organization, they can say: you are a nature-inclusive farmer, we do not want that on our land. There must be maximum return from the land, more nature means loss of value of the land. It will be classified as nature, and we will lose agricultural land." [1]

Bureaucracy and dependency

"I need the commitment from the municipality, [...] but you notice the sluggishness and inability to decide, which is frustrating sometimes." [11]

Law and regulations

"But the municipality thought that was too intense. Then very long rows of trees would be planted and that would have too much impact on the landscape." [3]

"I don't have to apply for a permit, it is just tolerated and hopefully included in the zoning plan in the future. Suppose someone is going to be very difficult soon, then he can challenge that and then I must apply for a permit." [5]

"The municipality says wonderful what you do here. But I did quite a lot of things without asking because the regulations are not correct. You can't do this; you can't do that. When you're at a municipality, the officials say we do Article 5: turning a blind eye. Please do it." [9]

"Also inspired by how the government now deals with people who planted a production forest 15 years ago. Those practical examples are there, they can't go back. They are burdened differently for tax purposes and so on." [12]

"One hectare here is between 60 and 70k, then I am also depreciating my agricultural land on paper. Nature is at 20k I think, then you have a write-down of 40,000 euros, my financier is not going to like that, that I throw away 40k." [8]

"Certainly not if you set it up in such a way that you have a very diverse company. Laws and regulations are not designed for these types of companies." [7]

"I think that's the biggest problem, if you're going to convert agricultural land into hedges or strips for the benefit of agroforestry, the legislator is quietly able to change the rules of the game after 4-8 years due to a new cabinet. Then you're looking at your trees, which are large by then, they are a landscape element now. You're not allowed to harvest, even though it's your production." [8]

Technical

"Then the next step is: what are we going to plant there? What do different trees attract with respect to insects? What does it do in terms of landscape? What is the effect on arable crops? What does it cost in labor to maintain and harvest it and what does it yield?" [3]

"I don't have that knowledge about fruit myself, so you want to get it somewhere else, but then you soon end up in a common nursery system. They say you must prune in such and such a way, and they would say you planted like an idiot since you can't harvest it. You really miss that information, it's pioneering and that's not a bad thing, but in the end, you want to make money with it, and you lack quite a bit of knowledge." [1]

"If you ask people on the street what agroforestry is, 99/100 say they don't know. That's the reality." [2]

"First show that it can be done, and then we will invest in it. I have it very primitive now [...], because you also want to see if it works or not." [4]

"We rented a crane to plant the largest trees, but we sent them away because the ground was destroyed. You could immediately see that completely compacted puddles remained, while we do this for the soil." [1]

Have you ever driven a tractor? That's hard when something gets in the way. Why are there no trees in the middle of the meadow? That is very difficult, you tear the plow to pieces, or you must mow around it. [...] If the contractor had to mow there then it would be 10 times as expensive compared to a meadow without trees. [9]

"And if there is grain next to it which still needs time to grow, while some of the produce of the trees need to be harvested immediately, which of them is going to win?" [8]

"It must be in line with the mechanization we have now. Last year I experimented with 3-meter-wide strips. My conclusion: that is not feasible, not to implement on the entire company." [3]

"It's constantly a dilemma between diversity and efficiency. Because I would prefer to have 10 or maybe 20 different tree types on the farm, but that means that you only have a few trees of each tree. If you also must invest in a processing line for each species, that is of course never possible. So, we're not sure about that either. [3]

"It's work, though. It is something extra that you must do, extra things that you must arrange. That also makes it more complicated. Investments you must make. It's nice all those walnut trees, but who's going to peel all those walnuts." [7]

"Walnut oil is also a nice product, but you have to drive quite a long way for that, so if you would organize that together, it would be easier." [7]

Ecological

"I do recognize the shading effect, and that they affect the crop, but the trees offer protection against extremes. If you have 35-40 degrees of scorching sun, then a tree has a protective effect on the crops that it burns less. But in the temperate days, they have a limiting function on the crops. [...] We're in a temperate climate here, though we're noticing more extremes. We've had 3 or 4 very dry summers between 2018 and 2022, and now it was a very wet summer. [...] If you have a more fixed pattern in your climate, you might find it easier to make that choice." [11]

"The first two years went well, but from what we planted last winter a lot has died last spring in that very dry period. As a result, I am now a bit reluctant to order another batch of trees and start planting again" [3]

"For hazelnuts too, you get the nut beetle in there very quickly. If it lays eggs in there, you will suffer from it again next year, so you must regularly visit those trees to harvest." [4]

"In many tree species you still have a superficial root development, which limits you in tillage" [11]

Social

“There is no sustainable system if it is not economically justified. I've seen examples of what can happen, it can go off the rails.” [12]

“In the end, the student farmers tell me: Great that you are doing these new things, but not for me. Because my grandfather always did it this way, and my father did, and look how successful they were.” [9]

“If you want to make a very black-and-white separation, you could say: many people in the city think it's fantastic and many fellow farmers look at it very skeptically. But also, more and more farmers who find it inspiring and who also want to do something with it.” [3]

“Farmers are used to having it tight, neat, and straight, and a little groomed. Only in those agroforestry/food forests it goes to the extremes, it is just 1 sea of thistles and weeds, and that expensive planting material is almost completely overgrown.” [11]

“They tell you that it is just a bit of a hobby [...] Then I think what you are saying? I work, I don't know how many hours a week. That's serious work.” [2]

“Often, they have a son or daughter who wants it differently. But in the end, they don't do it because it's shame for the neighborhood, people will talk about you.” [9]

“I'm doing my best to get a new tractor here. Make no mistake about the impact. I'm very proud of my old tractor, but they see it right away. Ah, nice that you do that, such an idealist, but...” [9]

“We don't eat walnuts at all in the Netherlands, yes, a little bit from Ekoplaza. We don't eat berries; we just want to have pre-cut lettuce.” [6]

“I didn't have to worry about a lot of things that other people have to worry about and that gives me that sense of responsibility. I understand why other people make different choices because they worry about what to eat.” [2]

“Our company has a history of more than 100 years. We've taken that a generation further, the next generation must decide for themselves, but for me, it's a piece of family heritage that I want to continue.” [12]

“We have always been able to produce everything because we were going to do more for cheaper. You can't get that change done so quickly; it just takes a while.” [5]

Solutions

"When we were going to halve the number of livestock and set up the cheese factory, no bank wanted to finance that, while Rabobank commercials are all about sustainability... But then you come up with a sustainable plan and then suddenly it's not possible. We just did it and then a letter came with this is not allowed. But by then it had already happened. So, you have to dare to do that. On the one hand, it is entrepreneurship, but also ignoring the rules, and that too is something that should not be necessary." [7]

"In winter we follow several pruning courses from the walnut association. So that's how I try to build up my knowledge." [4]

"Then you create natural shade that can cool the local environment. It is well known that trees sometimes take away as much as 5-10 degrees of temperature." [8]

"For my company, to make the system in which we produce more robust, more future-proof, more climate-proof" [3]

"I also see that it gets more and more beautiful over time. That has multiple elements: the visual aspect, but also that you are more in nature, with birds, insect life of all kinds." [6]

"We have a community of practice every 4-5 months [...] then you are together with all the large-scale food forests and you exchange knowledge" [2]

"I didn't have to worry about a lot of things that other people have to worry about and that gives me that sense of responsibility. I understand why other people make different choices because they worry about what to eat." [2]

"You can produce food, but your main goal should be to create a livable world for everything that lives there. For people, for animals, for plants, and for the earth itself. As a result, you can produce food. Keeping it livable is number 1 because if you do it the other way around, it will collapse and then we all have a problem." [7]

"I was standing 8 meters away from this deer, I think that's fantastic when you see what nature gives us." [5]

"It's much nicer to work at a company or to walk around the company with people when you have insects buzzing all around you..." [3]

"The idea of the company's current developments is all about combining healthy food production with the stimulation of biodiversity." [3]

"The municipality was the first important hurdle, it was quickly overcome because we had a good story, and a plan, and the officials of the municipality who were in charge of this were very quickly enthusiastic, so that was easier than I thought." [3]