

4th part: DRAFT OF THESIS PLAN

DEADLINE:25/10 17:30

Student Name	Juliette Heeskens
Student Number	4719387
Preliminary graduation project title	Grounds to Change: Reimagining the Coffee Industry in a Circular Economy
Key words (4-7)	Sustainable agriculture, Coffee value chain, Circular economy, systemic design

Key images (min. 3)

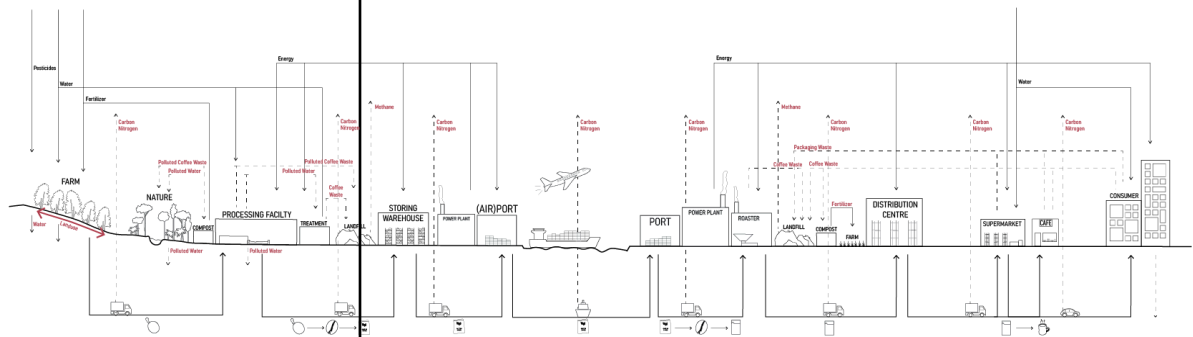


fig 1. (own work) systemic section of the coffee industry

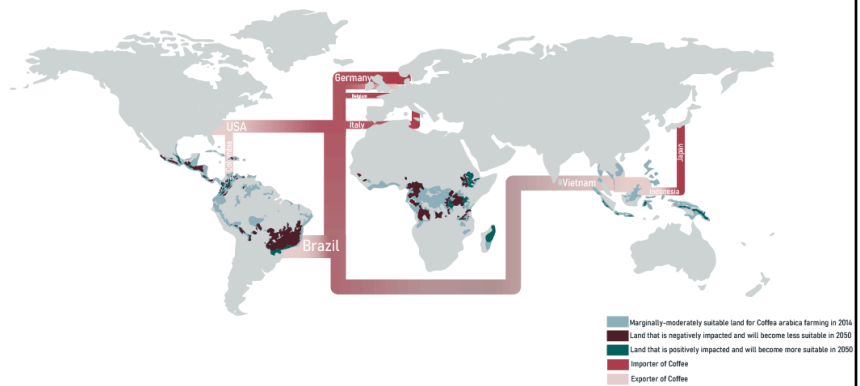


fig 2. (own work) suitability of coffee growing area biggest export flows.

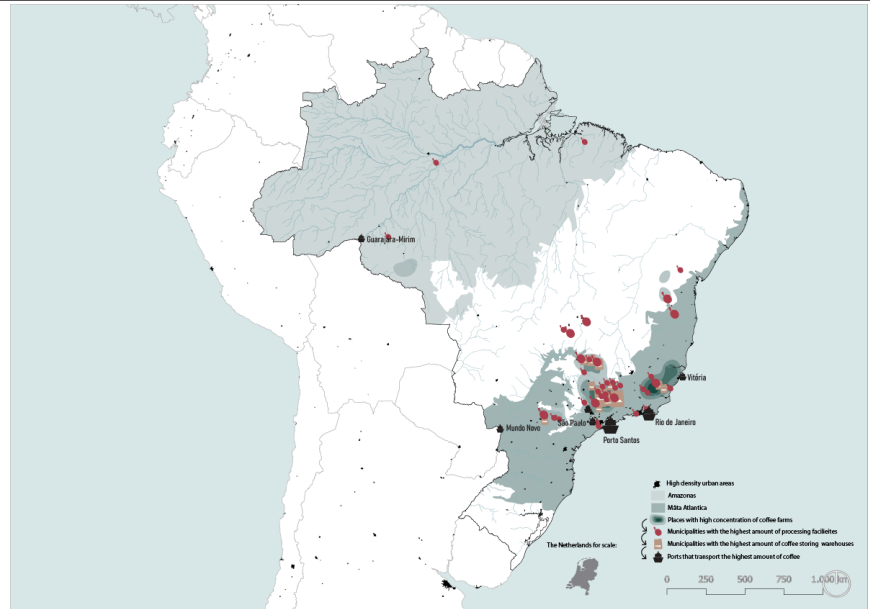


fig 3. Coffee industry in Brazil

Key literature (max 5)

- Bunn, C., Läderach, P., Rivera, O. O., & Kirschke, D. (2014). A bitter cup: climate change profile of global production of Arabica and Robusta coffee. *Climatic Change*, 129(1–2), 89–101. <https://doi.org/10.1007/s10584-014-1306-x>
- Panhuysen, S., & De Vries, F. (2023). *Coffee Barometer*. https://coffeebarometer.org/documents_resources/coffee_barometer_2023.pdf
- Rahn, E., Läderach, P., Baca, M., Cressy, C., Schroth, G., Malin, D., Van Rikxoort, H., & Shriver, J. (2013). Climate change adaptation, mitigation and livelihood benefits in coffee production: where are the synergies? *Mitigation and Adaptation Strategies for Global Change*, 19(8), 1119–1137. <https://doi.org/10.1007/s11027-013-9467-x>
- Gomes, L., Bianchi, F., Cardoso, I., Fernandes, R., Filho, E. F., & Schulte, R. (2020). Agroforestry systems can mitigate the impacts of climate change on coffee production: A spatially explicit assessment in Brazil. *Agriculture Ecosystems & Environment*, 294, 106858. <https://doi.org/10.1016/j.agee.2020.106858>

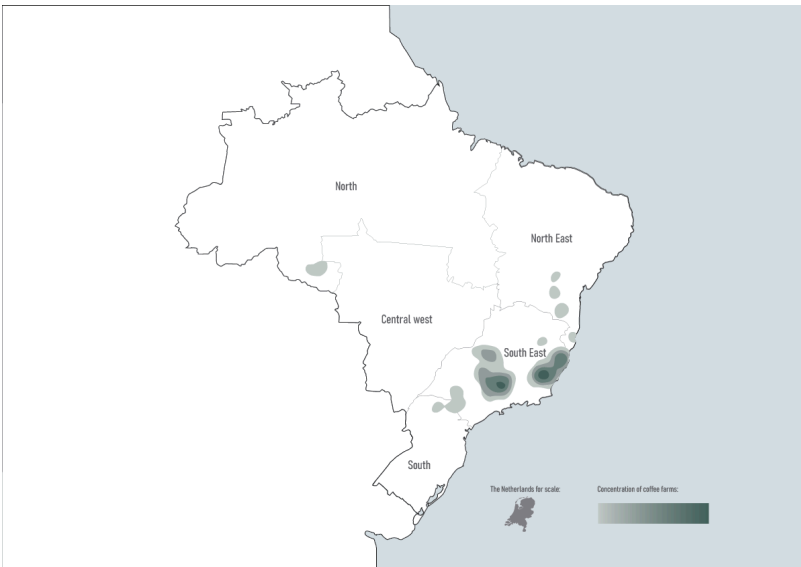
	<ul style="list-style-type: none"> - Centre for circular economy in coffee & international coffee organization. (n.d.). <i>Making a case for a circular economy in the coffee sector: Insights from the Multi-stakeholders Working Group on Circular Economy in Coffee</i>. Circular Economy in Coffee. Retrieved October 24, 2024, from https://www.circulareconomyincoffee.org/resources/
<p>Selected Graduation trajectory (argumentation)</p> <p>Design/Planning/Technology</p>	<p>My planned graduation will consist of a mix of Design, Planning and Technology. My project deals with multiple scales and complexities, which is why a hybrid trajectory seems fitting.</p> <p>The concept of circular economy and sustainable agriculture requires the application of technologies that work towards the goals of, among other things, climate mitigation and closing the loops. When working in the local context of a coffee community, design will be applied to translate these technologies into a spatial strategy. For the implementation of the strategy, a governance perspective including policies and stakeholder analysis is needed. This adds the trajectory of planning into the process.</p>
<p>Main motivation for the project / Problematization</p>	<p>Coffee is the most expensive that it has been for a long time (Davis, 2017). At the same time, it is becoming more difficult and less attractive for a coffee farmer to stay in the business (NOS, 2024).</p> <p>Coffea arabica plants, which are the most common coffee plants around the world, are susceptible to climate change. High temperatures and extreme weather events are hard to withstand for the Coffea arabica plant. Research even suggests this coffee plant could be extinct during this century, solely due to climate change (Davis, 2017).</p> <p>125 million people worldwide, who depend on coffee for their livelihoods are negatively affected by this (NOS, 2024). Despite large companies seemingly improving their ethical and sustainable sourcing, Sustainability is defined with a narrow scope and farmers in most countries still live below the poverty line (Panhuysen & De Vries, 2023).</p> <p>Moreover, the coffee supply chain is long and wasteful. Coffee production produces many waste streams including contaminated water and coffee remains, which result in pollution and degradation of the natural environment (Ijanu et al., 2019). only 1 to 5% ends up in your morning cup of coffee (Centre for Circular</p>

Economy in coffee & International Coffee Organization [ICO], 2023)

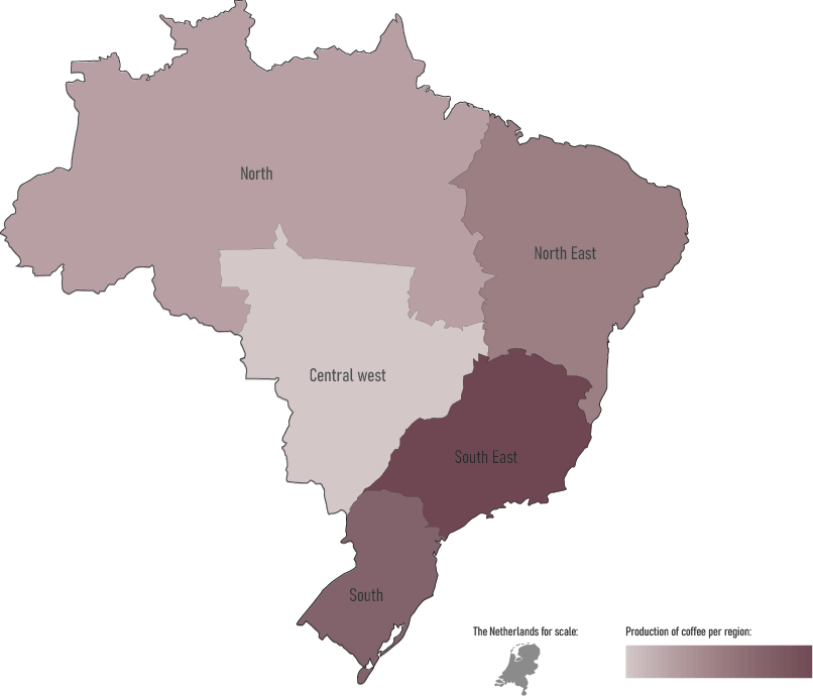
Although Brazil stands out as the only country where coffee producers earn enough to earn a living income with coffee (Panhuysen & De Vries, 2023), the country faces considerable challenges. The suitability of land for growing coffee will drastically diminish due to the effects of climate change (Bunn et al., 2014) and farms have to become resilient to mitigate the effects. Besides that, the concept of circular economy is lacking within current policies and strategies. There is a need for a socio-ecological and spatial strategy that implements circular practices into the current value chain. This could remedy the effects of climate change and shift the industry into an industry focused on longevity and justice.

Location(s) of your graduation project (for research and intended interventions)
 (add visual references, including maps)

South-East of Brazil (regions: Minas Gerais, Espírito Santo, Rio de Janeiro and São Paulo) The coffee industry of Brazil is concentrated in this region: the region has the highest concentration of coffee farms:



The highest coffee yield in the country (*Instituto Brasileiro de Geografia e Estatística - IBGE, 2016/2017*)

	 <p>This is why the interventions would have the most impact in this area and I want to focus the interventions there. <i>source: (Instituto Brasileiro de Geografia e Estatística - IBGE, 2016/2017)</i> I will zoom in further after the P1 presentation.</p>
<p>Aim of study</p>	<p>This study examines the spatial implementation of a circular economy in a coffee production region, specifically the Southeast of Brazil, and reviews whether these outcomes can help mitigate the effects of climate change and complement a more just value chain.</p>
<p>Main preliminary research question(s)</p>	<p>Research Question: “How could the implementation of circular socio-ecological spatial strategy mitigate the effects of climate change while enhancing a more fair value chain for coffee producers in Southeast Brazil?”</p> <p>Sub question 1: Which circular economy practices can be implemented in the coffee value chain and how has this been done so far?</p> <p>Sub question 2: How do these circular economy practices contribute to creating a more climate-resilient coffee value chain and what stakeholders are involved?</p> <p>Sub question 3: How can the circular economy practices enhance a fair coffee value chain and what stakeholders are involved?</p>

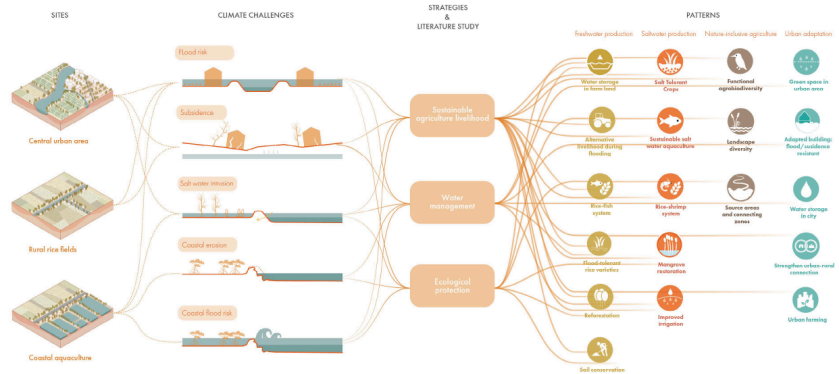
Sub question 4: How can these practices be translated into a pattern language?

Sub question 5: How can these patterns be used to implement changes in the current coffee production region?

Intended concrete outcomes (add visual references, including reference projects)

A complete pattern book:

PATTERN FIELD

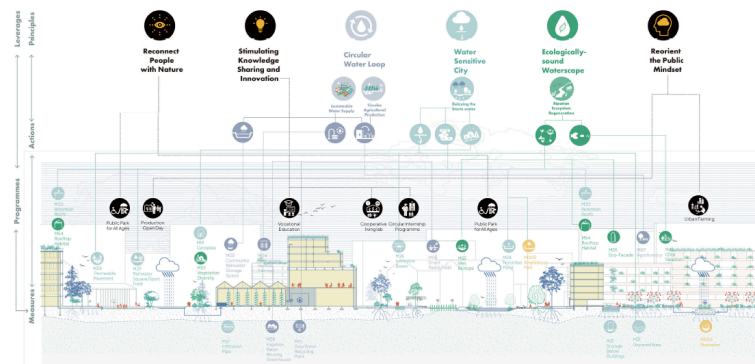


(Zhou, 2023)

A regional spatial strategy

- including a systemic section of the new situation. Linking patterns from the pattern language to show where they apply

A Pattern Language for Water-Oriented Urban Development



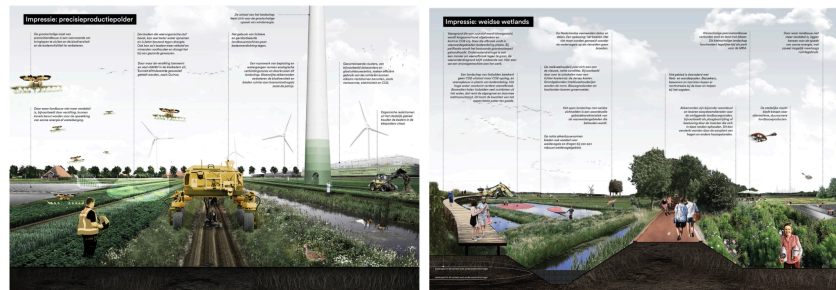
(Wang, 2022)

- And a map with the regional strategy (also linked with the patterns)



(Vermeulen & Willemse, 2021)

- Visualisations of the transformations that will have to take place



(Vermeulen & Willemse, 2021)

Indication of possible preliminary project approach (methodology/methods)

- Conduct a systemic analysis on the zoomed-in region within Brazil, that will give insight into how the coffee industry influences the natural systems and how they influence the system.
- The systemic section will be expanded, to create a comprehensive understanding of the full coffee value chain.
- To create a further understanding of circular economy and regenerative agriculture further literature research will be done.
- to understand the full extent of the stakeholders that are impacted by or have an interest in the transformation of the coffee industry, I would like to make a stakeholder analysis
- I will expand my current pattern language and pattern field. This could be used as a design tool and a tool for

	<p>co-creation and/or communication with stakeholders throughout the coffee value chain.</p>
<p>Scientific relevance of your graduation project</p>	<p>The effects of climate change within coffee-producing regions are starting to show (NOS, 2024). Thus, the necessity of transforming the coffee industry is high. The scientific relevance of the project lies in the addition of the concept of circular economy and climate adaptivity in the coffee industry and finding the connections and synergies between different perspectives and fields. The addition of a spatial strategy will add value to the currently available research. Even though this research will be applied to Southeast Brazil, technologies applied and synergies will also likely apply to other coffee-producing regions.</p>
<p>Societal relevance of your graduation project</p>	<p>The coffee value chain is facing a few societal challenges. My project aims to promote social equity within the coffee value chain. It will address the unfair distribution of profit in relation to the amount of labour and will look at the needs of coffee communities that are dealing with an important transition due to climate change. The focus will be on creating a long-term vision, rather than finding temporary solutions. It will focus on conserving nature and communities that currently don't have a voice in society.</p>
<p>Reflection on all Urbanism MSc3&4 studios: briefly describe the project focus when performed under each studio (200 words per studio)</p>	<p>Metropolitan ecologies of places: Currently, I am working in the MEP studio. If I would continue to work only within this studio the focus would lie on keeping the systemic approach, to look at the complete coffee value chain as the context of transformations that have to take place. there is an important emphasis on the relationship between the different parts of the system and how they interlink and change when transformations need to happen. I think that the topics of my project, circular economy, sustainable and regenerative agriculture and ecology fit within the expertise of the mentors and there are still multiple different angles that I could focus on depending on which second mentor I would choose.</p> <p>The result of the thesis would be a spatial strategy and the multi-scalar approach would have a big importance. There will also be a big emphasis on the relationship between the different scales.</p>

Planning complex cities:

There are a few different angles that are already important in my project which would get an extra emphasis when performed under the Planning Complex Cities studio. Firstly, the aspect of governance would get a bigger role. There would be more of a focus on creating policy changes and looking at the institutional change that has to happen for the circularity and ecological ambitions to be realised in the coffee value chain. Another aspect that is focused on within the studio is the complex variety of stakeholders, as well as the relationships between them, concerning the transformation of the coffee chain. Since I already have done the pattern language intensive and I have the ambition to use the patterns as a communication tool to interact with stakeholders and actors, I think that if the project were performed under PCC, there would be more of an emphasis on creating a deeper relationship with the stakeholders, and seeing how they can be heard, and taken into account in all parts of the project. Even though, in my current trajectory this is an important aspect that has to be taken into account, the result from my thesis is more about how this perspective, including many others, can be translated into a spatial design and/or strategy.

Design of the urban fabric:

My project focuses not only on urban but also on agricultural, and rural landscapes. If my project were performed under this studio, I would focus more on the morphological transformations within urban areas close to coffee communities that have to be done, in combination with mitigation of the effects of climate change. I could also focus on circularity within a more urban domain and the relation it could have with rural coffee areas. The final results would be on a more zoomed-in scale, rather than being a regional strategy. And even though the global value chain would still be important, there would be less of an emphasis on it. Because I want to also focus on the actual processes of coffee and create a regional strategy I think this studio would not suit my project as well as other may.

Transitional Territories:

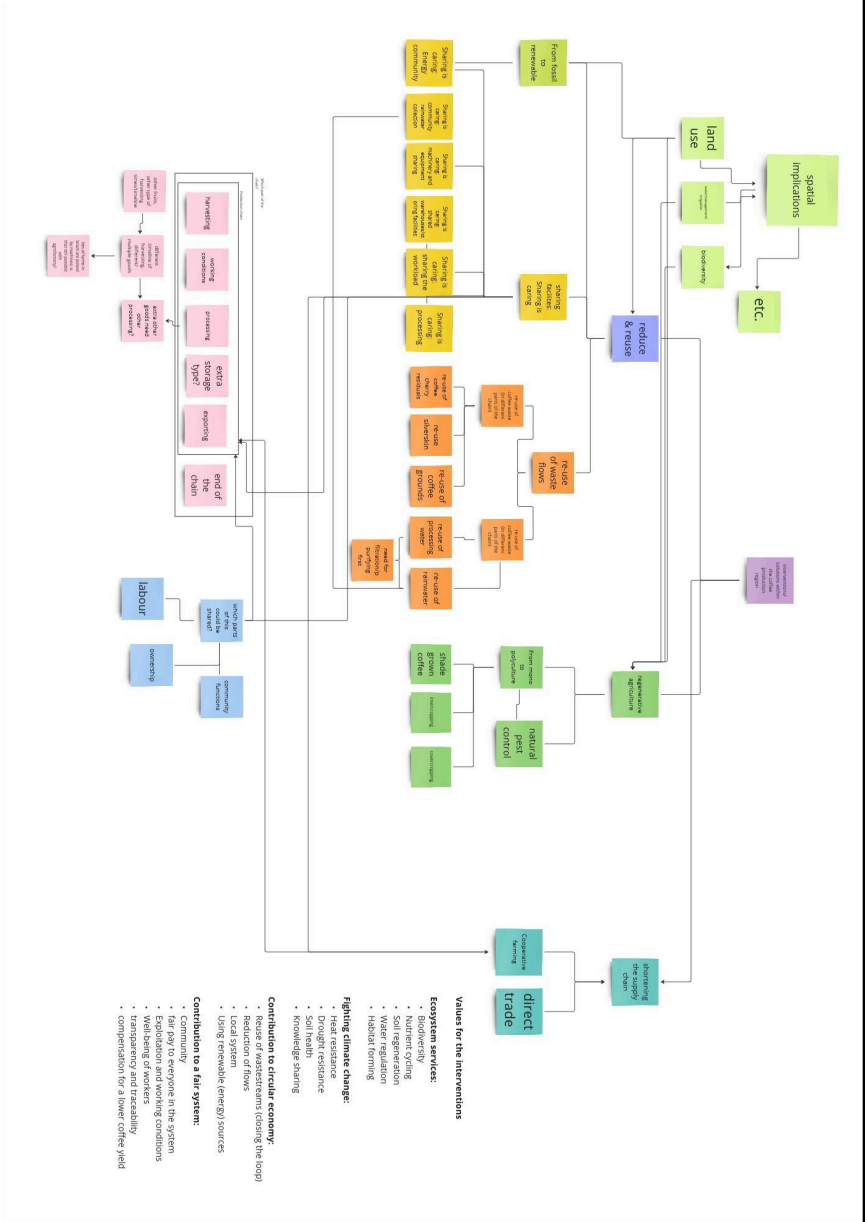
The Transitional Territories studio focuses mostly on the relationship between critical design and theories. The topic of my thesis could fit into the studio and there would probably be a focus on shifting the mindset next to only shaping a socio-economic strategy. I think that critically thinking about the coffee industry is important. It is necessary to think about the

	<p>impact of the industry on the planet and to think about a future way of creating coffee in a more nature-inclusive way.</p> <p>Transitional Territories is a studio that aims for radical projects. Although this is a very interesting trajectory to take, I would be more interested in keeping the focus on a project that can result in a direct application for the future of the coffee regions and that was made in close relation to current stakeholders.</p> <p>-</p> <p>City of the Future:</p> <p>The city of the future studio is focused on a multi-disciplinary approach. This approach could be very interesting since my project deals with many stakeholders from diverse fields of work with various perspectives and stakes. Although the other disciplines within the studio (architecture, TPM) do not directly link to the topic of coffee agriculture, it would be interesting to see the different attitudes there are about the transformation of the current industry.</p> <p>The difference with the current trajectory of my project is that the situation of the studio is mostly in the city, while my thesis focuses a lot on agricultural landscapes as well as the urban context of the coffee value chain. So, if my project would be performed under this studio there would be more of a focus on the transformations within nearby urban areas rather than in the rural coffee landscapes.</p>
<p>Ethical considerations</p>	<p>When dealing with personal data, E.G. interviews from farmers, it has to be handled sensitively. Besides that, I am going to suggest a strategy that will have an impact on a social structure. Possibly, a change in the way of working within communities. The strategy that I make should take into account the transitions these communities have to go through.</p> <p>Within the current coffee value chain, inequalities are apparent. Farmers often have little say in the coffee value chain, my project aims to change that. Another stakeholder that is often overlooked, is nature. Deforestation is a big problem in Brazil not only in the Amazonas (NOS, 2023) but also in the Mâta Atlantica rainforest (Gunther, n.d.). Nature should get a voice and should be seen as an important stakeholder.</p>

Possible resources

- Potentially co-creating workshops with different stakeholders
- Interviews with stakeholders
 - with farmers
 - processors
 - coffee cooperatives
- I would like to reach out to companies that are transparent and open about their sourcing, specifically in Brazil.

Mind map brainstorm on the project / topic



Additional remarks	-
--------------------	---

References

Barthel, S., Isendahl, C., Vis, B. N., Drescher, A., Evans, D. L., & Van Timmeren, A. (2019). Global urbanization and food production in direct competition for land: Leverage places to mitigate impacts on SDG2 and on the Earth System. *The Anthropocene Review*, 6(1–2), 71–97. <https://doi.org/10.1177/2053019619856672>

Bunn, C., Läderach, P., Rivera, O. O., & Kirschke, D. (2014). A bitter cup: climate change profile of global production of Arabica and Robusta coffee. *Climatic Change*, 129(1–2), 89–101. <https://doi.org/10.1007/s10584-014-1306-x>

Centre for circular economy in coffee & international coffee organization [ICO]. (2023). *Making a case for a circular economy in the coffee sector: Insights from the Multi-stakeholders Working Group on Circular Economy in Coffee*. Circular Economy in Coffee. Retrieved October 24, 2024, from <https://www.circulareconomyincoffee.org/resources/>

Davis, A. P. (2017, March 1). *Is our daily cup of coffee under threat?* Kew. Retrieved October 24, 2024, from <https://www.kew.org/read-and-watch/is-our-daily-cup-of-coffee-under-threat>

Gomes, L., Bianchi, F., Cardoso, I., Fernandes, R., Filho, E. F., & Schulte, R. (2020). Agroforestry systems can mitigate the impacts of climate change on coffee production: A spatially explicit assessment in Brazil. *Agriculture Ecosystems & Environment*, 294, 106858. <https://doi.org/10.1016/j.agee.2020.106858>

Gunther, M. (n.d.). *Atlantische regenwoud* | WWF | *Bescherm bossen en dieren*. WWF.nl.

Retrieved October 25, 2024, from

<https://www.wwf.nl/wat-we-doen/waar-zijn-we-actief/zuid-amerika/atlantisch-regenwoud>

Ijanu, E. M., Kamaruddin, M. A., & Norashiddin, F. A. (2019). Coffee processing wastewater treatment: a critical review on current treatment technologies with a proposed alternative. *Applied Water Science*, *10*(1). <https://doi.org/10.1007/s13201-019-1091-9>

Instituto Brasileiro de Geografia e Estatística - IBGE. (2017). A geografia do café. In *Instituto Brasileiro de Geografia e Estatística - IBGE* (ISBN 978-85-240-4401-4, Vol. 28). Retrieved October 7, 2024, from https://www.ibge.gov.br/apps/dinamica_agropecuaria/#/home/ (Original work published 2016)

NOS. (2023, August 4). *Flinke afname ontbossing Brazilië, vlak voor belangrijke Amazone-top*. <https://nos.nl/artikel/2485440-flinke-afname-ontbossing-brazilie-vlak-voor-belangrijke-amazone-top>

NOS. (2024, August 13). *We staan voor een wereldwijde koffiecrisis, zeggen experts*. <https://nos.nl/nieuwsuur/artikel/2533160-we-staan-voor-een-wereldwijde-koffiecrisis-zeggen-experts>

Panhuysen, S., & De Vries, F. (2023). *Coffee Barometer*.

https://coffeebarometer.org/documents_resources/coffee_barometer_2023.pdf

Rahn, E., Läderach, P., Baca, M., Cressy, C., Schroth, G., Malin, D., Van Rikxoort, H., & Shriver, J. (2013). Climate change adaptation, mitigation and livelihood benefits in coffee

production: where are the synergies? *Mitigation and Adaptation Strategies for Global Change*, 19(8), 1119–1137. <https://doi.org/10.1007/s11027-013-9467-x>

Vermeulen, M., & Willemse, B. (2021). *De cirkel rond!?* marcovermeulen.eu. Retrieved October 25, 2024, from <https://marcovermeulen.eu/nl/projecten/de+cirkel+rond++>

Wang, J. (2022). *Live with water* [Master thesis, TU Delft].

<https://resolver.tudelft.nl/uuid:ec611a54-07c1-4801-9bbd-2d4afd8ac120>

Zhou, K. (2023). *Pattern Book - Towards a climate Resilient rice production in the Mekong Delta of Vietnam* [Master Thesis, Tu Delft].

<http://resolver.tudelft.nl/uuid:b1965ae1-4377-4752-b384-974cef258f0c>