

UNIVERSITY OF TWENTE
Master in Environmental and Energy Management

MASTER THESIS

**Exploring the Impacts of the
Institutionalization of Agroecology for a Just
and Fair Transition in India and Senegal**

Supervisors

Steven McGreevy
Athanasios Votsis

Student

Linda Migliorati

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Abstract

Sustainable agriculture practices are critical for food security and environmental protection. Agroecology is a widely accepted approach to addressing climate change and meeting Sustainable Development Goals and it has recently received attention from Governments, international organizations, and researchers, who are incorporating its principles into policies for sustainable food systems transitions.

However, to avoid exacerbating existing inequalities and to address current concerns that agroecological practices are sometimes labor-intensive rather than capital-intensive, institutionalizing agroecology requires careful implementation. Few empirical insights exist on the effectiveness of institutionalizing agroecology, and research is needed to assess its performance in achieving just and fair transition goals.

The objective of the thesis is to assess how the institutionalization of agroecological practices impacts its ability to realize a just and fair transition in the agrifood sector, with a focus on India and Senegal.

First, the study develops an evaluation matrix, based on the theoretical framework of environmental justice and agroecology elements. These evaluation criteria are then used to assess the institutionalization of agroecology in India and Senegal. From the analysis it emerges, we can conclude that institutionalization of agroecology through policies and initiatives is necessary because of the scale it can reach, the resources which can put in place, the legislative power it possesses. However, an agroecology transition should not start with the institutionalization, as this should come after farmers have brought up willingness and knowledge to switch to more ecological practices. Furthermore, the institutionalization should not overshadow the farmers and should grant them with the necessary autonomy to practice agroecology without interference from external stakeholders.

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Abbreviations

AAC	Agroecology Advocacy Coalition
AE	Agroecology
APCNF	Andhra Pradesh Community Natural Farming
APZBNF	Andhra Pradesh Zero Budget Natural Farming
BJP	Bharatiya Janata Party
CMNF	Community Managed Natural Farming
CMSA	Community Managed Sustainable Agriculture
CNCR	National Council for Concertation and Rural Cooperation
EU	European Union
FAO	Food Agriculture Organization
FAPD	Fédération des AgroPasteurs de Diender
GDP	Gross Domestic Product
GIS	Geographic Information System
HLPE	High Level Panel on Food Security and Nutrition
IPCC	Intergovernmental Panel on Climate Change
LVC	La Via Campesina
NFSA	National Food Security Act
NGO	Non-Governmental Organization
NMSA	National Mission for Sustainable Agriculture
NPM	Non-Pesticidal Management
PADAC	Projet d'Appui au Développement de l'Agriculture Intelligente face au Climat
PSE	Plan Sénégal Émergent
SERP	Society for elimination of Rural Poverty
TAPE	Tool for Agroecology Performance Evaluation
ZBNF	Zero Budget Natural Farming

List of Tables

TABLE 1.....	13
TABLE 2.....	14
TABLE 3.....	16
TABLE 4.....	20
TABLE 5.....	22
TABLE 6.....	24
TABLE 7.....	37

List of Figures

FIGURE 1.....	10
FIGURE 2.....	14

Content

Abstract	i
Acknowledgement.....	i
Abbreviations	ii
List of Tables	iii
Content	iv
1 Introduction.....	1
1.1 Background.....	1
1.2 Problem context	2
1.3 Research objective	3
1.4 Research questions.....	3
1.5 Research Proposal Outline.....	4
1.6 Social and Scientific relevance	4
2 Theoretical framework and context	5
2.1 Sustainability Justice for a Just Transition in the agri-food system.....	5
2.1.1 Distributive justice	5
2.1.2 Procedural or participatory justice	7
2.1.3 Recognitional or representational justice.....	7
2.2 Agroecology.....	8
2.2.1 Definition, theoretical framework and principle	8
2.2.2 Institutionalization of Agroecology	10
2.3 Selection of the case studies countries and their characteristics	11
2.3.1 India	11
2.3.2 Senegal.....	12
3 Methodology.....	13
3.1 Research design and strategy	13
3.2 Data sources and data analysis.....	14
3.3 Ethical considerations	16
4 Results.....	17
4.1 Research question 1: What are the justice-related criteria necessary for assessing a just food transition valid for India and Senegal?	17
4.1.1 Distributive justice in a just and fair transition to agroecology	17
4.1.2 Procedural justice in a just and fair transition to agroecology	18
4.1.3 Recognition justice.....	19
4.2 Research Question 2: How is the institutionalization of agroecology implemented in India and Senegal?	21
4.2.1 India	21
4.2.2 The Senegal Dynamics and the Agroecology Transition Policies	24
Research Question 3: What are the impacts of institutionalization of agroecology from procedural / substantive and recognition justice in India and Senegal?.....	26
4.2.3 India	26
4.2.4 Senegal.....	32

5	Discussion	38
6	Conclusion	41
7	References.....	44
8	Appendices.....	51

1 Introduction

1.1 Background

For many years, population growth and food security have been major concerns. According to projections from the FAO and the United Nations, by 2050, there will be a 34% increase in the world's population, bringing the total to 9.7 billion (FAO, 2016). Most people agree that the need to increase food production by 50–70% by 2050 will make it harder to make sure everyone has enough food (Meah & Sharma, 2020). As crop yields plateau in many parts of the world and natural resources like soils, water, and biodiversity are dangerously depleted, it is hard for food production to keep up with demand. The fact that agriculture is so vulnerable to climate change makes the situation worse. As temperatures rise and extreme weather events become more frequent, crops are becoming more vulnerable to pests, diseases, and droughts, leading to decreased yields and quality of food produced. Additionally, the warmer temperatures and changes in precipitation patterns are making farming practices more difficult or impossible, leading to decreased food security (FAO, 2016; IPCC, 2019).

In particular, the IPCC has identified sub-Saharan Africa and Asia as the most vulnerable regions to climate change (IPCC, 2019). According to certain forecasts, fluctuations in rainfall, temperature, and severe weather events are expected to reduce crop yield in the aforementioned areas, making them increasingly at risk of food insecurity (Gornall et al., 2010). In addition, agriculture continues to be the primary source of income for rural households and a significant source of rural employment in many of the emerging economies (Meah & Sharma, 2020). Data from 2017 show that farming accounts for about 68% of rural income in Africa and about 50 percent in South Asia (World Bank Group, 2017). Furthermore, although per capita food production has steadily risen to around 2,900 daily calories per individual, there is a concerning rise in both the percentage and total count of individuals facing severe food insecurity (FAO, 2016). Regrettably, marginalized, and vulnerable communities bear the brunt of unequal obstacles when striving to access nourishing and economical sustenance.

Agriculture is at the center of big changes needed toward sustainability because of its links to climate change and social and economic instability (FAO, 2015). This calls for a change to food and farming systems that are more sustainable, provide food security and nutrition for everyone, are fair on a social and economic level, and protect biodiversity and the ecosystem services that agriculture depends on. A “just transition” in agriculture refers to a shift towards a more sustainable and equitable food system that benefits all stakeholders, including farmers, workers, consumers, and the environment (Actionaid, 2018; Blattner, 2020; Heffron & McCauley, 2018). To achieve this, the social and economic problems in the sector need to be fixed and practices that are good for the environment and the economy need to be encouraged, and make sure that everyone with a stake in the food system is involved in the transition. By placing an emphasis on justice and fairness, the food system reform can enhance the well-being and stability of all parties involved.

Recently, among the different ways to produce food in a sustainable way, agroecology is being promoted as an approach that can address multiple crises in the food system while addressing climate change and contributing to the Sustainable Development Goals (Isgren & Ness, 2017; Nyéléni, 2015; Oteros-Rozas et al., 2019; Sachet et al., 2021). Altieri’s commonly used definition of agroecology has been a key reference point as “the application of ecological concepts and principles to the design and management of sustainable agroecosystems” (Altieri, 2018). Consequently, agroecological methods strive to increase biodiversity and ecosystem services, preserving the complexity and multifunctionality of agricultural landscapes while generating food (Oteros-Rozas et al., 2019). It can address multiple problems in the food system, contribute to the Sustainable Development Goals, and allow for a fair transition (FAO, 2018a; Nyéléni, 2015).

By putting an emphasis on ecological principles and practices in food production, it focuses on sustainable and regenerative farming methods that put soil health, biodiversity, and ecological resilience at the top of their list of priorities. Agroecology is not only a set of agricultural practices; it is also a social

and political movement that can transform power structures in society. As a social movement, agroecology values people's lives and the planet over profit: Agroecology supporters also claim that it has the potential to make agri-food systems more socially just besides its ecological objectives (Holt-Giménez and Altieri 2012; Timmermann and Félix 2015; Anderson et al. 2019; Boillat and Bottazzi, 2020) by prioritizing local knowledge, biodiversity, and community participation, agroecology seeks to address issues of food sovereignty and ensure access to healthy and culturally appropriate food for all. In this respect, over the past ten years, La Via Campesina (LVC) and other international agrarian social movements have played a significant role in promoting agroecology as a means of achieving food sovereignty: they actively helped to build a global network of farmers and food activists that defend the right of those who produce, distribute, and consume food by promoting access to and control over their own resources (Martínez-Torres & Rosset, 2010).

1.2 Problem context

Agroecology supporters also claim that it has the potential to make agri-food systems more socially just besides its ecological objectives (Boillat et al., 2021). Even if agroecology emphasizes the importance of interactions between small-scale producers and their natural environment, harnessing the potential of agroecology to create a sustainable food production system requires a coordinated effort and collaboration among a range of actors, such as farmers, researchers, policymakers, and civil society organizations (Geels & Schot, 2007). Agroecology is attracting growing interest and support on the political and institutional agenda and from governments, operators and international organizations (CIRAD, 2021). Governments play a crucial role in scaling up agroecology, as they can help small scale producers by addressing institutional budget allocation, can reduce uncertainty and risks by setting food prices, can secure access to land or common property resources, or influence the breaking up of the monopolies of agriculture transnational corporations (FOEI, 2018; Giraldo & McCune, 2019). International organizations have an important role as well, because they can promote research and influence the government, and they provide the technical capacity and support (FAO, 2018b).

The institutionalization of agroecology, which is the incorporation of agroecological principles into agricultural systems as recognized and integral components of policies, norms, guidelines, research agendas, and educational frameworks, has the potential to promote a shift in current agricultural practices (Coq et al., n.d.; Nelson et al., 2008; Petersen et al., 2012).

For example the **Indian State** of Andhra Pradesh launched in 2018 a scale-out plan, called Zero Budget Natural Farming, to transition 6 million farmers out from conventional synthetic chemical agriculture to alternative farming making Andhra Pradesh India's first 100% natural farming state (Khadse & Rosset, 2019; Weller, 2018). In sub-Saharan Africa, **Senegal** was chosen by the FAO in 2015 as a pilot country for agroecology projects (CIRAD, 2020):experts and the Minister of the Environment and Sustainable Development have drafted a report named "*Contribution aux politiques nationales pour une transition agroécologique au Sénégal*" (*Contribution to national policy for an agroecological transition in Senegal*), containing a set of policy recommendations for the country's agroecological transition (CIRAD, 2020). While institutionalization can help to promote and scale up agroecology, it can also pose some risks as it can lead to what is called "false agroecology" and worsen people's rights, reduce land and resource rights, and exacerbate inequalities, in the name of food security rather than food sovereignty (Ghosh, 2021; Khadse & Rosset, 2019; Schübel & Wallimann-Helmer, 2021). Some scholars criticize the fact that institutionalizing agroecology and food sovereignty loses its transformative potential and reduces it to a technical solution, leading to some potential risks (Dorin, 2022; Giraldo & Rosset, 2018; González de Molina, 2013; Khadse & Rosset, 2019; Nyéléni, 2015b, Bottazzi & Boillat, 2021b); these risks are summarized as follows:

- **co-option** by the dominant agro-industrial model, by political parties, governments, traditional elites, and the lobbies of organic product commercialization to serve new marketing interests that prioritize profit over ecological sustainability and social justice. The lack of strong ties between contemporary progressive non-governmental organizations (NGOs) and traditional agrarian movements makes the danger worse.
- **commodification**, where agroecological practices are reduced to marketable products that can be bought and sold, thus prioritizing the interests of the market over the needs of small-scale farmers and marginalized communities.
- **homogenization of practices and a loss of diversity**, neglecting the fact that it is rooted in local knowledge and that the diversity of practices and approaches is essential to its success.
- **exclusion of small-scale farmers and marginalized communities**, who may not have the resources to participate in the new institutional structures, thus reinforcing existing power imbalances and inequalities.
- **inclination to oversimplify** agroecology by merely replacing chemical inputs with a standardized certification process, and the potential for political exploitation of this approach (Bottazzi & Boillat, 2021b).

Even though policies to institutionalize agroecology may have good intentions, there may be trade-offs and unintended consequences that hurt groups already struggling. That's why, when promoting agroecological practices, it is essential to evaluate the trade-offs, try to foresee the undesirable effects and act upon them to ensure a fair distribution not only of the benefits of transformation but also the costs and risks (distributive justice), guarantee that all the voices are heard (recognition justice), and ensure a transparent decision-making process (procedural justice). Despite the growing recognition of agroecology's potential in fostering sustainable agricultural practices, the extent to which it has been effectively institutionalized within various contexts is still underexplored (Oteros-Rozas et al., 2019). This study aims to contribute filling this gap by investigating the dynamics, challenges, and outcomes associated with the institutionalization of agroecology in developing countries.

1.3 Research objective

The overall goal of this research project is to assess how the institutionalization of agroecology impacts its ability to realize a just and fair transition in the agri-food sector. The objective is reached by analyzing and making a comparison of the two geographical areas in the Global South where agroecology has been integrated into policies.

1.4 Research questions

R.Q. To what extent does the institutionalization of agroecology contribute to a fair/just transition in the agriculture sector in India and Senegal?

1. What are the justice-related criteria necessary for assessing a just food transition valid for India and Senegal?
2. How is the institutionalization of agroecology observable in India and Senegal?
3. What are the impacts of the institutionalization of agroecology from a procedural, substantive and recognition justice perspective in India and Senegal?

1.5 Research Proposal Outline

The structure of the Research Proposal is as follows. The first chapter describes the background of the research, the problem statement, and the knowledge and insights that will be provided by this research. In the second chapter, the theoretical framework and preliminary research that will be used to do the research are explained. In the last section, the design of this research is explained in more detail. This includes the research framework, research questions, research strategy, methodology, data collection, data analysis, and planning for the research.

1.6 Social and Scientific relevance

The relevant contribution of this thesis is the following:

- a) assessing the institutionalization of agroecology in India and Senegal (Khadse & Rosset, 2019; Marfurt et al., 2023).
- b) it contributes to the current debate on how to best scale up agroecology (Place et al., 2022; Wittman, 2015).
- c) it contributes insights on how to avoid certain injustices in the food system by the process of institutionalization (Lickel, 2019; Pimbert, 2023).

2 Theoretical framework and context

This chapter describes the theoretical framework of the thesis. The first section introduces the concept of sustainability justice as a framework to evaluate disparities in transition processes. The interconnection between sustainability justice, encompassing both environmental and social justice, and the concept of Food Justice is highlighted. Thereafter, the principles of agroecology from the FAO are explored. Finally, the section provides an overview of the selected countries, India and Senegal.

2.1 Sustainability Justice for a Just Transition in the agri-food system

The concept of justice has become crucial in sustainability studies, especially in fields like environmental, climate change, energy, water governance, policy, and law. The importance of justice has increased due to the need for disruptive transitions to achieve Sustainable Development Goals (SDGs) in socio-technical and socio-ecological systems (Heldeweg, 2023). Sustainability and justice are therefore intertwined: a just transition doesn't just look only at the desired or just end-states but means that the pathway to a more sustainable future system should be as just as possible. In other words, it means ensuring that the distribution of benefits and burdens of changes that must be made in order to ensure long-term sustainability are fair and disadvantaged members of society are not left behind or given the greatest burdens (Heldeweg, 2023).

Although much of the research on just transition has focused on energy transitions, recent global challenges posed by the dominant agriculture and food system (such as population growth, resource depletion, and food insecurity) have highlighted the urgency of transforming the global food system through sustainable production and consumption (Hebinck et al., 2021; Kaljonen et al., 2023). Food justice is a framework that acknowledges that the production, distribution, and consumption of food are interconnected with broader social, economic, and political systems, encompassing the idea that everyone should have access to healthy, nutritious, and culturally appropriate food (Tribaldos & Kortetmäki, 2022). Food justice concerns encompass a broad range of issues, including the equitable distribution of benefits and burdens throughout the food supply chain, ensuring equal access to fresh food and food security, upholding the rights of farmers and workers, addressing power imbalances in decision-making processes, and exploring the potential of citizen-led initiatives in tackling food-related inequalities (Puupponen et al., 2023). Food justice can be best understood within the broader frameworks of relational social justice and environmental justice (Tribaldos & Kortetmäki, 2021). These frameworks commonly depict three interlinked dimensions: distributive, procedural, and recognitive justice (McCauley et al., 2013; McCauley & Heffron, 2018).

In the following section, I will explain how these justice dimensions relate to food justice.

2.1.1 Distributive justice

One of the core elements of social justice and therefore of any just transition, is the distribution of material and immaterial goods that every person wants or needs, including the equitable allocation of benefits and burdens of transition impacts such as resources and risks (Rawls, 1971). The distribution of advantages and disadvantages within a society is shaped by its economic, political, and social framework. This framework includes laws, institutions, and policies that determine how resources and opportunities are allocated among members of the society. Since this framework is a product of human political processes, it is constantly evolving, both across societies and within them over time. Therefore, the way in which this framework is structured is critical, as it has a significant impact on people's lives through the distribution of benefits and burdens that result from it (Lamont et al., 2017). There are various distributive principles available that aim to achieve distributive justice, and the selection of a principle will depend on several factors such as: what is considered important (income, wealth, opportunities, jobs, welfare, or utility), who are the recipients (individual persons, groups, or reference classes) and what are the criteria for distribution (equality, maximization, individual characteristics, or free transactions). These

principles are not fixed and can vary depending on the situation, making the concept of distributive justice a dynamic and evolving one (Lamont et al., 2017).

In distributive terms, the commonly identified food injustices are encountered in the following aspects: access to adequate and healthy food, profits and labor exploitation, livelihood opportunities, resource concentration and environmental degradation, food chain and market access.

The Right to Food is a crucial human right that states are obligated to protect and promote in order to achieve the full realization of adequate food for all (FAO, 2004). To achieve this right, food security is essential, which is defined as the availability, stability of supply, access, and utilization of sufficient, safe, and nutritious food to meet dietary needs and preferences.

Despite the constant rise in per capita food production, where the daily calorie production exceeds the requirements of more than 9 billion people, extreme food insecurity increased between 2014 and 2016 due to the current unsustainable food chain. The World Health Organization noted in 2017 that this critical situation includes both undernutrition, which denotes an insufficient intake of calories, and the rising of obesity, which counts approximately 650 million people suffering from it. Moreover, a subtler yet equally pressing issue, referred to as "hidden hunger", emerged, characterized by micronutrient insufficiencies such as vital vitamins and minerals (Chappell & Bernhart, n.d.). The lack of availability of suitable and nutritious food is frequently attributed to factors such as geographical location: Countries in the Global North and urban areas of low- and middle-income countries have the presence of cheap imported foods, the prevalence of unhealthy dietary options, and retailer availability. Moreover, the socioeconomic status of families also emerges as a crucial determinant, accentuating the pervasive disparities in food access and quality (Chappell & Bernhart, n.d.).

Additionally, workers in the food chain experience disparities in wages and working conditions. As farmworkers play a crucial role in our food system, their well-being is a crucial component of food justice advocacy, and their working conditions should be deemed acceptable. Sometimes there is a gender bias that subjects' women disproportionately to unequal pay and more repetitive and stressful work. In some cases, the presence of entrenched hierarchical power structures accentuates the precarious nature of these working conditions, limiting opportunities for viable alternatives or increasing bargaining power among those affected (Marfurt et al., 2023).

The way in which the industrial agri-food regime has altered how we produce food and who produces it, has put a strain on rural farmers. Rural livelihoods not only provide food for urban areas but also depend on urban food preferences. Farmers leave their land because of unsustainable livelihood opportunities or because they are pushed off their land, thus increasing the migration and urbanization phenomena. The rural landscape has ingrained off-farm employment as a longstanding fixture, a facet that has gradually evolved into a cornerstone for farmers' survival. In this evolution, rural residents are entangled in a dichotomy of livelihood strategies that pull in opposite directions, all while navigating the unpredictability of their economic prospects (Chappell & Bernhart, n.d.). This has contributed to reduced farm size in most low-income countries, resulting in profit disparities between small farmers and agribusiness, which benefit from easier access to resources, technology, or markets. Reducing poverty and inequality in rural areas is necessary to sustain and regenerate rural livelihoods. Livelihood resilience is key to creating livable rural livelihoods, and farming should remain a viable opportunity for rural people.

Land, along with water and other natural resources, is essential for food production and thus plays an important role not only for those who rely on it directly (farmers), but for all humans (Guereña and Wegerif, 2019). The current food system is characterized by massive inequalities in terms of natural resources, which are visible in the differences in land size or value, the level of security in ownership or access to resources, and control over the benefits derived from the land (Anseeuw & Baldinelli, 2020). Particularly, land inequality is rising in most countries in the world:

according to Bauluz et al.(2020) the wealthiest 10% of the rural population capture 60% of agricultural land value, while the poorest 50% of the rural population, who are generally more dependent on agriculture, control only 3% of land value. According to Anseeuw & Baldinelli (2020), resources inequality is observable both vertical and horizontal: the first focuses on the distribution of land among individuals, usually owners or those who directly control land, while the second focuses on benefits based on gender, ethnicity, and culture. In Fact, according to the same research, there is a clear male bias in land rights. With few exceptions, women have rights to less land than men and to land of lesser quality.

Lastly, there are extremely few entrance points into the market access and trade domains, which favor well-established agricultural companies with the ability to handle complicated trade procedures and build worldwide market footholds. Small-scale farmers, on the other hand, who are usually from developing countries, face challenges such as poor infrastructure, communication shortages, and rigorous quality requirements, which limit their access to profitable markets. Additionally, trade exacerbates these inequities by allowing wealthier countries to utilize their economic influence to negotiate trade agreements that typically disadvantage producers from less affluent regions of the globe. Tariffs, subsidies, and intellectual property rules disproportionately favor dominant businesses, compounding the uneven distribution of benefits across the agri-food trade sector. Because of these structural disparities, a sad cycle of economic stagnation and reliance is perpetuated (Marfurt et al., 2023).

2.1.2 Procedural or participatory justice

Procedural justice refers to "the fairness and transparency of the processes used to make decisions and allocate resources in social systems" (Lamont et al., 2017). The distribution of burdens and benefits aforementioned is strongly connected with the actors who have duties and responsibilities in the decision-making process. Practically speaking, procedural justice involves who sits at the decision-making table and whether everyone's voice is heard there. Procedural justice and recognition are very similar. The main difference between the two is that recognition justice makes sure that people's opinions are taken seriously, while procedural justice makes sure that everyone has a say in making decisions (Boillat et al., 2020). In writing about just transition and food justice, obstacles to de facto participatory equality, which may be different from de jure participatory equality in decision-making, have received a lot of attention (Tribaldos & Kortetmäki, 2022). Power imbalances, gaps in capability, and failed engagement procedures must be rectified, and individuals who (should) have a voice must be heard (Tribaldos & Kortetmäki, 2022). While assessing a transition through the procedural justice lens it's important to consider the extent to which marginalized communities have been meaningfully involved in the policymaking process, and whether the policy prioritizes their needs and concerns. One key question to ask is whether marginalized communities have had adequate support and resources to participate fully in decision-making, without facing barriers such as language, time, or financial constraints (Tribaldos & Kortetmäki, 2022). Another important consideration is whether the policy prioritizes the perspectives and experiences of these communities and centers their voices and concerns in the decision-making process (Boillat et al., 2020).

2.1.3 Recognitional or representational justice

Recognitional justice refers to the idea that individuals and groups have a right to be recognized and respected as full members of society, and that recognition is a crucial element of social justice. As highlighted in the recent philosophical discourse, some injustices have gone beyond the material and tangible treatment that individuals receive either from others or from institutions. These kinds of injustices stem from the failure of society, due to social norms and social practices, to recognize individuals for who they are, resulting in a diminished sense of agency and self-worth (Boillat et al., 2020; Murphy et al.,

2022). In this context, justice is defined as the fair and appropriate acknowledgement of an individual's identity, qualities, and achievements. This recognition is multifaceted and can be understood in various ways. Firstly, justice involves recognizing a person as an equal member of a group, with a status and standing that are on par with other members and this means treating individuals with respect and dignity, regardless of race, gender, or sexual orientation. Secondly, justice also involves recognizing an individual for their unique identity and characteristics. This means valuing and celebrating diversity, and acknowledging the different experiences and perspectives that individuals bring to a group or community.

In the context of food system activities, it relates to socio-cultural respect, recognition, and non-discrimination. With respect to respect and recognition in telecoupling research or food transition, the literature (Murphy et al., 2022; Puupponen et al., 2023; Tribaldos & Kortetmäki, 2022) refers to:

- a) Traditional, indigenous and local knowledge are respected.
- b) opportunities for culturally different communities to self-determine their food practices.
- c) the legitimacy of different visions of food production.
- d) equal opportunities for these groups to be heard in decision-making and the ways in which different narratives and visions of eating well are considered in public discussions.
- e) non-discrimination based on ethnicity, gender, or age.

From the literature the justice tenants mentioned above are the one suggested to evaluate any transition and are somehow to easiest one to get approval and implementation, but there are however other kind of justice that are mainly related to the ethical and moral values of the people, that should be at the core of the human interaction. At the very core of the decisions, and the implementation of any transition, should be a strong feeling of kindness, and a will to act of the behalf of grater good. All the actors involved should have this kind of mindset, even though it cannot be quantified. This aspect, many times neglected, brings a humanins to this process.

2.2 Agroecology

2.2.1 Definition, theoretical framework and principle

Agroecology (AE) is a hybrid and dynamic discipline because it combines knowledge from the natural and social sciences. Although its practice has been seen as a regenerative form of agriculture and food systems for many centuries, agroecology doesn't have a single, agreed-upon definition. However, these definitions acknowledge that an agroecological approach combines science, a set of practices, and a social movement (Wezel et al., 2009).

As a science, AE integrates studies of the ecology of the entire food system, and applies the ecological concepts and principles to the design and management of sustainable food systems (Gliessman, 2016); more recently, it has integrated research as well as education and action that bring sustainability to all parts of the food system: ecological, economic, and social (Gliessman, 2016). As a set of farming methods, agroecology tries to improve agricultural systems by using natural processes, reducing the amount of outside inputs, and making use of ecological processes (Wezel et al., 2009). As a social movement, agroecology seeks to challenge the current dominant industrial food system by prioritizing the economic viability of rural areas through the promotion of short food supply chains and the production of safe, healthy, and fair food. In order to achieve these goals, agroecology emphasizes the importance of small-scale food production, which supports rural communities, strengthens local economies, and promotes food sovereignty. Agroecology also recognizes and values the role of local knowledge, culture, and identity in shaping food systems, and seeks to promote social justice and indigenous rights by empowering communities to take control of their own food production and distribution (Kothari A., 2019).

AE gives a theoretical framework for sustainable agriculture by focusing on the connections between ecological, social, and economic factors in agriculture. Its importance as a framework for sustainable agriculture relies on the fact that, by emphasizing the importance of local knowledge and community participation, agroecology seeks to build more resilient and sustainable agricultural systems that can adapt to changing environmental and social conditions.

Agroecology provides several multifunctional ecological and social benefits, from improving yield and profitability to enhancing biodiversity, addressing climate mitigation, and providing quality nutrition (Anderson et al., 2020). AE can:

- improve biodiversity through the use of heterogeneous seeds and breeds or through methods such as intercropping, mixed farming, agroforestry and agro-silvo-pastoral systems.
- address climate change, because through both mitigation and adaptation represent a prime example on nature based-solution (IPCC,2019);
- contribute to good nutrition, because due to its subsistence nature together with and local food market provisions, AE allows different people, in different seasons, to use different form of agricultural products.
- strengthen social relations: The social impact of agroecology is notable, especially when it is underpinned by collective, community and territorial processes such as the establishment of food policy councils and peasant-to-peasant learning networks/movements or through the construction of cooperative economies of food distribution (such as community-supported agriculture).

The theoretical framework used to define agroecology consists of the FAO 10 Elements of Agriculture and the Gliessman's transition level (Gliessman, 2016). In an institutional context, FAO has played a leading role in promoting agroecology with the aim to consolidate the evidence on agroecology and identify priorities to scale it up as a strategic approach to achieve Zero Hunger and the other Sustainable Development Goals (SDGs). In 2018, FAO identified 10 elements, connected, that characterized agroecology.

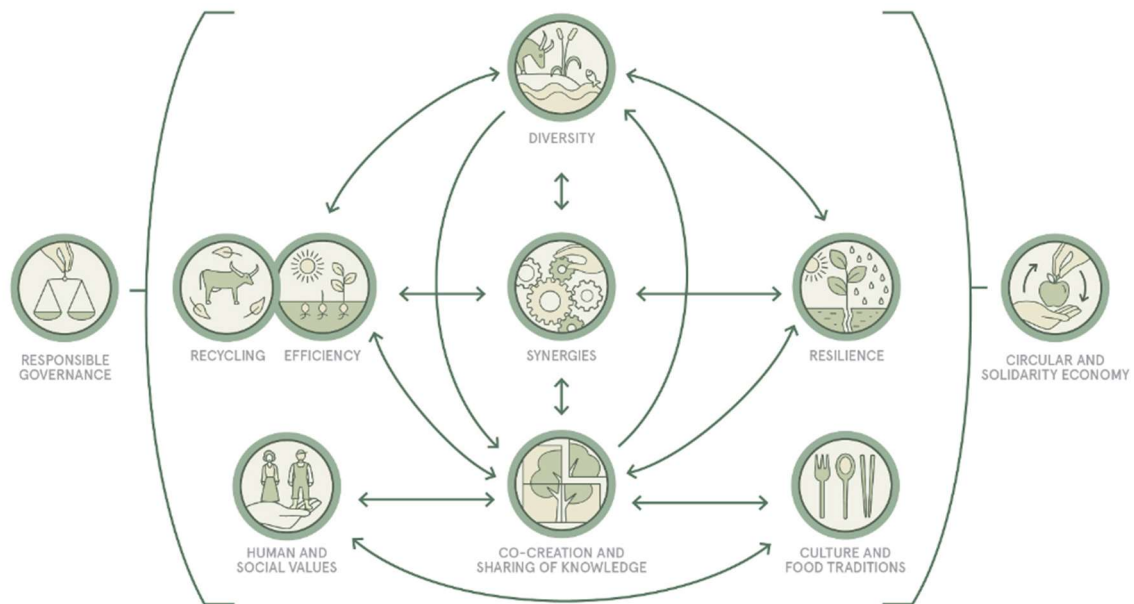
The 10 elements are:

- Diversity: Agroecology emphasizes the importance of diverse farming systems that incorporate a variety of crops, animals, and other components. This helps to increase resilience and reduce risk, as well as providing a range of environmental and social benefits.
- Co-creation and sharing of knowledge: Agroecology recognizes the importance of local knowledge and expertise and promotes the active involvement of farmers and other stakeholders in research and innovation processes.
- Synergies: Agroecology seeks to promote synergies between different components of the farming system, and between farming and other sectors such as forestry, fisheries, and rural development.
- Efficiency: Agroecology prioritizes the efficient use of resources such as water, energy, and nutrients,
- Recycling: it promotes the recycling of organic matter and other waste products.
- Resilience of people, communities, and ecosystems, in response to climate change impacts, price fluctuation in the markets or external shocks.
- Human and social values: agroecology should be context dependent and specific knowledge should be taken into consideration rather than offer a fixed solution; dignity, equity, inclusion based on gender and age should be promoted.

- Culture and food tradition: food as well as agriculture should be considered as heritage, that come from years and years of practice. In some areas, women are the holders of knowledge and run the farming activity, but they don't have equal access to land or control over their decisions.
- Responsible governance: recognizes the importance of governance systems that are transparent, participatory, and accountable, and that prioritize the public interest over private interests.
- Circular and solidarity economy: producers and consumers should be connected; the food waste should be reduced both at consumers and at farms level.

Figure 1

FAO 10 Elements of Agroecology: system components and key interactions



In 2019, the High-Level Panel of Experts of the Committee on Food Security published a report (HLPE, 2019) on “Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition.” This report recommends in particular to establish and use comprehensive performances measurement and monitoring frameworks for food systems, with specific recommendations for FAO to encourage data collection at national level, documentation of lessons learned and information sharing at all levels; and in collaboration with member countries, assess and document the contribution of agroecological and other innovative approaches to food security and nutrition at national and global levels.

2.2.2 Institutionalization of Agroecology

The process by which a set of activities or behaviors becomes an integral and sustainable part of a formal system, whether it is an organization, a social system, or society as a whole, is referred to as institutionalization in sociology (Collins, 2020). This is a series of events that gradually establish new practices as standard operating procedures. In other words, institutionalization entails the routinization and standardization of new practices so that they are widely accepted and adopted by system participants.

Various countries present diverse instances of institutionalization in the literature, illustrating distinct paths of implementation. A case in point mentioned in (Coq et al., n.d.) is Cuba, where responses to the challenges posed by conventional agriculture's decline due to the US embargo and the later dissolution of the Soviet Union led to a transformative shift. Although the term "agroecology" might not be overtly stated

in existing policies, the essence of the concept has been subtly woven into frameworks addressing food security and sovereignty. Similarly, other nations like Mexico, Chile, and Costa Rica have indirectly embraced agroecology, intertwining it with the rejuvenation of smallholder agriculture and the preservation of indigenous traditions, practices, and communal production models. Moving on to direct institutionalization, exemplars include Brazil's 2012 National Policy on Agroecology and Organic Production, a bold stride towards formal integration. In a similar vein, Nicaragua's 2011 legislation dedicated to agroecology underscores a purposeful commitment to its advancement (Coq et al., n.d.).

Governments play an important role in facilitating institutionalization because they are responsible for establishing a policy framework that establishes guidelines, regulations, and laws that shape the behavior of individuals and organizations. This framework's stability and predictability help to build trust among different actors and reduce uncertainty and risk, which is critical for promoting economic growth and social development (Nelson et al., 2008). Furthermore, government agencies are responsible for establishing and enforcing standards that ensure the quality and safety of products and services, protect the environment, and protect citizens' rights. In addition to providing a policy framework, governments can establish and support institutions that promote social and economic development. For example, they may create institutions that provide education and training, promote innovation and entrepreneurship, and support the development of infrastructure and technology.

Furthermore, non-governmental organizations (NGOs) such as universities, research institutions, and local organizations play an important role in this process (Nelson et al., 2008). Research institutions and universities, in particular, are frequently at the forefront of developing new ideas and concepts that challenge the status quo. They also help to build the capacity of local organizations and communities by putting academic findings into practice through workshops or seminars, training, and technical assistance.

In the case of agroecology, the agroecological practices have been incorporated in several courses at the University or technical college (Nelson et al., 2008; Petersen et al., 2012).

2.3 Selection of the case studies countries and their characteristics

The countries selected for the analysis are India and Senegal, two countries chosen for their distinct perspectives and similarities. They have a common thread in their intertwined histories of agriculture and colonial legacies, as both have felt the impact of colonial rule, which has shaped their agrarian practices, land ownership systems, and socioeconomic dynamics.

2.3.1 India

For decades, agricultural intensification has been a popular strategy across both industrialized and developing countries. This approach, which involves boosting production or output by increasing physical, managerial, and capital inputs, aims to improve farm-level outcomes such as household income and meet broader food security goals at the country level (Patel et al., 2022). In India, alternative agricultural methods that challenge conventional intensification strategies have gained traction (Dorin, 2022; Jha et al., 2023): these include principles of agroecology, sustainable and organic farming, and permaculture. One of the most significant endeavors to implement agroecology on a large scale is the Zero Budget Natural Farming (ZBNF) initiative, also known as Community Managed Natural Farming (CMNF). This initiative has recently been codified as state policy in the Indian State of Andhra Pradesh after the success in Karnataka (Khadse et al., 2018; Khadse & Rosset, 2019).

The ambitious goal set forth in Andhra Pradesh is to transition all of its approximately 6 million farms to ZBNF by 2027, by marking a significant departure from conventional modes of production by completely rejecting and reversing dependence on purchased inputs, particularly manufactured fertilizers and pesticides (Khadse et al., 2018; Rose et al., n.d.; Weller, 2018). The Department of Agriculture in Andhra Pradesh has entrusted Rythu Sadhikara Samstha (RySS), a state-run research institute, with the

responsibility of supervising the "Climate Resilient Zero Budget Natural Farming" initiative. RySS was established to provide training to farmers and encourage peer-to-peer learning. In 2016, the state piloted the ZBNF program across more than 700 villages with the participation of approximately 40,650 farmers (Veluguri et al., 2021). As of March 2020, the program had enrolled roughly 623,300 farmers, representing nearly 10.5% of all farmers in Andhra Pradesh. The total cultivated area under ZBNF was nearly three percent of the state's net sown area, accounting for 181,600 hectares (Khurana and Kumar 2020).

2.3.2 Senegal

Senegal's economy is highly reliant on agriculture, which employs 70% of the population and accounts for 17% of total GDP. Only 17% of the land is suitable for agriculture and Senegal's agricultural industry is dominated by tiny family farms, which account for 95% of agricultural area and 80% of the population (CIAT & BFS/USAID, 2016). Despite ranked 164th out of 189 nations on the Human Development Index in 2017, Senegal continues to suffer food security challenges (TEEB AgriFood Initiative, n.d). Senegal's two most important cash crops are sugar cane and groundnuts, with rice coming in third in terms of output value. As domestic food production falls short of the country's demands, ensuring and strengthening food security is a primary issue for the Senegalese government. Major staple crops provide just 30% of consumption needs, with the remaining 70% imported, including rice, wheat, and maize. Because of their dependence on global markets, consumers are more vulnerable to price volatility (TEEB AgriFood Initiative, n.d).

Senegal, like many countries in West Africa, faces a number of challenges related to agriculture. Climate change has led to more frequent droughts and floods, making it difficult for farmers to grow crops. Additionally, the use of chemical fertilizers and pesticides has led to soil degradation and reduced yields, exacerbating food insecurity in the country.

Agroecology has been seen as a solution to these challenges. That's why agroecology has gained significant traction in Senegal in recent years. The country's government has recognized the importance of agroecology for sustainable development and food security and has taken steps to institutionalize the approach. Institutionalization of agroecology in Senegal has taken a number of forms. One key step was the creation of the National Agroecology Platform (Plateforme Nationale d'Agroecologie) in 2013 (Bottazzi & Boillat, 2021b). The platform brings together government agencies, NGOs, and farmers' organizations to promote agroecology and support its adoption at the local level. Another important development was the adoption of the National Agroecology Policy in 2015. The policy recognizes agroecology as a key component of sustainable development and food security, and sets out a number of objectives related to agroecology, including increasing the use of organic inputs, promoting local food systems, and supporting small-scale farmers. The Ministry of the Environment handed in a report titled "Contribution aux politiques nationales pour une transition agroécologique au Sénégal" (Contribution to national policy for an agroecological transition in Senegal). The report includes a diagnosis of the current situation of agriculture in Senegal, and makes a set of policy recommendations for the country's agroecological transition. The report includes four main objectives: improve productivity, promote agroecology's products, improve governance and funding; and improve food security: It also includes three priorities for the scaling up of agroecology in the short term: establishment of a framework for agroecological transition, facilitation of participatory workshops at the municipal level, identification of practical step for an immediate agroecological transition, such as biofertilizers (CIRAD, 2020).

The government has also established a number of programs to support agroecology. For example, the *Projet d'Appui au Développement de l'Agriculture Intelligente face au Climat (PADAC)* supports small-scale farmers in adapting to climate change through the use of agroecological practices. The government has also invested in research and development of agroecology, including the creation of a research institute focused on agroecology and sustainable agriculture.

3 Methodology

This chapter describes the steps taken in conducting this research and how the theories discussed in the previous sections are operationalized. First, the research design will be discussed, focusing on the clarification of the research unit, the reasons for selection parameters. Then, the data collection and analysis steps are explained. The final sections are dedicated to discussing the data's validity and ethical considerations.

3.1 Research design and strategy

Based on Verschuren and Doorewaard (2010), the research consists of the following steps:

Step 1. Determine the research objectives

Agroecology has gained widespread acceptance in the policy arena and careful implementation is required to avoid unequal distribution of benefits, and potential threats to resource and human rights. The purpose of this study is to assess how the institutionalization of agroecological practices affects the realization of a just and equitable transition in the agri-food sector. This study provides a thorough examination of the subject by focusing on India and Senegal as two distinct contexts. The study employs a comparative approach to identify key factors and challenges associated with the institutionalization process and investigate their implications for fostering social and environmental justice within the transition to sustainable agricultural systems.

Step 2. Establish the nature of the research perspective

In order to examine the potential risks and inequities that may arise from the institutionalization of agroecology, a justice-oriented research approach was adopted, which critically addresses the dimensions of distributive, recognition, and procedural justice, shedding light on their significance in understanding the implications of agroecological institutionalization.

Step 3. Determine the sources of the research perspective

The theoretical framework of this research is developed through a comprehensive review of scientific literature and relevant documentation, including grey literature and policy briefs. Table 1 shows the concepts and their key theories and documentation.

Table 1

Key concepts and related theories

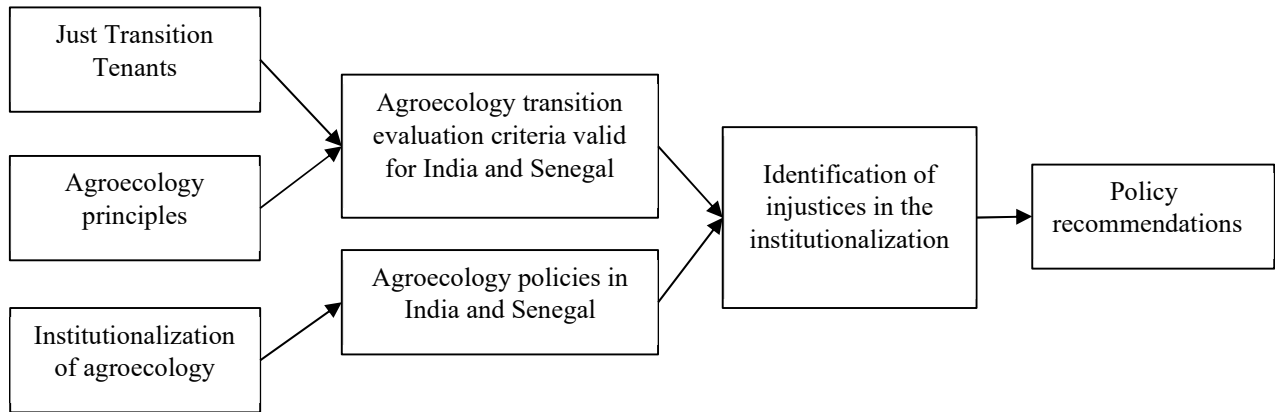
Key concept	Theories
Just transition	Environmental Justice
Agroecology	FAO 10 Elements of Agroecology and Institutionalization

Step 4. Make a schematic representation of the research design.

A visual representation of the research can be seen in Figure 2.

Figure 2

Schematic flow of the research design (Source: Own Interpretation)



Two countries are chosen as research objects: India and Senegal. The are two main reasons beyond this choice: a) the countries are in the area that have been identified as the most vulnerable to climate change and agriculture plays a key role for the vast majority of the population; b) the countries have recently adopted agroecology polices, that grants me necessary data to assess. This number can be considered sufficient for a comparative analysis regarding the effectiveness or not in terms of justices of the institutionalization of agroecology. Moreover, focusing on two countries allows deep understanding of Country’s internal dynamics, instead of a bigger sample.

3.2 Data sources and data analysis

To answers the research and sub-research questions, data was collected through semi structured interviews and desk research. The desired information, sources and accessing method per sub-research question are presented in Table 2.

Table 2

Research questions and data gathering

Sub-Research question	Data/ information required	Data source	Accessing method
What are the justice-related criteria necessary for assessing a just food transition valid for India and Senegal?	Frequency and intensity of floods and droughts. Volume of imported and exported food; Socio-demographic data (nutrition/diet	public online database, scientific literature; public online database; online database; Governmental public	Desk Research. Online database

	level, education level, income level, ethics groups); Farming production system Justice dimensions of food system outcomes	documents, scientific literature scientific literature scientific literature	
How is the institutionalization of agroecology implemented in India and Senegal?	Initiatives supporting agroecology (Who, what, how)	Governmental and non-governmental public policy documents; scientific literature, Experts, Implementers	Desk research
What are the impacts of institutionalization of agroecology from procedural / substantive and recognition justice in India and Senegal?	Socio and economic effects of agroecology policies	Public assessments, public reports, experts	Desk Research, Interviews

The data and information have been obtained from both secondary and primary data. The secondary data sources are obtained from publicly available policy documents, government articles and reports, and reports and policies of relevant agencies. The policy documents were identified on the Senegal and India Government webpage or specific NGOs webpages. The scientific publications were identified using Google Scholar and Scopus as database. The literature review includes publications that address just food transition, agroecology, and the political domain of agroecology. To identify the corresponding and relevant studies, I did a title, abstract and keyword search using the strings ‘agroecolog*’ AND ‘just transition’ AND (Senegal OR India). Besides scientific studies about the agroecological practices and impacts in the selected countries, I looked at all published material about the principles developed by agroecological peasant movements, particularly the Declaration of the International Forum for Agroecology.

The primary data have been collected from the results of the interviews with each stakeholder. This research used a purposive sampling approach to select the key stakeholder: academic experts, NGOs representatives, decision-makers. The Interviews were conducted to collect data from 8 interviews representing each stakeholder from April to July 2023. The list, date and code of the interviewees are presented in Table 3. The interviews questions were design specifically for each stakeholder and the average time spent on each interview was of 60 minutes.

Table 3. List of interviewees

	Role	Date	Interviewee code
India	Expert in Agroecology	12 th April 2023	Interviewee1
	Practitioner and Policy advisor	4th May 2023	Interviewee2
	Researcher	16 June 2023	Interviewee3
	Researcher	13 July 2023	Interviewee4
Senegal	International NGO representative	6th May 2023	Interviewee5
	Researcher	21 June 2023	Interviewee6
	<i>Local NGO</i> Project Manager	3 July 2023	Interviewee7
	Expert	Written Response	Interviewee8

All interviews were recorded and subject to transcription and systematic annotation and thematic categorization. I used Amberscript software to obtain the transcript from the audio record and then the transcripts were color-coded based on the evaluation criteria.

3.3 Ethical considerations

Before the interviews were done, the interview protocol was checked to see if it meets ethical standards. Only after, the BMS (Behavioural, Management and Social Science) Ethics Committee of the University of Twente evaluated and approved the research's ethical standards, the interviews took place.

Participants have been fully informed about the nature and scope of the research, as well as its purpose and its procedures. Prior to the interview, they have been asked to sign the consent form (see Annex A), which included information about the audio recording as well as the right to withdraw at any time. Moreover, participants have been given the questions ahead of time so that they could prepare and provide thoughtful and informed responses during the online interview. The participants' personal information and responses are kept confidential and have been used exclusively for this research. According to BMS Standards, the interviews have been conducted in a safe and private environment. To reduce any burdens for participants, the following measure were taken:

- they were given the option to turn off their camera during the online interview depending on their preferences.
- The scheduling of the interview has been arranged to accommodate the participants availability.

The information has been kept confidential. The audio file has been uploaded in my personal cloud service at the University of Twente and once the transcript is completed the recording file has been deleted.

4 Results

This chapter presents the research findings derived from the analysis of the collected data. Each section focuses on a specific sub-question and presents the corresponding results: first the analytical framework with the relevant criteria has been created. The justice principles were used to identify agroecology-specific principles for a just transition. Then I assess the institutionalization of agroecology by considering the historical pathway that led to initiatives to scale up agroecology and the actors involved. Finally, the discussion about each country will be presented.

4.1 Research question 1: What are the justice-related criteria necessary for assessing a just food transition valid for India and Senegal?

In this section, I will present and discuss the criteria for evaluating agroecology policies and pathways for a just transition. These criteria represent the prerequisites for a just agricultural transition in the food system via agroecology, capable of promoting resilience in both livelihood and landscape. Based on the literature reviewed, I utilize the three-dimensional framework of environmental justice, which encompasses the interconnected dimensions of distributive, procedural, and recognition justice (also referred to as socio-cultural justice) as proposed by Schlosberg in 2007 and further elaborated by Kaljonen et al. in 2021. In this thesis, this framework, which has been successfully applied in numerous studies examining policies related to just transitions, demonstrated by McCauley & Heffron (2018), has been expanded and adapted to agroecology principles and transformation domains (C. R. Anderson et al., 2019) by formulating a set of analysis-guiding questions that specifically address various aspects of justice in the context of agroecology policies and initiatives (see Table 4. *Criteria for assessing agroecology policies for a just transition*, based on the work of Tribaldos & Kortetmäki (2022)).

4.1.1 Distributive justice in a just and fair transition to agroecology

The concept of distributive justice revolves around the fair allocation of both tangible and intangible goods that are universally desired or necessary for individuals, regardless of their personal definition of a good life (Rawls, 1971). To understand this concept, two aspects need to be considered: a) determining the benefits and drawbacks of the tangible and intangible goods that should be equally distributed, and b) identifying the recipients to whom this equality should be extended. These two aspects are interdependent and should be considered together.

Access to healthy and safe food is amongst the most basic tangible goods, and therefore should be one of the distributive criteria to evaluate a good agroecology policy. Furthermore, the fact that agroecology promotes natural ways of agriculture, reducing the dependences of external inputs such as chemical fertilizers, this enables every farmer to cultivate the goods independently and increases the resilience of the entire supply system towards external factors. This is the long run, ensures a continuous and reliable food supply, that can withstand droughts, weather fluctuations, political and social instability, unemployment and price fluctuations (What Is Food Security? There Are Four Dimensions, n.d.)

Another tangible good, important to be addressed by agroecology policies is the food chain structure. After enabling farmers to produce their products more independently, policies should promote an equal food chain. In a just food chain structure, the farmers can have easy and direct access to their own products and avoid intermediaries, also have protected access to different markets (internal/export), and transparent and (just) access to the green certifications or labeling.

An additional criterion that falls under the category of tangible goods is access to natural ecosystem resources, particularly the existence of any discrimination among different social groups or communities. The agroecology principle “Responsible Governance” (Anderson et al., 2020) can be evaluated by how equitable is the distribution of resources and the benefits derived from these ecosystems. This includes examining how access to natural ecosystems, namely water, land and seeds, are distributed among diverse

social groups and communities. Existing evidence suggests that secure land tenure positively impacts the growth of agroecological approaches, environmental sustainability, efficiency, equality, productivity, income stability, and poverty reduction.

With regards to intangible good, as agroecology is a knowledge-based practice (Anderson et al., 2020; Loconto & Fouilleux, n.d.), knowledge and culture should be considered as intangible goods. Specifically, we can examine whether all communities, especially marginalized communities, have equal access to the information, education, and resources necessary to participate in and benefit from agroecological practices. This involves ensuring that all communities have equal access to information about food quality, climate impact awareness through trainings, workshops, and educational support.

Agroecology is labor intensive practice and also requires an initial significant amount of time and effort in order to visualize the good results. Therefore, the policies should make sure that farmers are receiving the adequate income, and working under reasonable conditions in terms of time, access to tools, having insurance, etc. Also, the income policies should take into consideration the significant time between the plantation and the harvest and ensure that the farmers should have a dignified life in the meantime. By providing a stable income to the farmers, not only ensures a more productive labor force, but also helps the farmers to feel motivated and satisfied with their work and increases support to agroecology from the farmers. Another aspect under the labor justice to be considered is how the daily tasks are distributed and what legal measures are taken to ensure that no bias in terms of ethnic group/religion/age or gender take place. Finally, the policies should also consider the just awarding for the farmers. The farmers should have the equal possibility to grow and upskills in job.

Another principle is the one that evaluates how agroecology policies consider future generations in terms of granting food security, access to natural resources, access to knowledge and opportunities. The agroecology policies should avoid over exploiting the current natural resources by limitless increasing in the farming land, in order to meet food demands for countries, and compromising the availability of the same land for the future generations. The same regulations should also apply to water and other mineral resources important to the practice of agriculture. By making sure that land and water are well managed nowadays, it goes without saying that it will guarantee the food security of the next generations. Additionally, the timely transfer of the knowledge to the next generation is key to secure a continuous advancement of the agroecology.

4.1.2 Procedural justice in a just and fair transition to agroecology

Procedural justice refers to participatory parity, hence the ability of (affected) stakeholder groups to participate equally and in a non-discriminatory way in decision-making. At the policy evaluation level, several key elements contribute to achieving procedural/representation justice. Firstly, it involves ensuring a just and fair process that provides equal opportunities for different groups to participate and have their voices heard in decision-making. This includes actively engaging marginalized communities and addressing power imbalances that may lead to misrepresentation or misaiming of their perspectives. Additionally, fair allocation of time and financial resources is crucial to prevent the exclusion of less privileged groups from time-consuming decision-making processes. Recognizing that power dynamics play a role, efforts should be made to address issues of power and create inclusive spaces for meaningful participation.

Moreover, the concept of food sovereignty emphasizes the need for institutions at local and global levels that support communities in developing self-determined agri-food systems. These institutions should enable and facilitate community empowerment rather than imposing restrictions. Additionally, discourse plays a crucial role in driving transformations in food and agriculture. The way language is used to frame debates, policies, and actions shapes the discourse surrounding these issues. Therefore, the control over prevailing discourses becomes a highly contested and strategic focus for advocates of food system transformation, as recognized by Pimbert (2023).

4.1.3 Recognition justice

Recognition justice encompasses the acknowledgment and appreciation of social and cultural values, as well as the inclusion of various stakeholders. One fundamental aspect of recognition justice is the principle of "Knowledge and culture," which involves recognizing and valuing diverse knowledge systems and cultural practices within the context of agroecological transformation. This entails acknowledging and incorporating the traditional ecological knowledge that indigenous peoples and local communities hold, as well as incorporating their viewpoints and practices into agroecological initiatives. Additionally, it entails recognizing various cultural practices and systems that depend on the environment, way of life, and diet. Another critical dimension of recognition justice pertains to the identification of who is engaged and recognized. This can be understood through two temporal dimensions: future generations and present communities. When considering future generations, recognition justice involves ensuring their respect and protection by considering planetary boundaries. It also entails honoring equity principles that encompass gender, age, race, and other characteristics. By avoiding assigning unequal value to individuals based on such characteristics, recognition justice enables equal participation for all in society. The system of "Knowledge and culture" (C. R. Anderson et al., 2019) further highlights the significance of diverse agroecological systems. The economic, ecological, social, and cultural contexts of these systems influence them, and they rely on specialized, practical wisdom. This knowledge is embedded and perpetuated through the traditions, culture, and practices of food producers and indigenous peoples, evolving through dynamic human-nature relationships over time.

Table 4*Framework for assessing justice in agroecology policies or initiatives.*

DISTRIBUTIVE JUSTICE <i>fair allocation of material and immaterial harms and benefits but also associated responsibilities</i>	
Principle	Policy pathway evaluation
Food security	The policy protects the access to the whole population to sufficient nutritious, adequate and safe food at all time.
Food chain structures	The policy increases the resilience of the food supply chain (shocks, infrastructures, markets).
Ecosystem resources	The policy guarantees a just accesses to natural resources (water, land and seeds)
Knowledge	The policy enhances equal access to the information, education, and resources
Labor Justice	The policy establishes fair payment and working conditions
Future generation	The policy grants food security, access to both natural resources and to knowledge for future generations.
PROCEDURAL JUSTICE <i>participatory parity, hence, the ability of (affected) stakeholders to participate equally and in a non-discriminatory way in decision-making</i>	
Decision-making process	The policy provides equal opportunities for different groups to participate and be heard in decision-making;
Discourse	Narratives around agroecology (Who and what kind of knowledge)
RECOGNITION JUSTICE <i>fair consideration and respect for different views or values</i>	
Recognition	acknowledge divergent perspectives in social, cultural, ethnic, racial, and gender differences.
Non-discrimination	People are not discriminated on ethnic-, gender-, age-related, or other grounds.

4.2 Research Question 2: How is the institutionalization of agroecology implemented in India and Senegal?

In India and Senegal, alternative farming and agrifood models have been proposed by producers, researchers, social movements, and public authorities. In this chapter, I will examine the policies in the countries that favored agroecological transition with the aim of understanding the agroecological situation in the countries and aims to understand how these policies have emerged and what are their challenges and opportunity.

4.2.1 India

This chapter aims to explore the meaning of agroecology in India and its level of institutionalization within the existing policy framework, with a specific focus on the state of Andhra Pradesh. The chapter analyzes the processes that have contributed to the emergence of agroecology in the region and the roles played by different stakeholders in the public debate. By examining the agricultural sectors in India and Andhra Pradesh, along with their historical significance and the challenges they face, we can gain insights into the need for sustainable and ecologically sound agricultural practices.

The Country Dynamics and the Agroecology Transition Policies

Although the Green Revolution brought about notable improvements in agricultural productivity and food security, it failed to distribute its advantages evenly among small-scale farmers, particularly those in rain-fed and resource-poor regions (Veluguri et al., 2021).

These farmers, who depended on chemical fertilizers and pesticides, faced a daunting cycle of debt due to the high costs of inputs, limited access to credit, difficulties in reaching markets, and insufficient surplus for investment. Consequently, agriculture became a low-profit endeavor, leading to a distressing number of farmer suicides (Shah et al., 2009). The unsustainability of input-intensive agriculture in India has resulted in various adverse consequences in terms of environmental, social and economic aspects. Environmentally, there have been significant impacts such as deforestation, soil erosion, water depletion, and chemical pollution, contributing to land degradation and loss of biodiversity; socially and economically, these consequences manifest as farmer distress, rural-urban migration, and concerns about food security (Patel et al., 2022). The Green Revolution, while increasing production and income for some farmers, did not ensure an equitable distribution of economic benefits. Over time, land holdings became increasingly fragmented, with a rise in the number of small and marginal landholders. This fragmentation, combined with the fact that market prices and yields have stayed the same, has left many small farmers with too little money, forcing them to look for other ways to make a living (Department of Agriculture, 2016). Likewise, both land-owning peasants and agricultural laborers have been migrating out of the agricultural sector, and a greater portion of cultivated land is now being farmed through tenancy agreements. The income generated from small farms is often insufficient to meet household needs. Moreover, input-driven agriculture has resulted in significant ecological consequences. Many Indian states exhibit a heavy environmental burden in crop production. India ranks as the world's largest extractor of groundwater, with over 85% of groundwater utilized for irrigation, leading to the depletion of most aquifers and the use of pesticides in agriculture has notable public health impacts. Pesticide poisonings are prevalent, adding another dimension to the harms caused by input-intensive farming practices. Despite a surplus in national cereal production, 31.2% of children under five suffer from stunted (Malnutrition-Free India, n.d.), indicating a failure of private market forces and government policies to meet the basic needs of many individuals. Following the liberalization of the Indian economy in 1991, which entailed significant policy changes, the issue of farmer suicides gained national attention (Veluguri et al., 2021).

This crisis is attributed to various factors, including financial distress caused by indebtedness, over-reliance on cash crops, increased risks faced by marginal farmers, and related challenges (CSTEP, 2019).

The ongoing agrarian crisis heavily influences the agendas of both central and state elections in India. Recent years have witnessed significant farmer protests, with demands centered around critical issues such as raising government-declared minimum support prices, providing loan waivers, and establishing commissions to alleviate farmers' debts. In response to these challenges, the ruling Bharatiya Janata Party (BJP) government has primarily approached the problem from an economic standpoint by introducing a direct cash-transfer program called PM-Kisan to enhance farmers' incomes (Veluguri et al., 2021). Conversely, certain non-governmental organizations (NGOs) have emphasized agroecological methods and advocated for alternative and sustainable agricultural practices. One such approach, known as 'Zero Budget Natural Farming' (ZBNF), gained popularity through the efforts of Subhash Palekar. Since 2016 and 2018, several states in India, including Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, and Himachal Pradesh, have witnessed widespread adoption of ZBNF. In some cases, it has emerged as a grassroots movement led by local communities, while in others, it has been supported by state-sponsored programs (Veluguri et al., 2021). In the case of Andhra Pradesh, ZBNF is primarily implemented through a training and field-level support program. The state is home to approximately 6 million farmers, and agriculture contributes to 34% of its GDP (CSTEP, 2019). The coastal belt is fertile and irrigated, while the inland region is semi-arid and rain-fed. The prosperous coastal regions have seen many land-owning farmers leave the agricultural industry, resulting in Andhra Pradesh having the highest proportion of land under tenant cultivation among all Indian states and here the agriculture heavily relies on inputs, with one of the highest per-capita purchasing rates of nitrogenous fertilizers and the highest per-capita electricity consumption in agriculture (Patel et al., 2022; Pathak, 2022). Additionally, the state has the highest farmer indebtedness rate, with over 90% of farm households in debt, compared to the national average of 52% (Pandey, 2023).

Table 5.

Chronology of events in India

Year	Program	Actor
1999 -2004	Integrated Pest Management (IPM)	FAO, Government of India
2004	Community Managed Sustainable Agriculture (CMSA)	Society for elimination of Rural Poverty (SERP) [part of the Department of Rural Development in Andhra Pradesh] NGOs
2007	Achievement: were given responsibility for program management	Women self-help groups
2015	Promotion of ZBNF	Department of Agriculture of the Government of Andhra Pradesh)
2016	Climate Resilient ZBNF program	Government (Vijay Kumar, who was then Special Chief Secretary) Rashtriya Krishi Vikas Yojana (financial resources); Azim Premji Philanthropic Initiative (APPI) - grant and financial resources.

2020	Andhra Pradesh ZBNF (APZBNF)	
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Institutions and Actors involved in agroecology policies

Civil society organizations in Andhra Pradesh have played a crucial role in promoting agroecology within the state (Veluguri et al., 2021): the Center for World Solidarity and the Center for Sustainable Agriculture were among the first to propose the use of Non-Pesticidal Management (NPM) to SERP, which led to pilot training programs and eventually the adoption of the CMSA program. Various NGOs in the state have provided technical assistance in agroecology practices and acted as resource organizations, facilitating the implementation of the CMSA program. These NGOs have also contributed to media discussions on safe food and agrarian distress, leading to a change in consumer perception and increased demand for organic produce (Veluguri et al., 2021). Many NGOs are now officially involved in the ZBNF program as resource organizations and field NGOs, providing training, expertise, and establishing networks with farmers across Andhra Pradesh. State agencies have also played a significant role in the adoption of the program. RySS, the nodal agency for implementation, was established as a registered corporation under the Department of Agriculture, serving as a one-stop shop for farmer welfare programs. While the agriculture department focused on chemical-based agriculture, RySS independently promoted the ZBNF program, accessing government resources. The executive powers advanced the ZBNF program through government orders, bypassing the state legislature. This structure allowed different agencies within the agriculture department to promote seemingly contradictory programs (Veluguri et al., 2021).

However, there has been opposition to the promotion of agroecology from within the Department of Agriculture and state agricultural universities. Some question whether agroecological practices can meet food security needs and challenge the scientific validity of ZBNF practices. Private sectors, such as APPI (a philanthropic organization), have partnered with the state government to support farmer livelihoods and the formulation of the ZBNF program. Vijay Kumar, a leader and individual champion, has played a pivotal role in promoting community-based agroecology programs in Andhra Pradesh. Under his leadership, the adoption of the CMSA program marked a turning point in decision-making about agriculture in the state. He has advocated for low-input chemical-free practices and utilized the women's self-help group network for their promotion. Vijay Kumar's positive working relationships with government officials and his influence as the Special Chief Secretary of Agriculture have been instrumental in facilitating the adoption and scale-up of the ZBNF program (Veluguri et al., 2021).

4.2.2 The Senegal Dynamics and the Agroecology Transition Policies

The colonial state has been driving agricultural development in Senegal for more than a century. Until 1984, the government provided support to farmers through input provisions (such as improved seeds, fertilizers, and pesticides) and facilitated commercialization via the National Office of Cooperation and Development Assistance, which purchased and subsidized most of the farmers' produce (Bottazzi & Boillat, 2021b). The introduction of the New Agricultural Policy in 1984 marked a significant shift, resulting in the complete withdrawal of the state and the deregulation of the food industry. This led to the emergence of small and medium-sized "peasant capitalism" based on traditional land and labor management practices (Bottazzi & Boillat, 2021b). Since 2000, several "Special programs" have been initiated, such as the Return to Agriculture initiative and the Great Agricultural Offensive for Food and Plenty. These projects primarily focused on increasing the national output of commercial crops, with little consideration for the social and environmental challenges prevalent in the rural sector. As a result, an agro-industrial sector that received support from local elites and foreign investment rose to prominence and exerted greater control over the labor of underprivileged rural residents and large-scale land acquisition /land grabbing has been a significant issue since the 1990s. Despite the rise of land grabbing and the inefficiency of the agrarian regime in supporting small-scale farmers, there has been minimal mobilization from rural areas to advocate for a transition towards more equitable and sustainable agriculture and only a few nationally recognized peasants' organizations have been established to defend the rights of smallholder farmers, including the National Consultation Committee of Rural People of Senegal (CNCR). Under President Macky Sall, since 2012, a productivism (or reformist) approach has been pursued, which involved subsidizing chemical inputs, promoting mechanization, and facilitating land grabbing. Even during his second term in 2019, the same direction was maintained, but with an added emphasis on integrating environmental concerns into the so-called green PSE (Plan Sénégal Émergent). The current government initiatives reflect a narrow view of agroecology, primarily focused on state-led reforestation programs, industrialized input substitution, and soil restoration (Bottazzi & Boillat, 2021b).

Bottazzi & Boillat (2021b) identified three different stages that lead to the agroecological diffusion in Senegal, as shown in Table 5.

Table 6.

Chronology of events in Senegal

Year	Activities / Initiatives	Actor
1972	For the first time environmental issues in agriculture are addresses	Environment Development Action (international NGO)
1982-1986	<ul style="list-style-type: none"> - addressing environmental issues related to rural development in Senegal; - research of agroecological alternatives. - Training of farmers in seed stewardship, conservation, revolving funds, organic certification, short value chain development, local governance of land and natural resources, and organizational skills and 	ENDA PRONAT

	empowerment.	
	first farmers' organizations in the country and the first to promote agroecology	Federation of Agropastoralists of Diender (FAPD)
2002	supports the production, certification, and commercialization of organic products	Agrecol Afrique
2000 - 2015	Proliferation and emergence of multiple and uncoordinated initiative from a variety of actors (NGO, farmer, research, IO)	AgriSud, CIRAD, local NGOs, farmer-based organizations (ASPSP, FENAB, AGRECOL Africa)
2015 - now	Formalization phase: an international symposium on agroecology in Dakar and creation of Agroecological Advocacy Coalitions (AAC)	FAO, AAC

Research Question 3: What are the impacts of institutionalization of agroecology from procedural / substantive and recognition justice in India and Senegal?

This section discusses the effects of agroecology policies on the three targeted elements of food justice (distributive, recognition, and procedural respectively), using Table 4 as a guide for my analysis of policy texts and interviews with key stakeholders. I will first discuss the dimensions of justice in India, followed by Senegal.

4.2.3 India

Distributive Justice

Food security

Improving food security while maintaining healthy ecosystems and supporting livelihoods is a crucial challenge, especially with a growing population. In India, the National Mission for Sustainable Agriculture (NMSA) of 2013 outlines a comprehensive strategy and targets to address this issue. At the national level, India has made remarkable progress in transitioning from a food-deficit nation to a self-sufficient food-producing country. The implementation of the 2013 National Food Security Act (NFSA) has been instrumental in extending the reach of Public Distribution, ensuring subsidized monthly household rations for an astounding 813 million people (Nutrition and Food Security, n.d.). At the state level, Andhra Pradesh, known as the "rice bowl of India," faces unique challenges because the majority of households in the State rely on agriculture and the population face nutrition issues such as child stunting, child wasting, and women's anemia, as well as rising rates of non-communicable diseases like diabetes and hypertension (Durga et al., 2023).

The poor nutrition conditions of many of the people sometimes results from a lack of diversity in food production, for example most of the food production *has largely been focused on wheat and rice rather than a diverse food system* (Interviewee3).

As a main challenge specially for developing countries, securing the healthy diet to the population is important and at the same time, as mentioned by all the interviewees, changing from chemical agriculture into agroecology demands a long and careful process that can't happen *overnight, because the State is not ready*(Interviewee2). Therefore, India has adopted a parallel approach, promoting both type of agriculture: in one hand, it promotes agroecology, on the other hand subsidizes chemical agriculture.

All of interviewees agree that *Food security is at risk because the yields are dropping year by year*. Agroecology initiatives have in some way considered the social dynamics of the State, however as tailored as the policies are, there are still social and economic issues rooted into the reality that cannot be solved solely by a set of initiatives:

“Can agroecology ensure that there is nutritional justice? Certainly not in the way the programs are designed now. But I don't think it's a problem of agroecology. I think it's a problem of a very unequal society as it exists today. Does the program attempt to address some of these? Yes. The program very actively talks about small and marginal farmers, women farmers and about nutrition and health. They certainly have the right intentions at the program level, at the bureaucracy level. But in terms of whether the actions they're taking have the intended consequences remains a bit unclear and unseen” (Interviewee4).

Labour Justice

One of the characteristics of developing countries is an uneven/unjust income system, which in most cases may discriminate against workers in sectors like farming. And one of the aspects of the agroecology is the need of increasing the labor, at least during the early stage of implementation. This increase in the labor

demand while not ensuring the proper income to the workers, enabling them to have a life with dignity. In India, a cast society, this unbalance in the income and in the access to opportunities are deepen. Despite the awareness about the labor intensity of agroecology, the Program is not fully addressing the issues and compensating women (especially Adivasi) from their labor, leaving most of them without any land rights or fair income (Khadse & Srinivasan, 2022). In India specially the women bear most of the burden of this increase in the work load:

“Women are the actual tillers of the land. Granting land to them, it will increase their drudgery. We must look at it in a lens that it [program], is increasing the value proposition of women's labor as a service (Interviewee1).

The increase in labor mainly in women can be solved by making the agroecology a more attractive for the overall working population. If the right wages and working conditions are provided, more people will move to farming as a good occupation. However, Interviewee3 stated that in India there is a fierce competition from other economic sectors such as industry, which takes away a significant amount of the work force from agriculture and therefore *“there is a need for investment in small farms for them to become viable, which does require some serious thinking at the policy level”*.

According to Interviewee4, in Andhra Pradesh, *“the local government has done a lot of work on insuring a minimum wage to the rural households through some cash transfer programs. But to address this issue at core, it requires moving towards more sustainable practices, reducing the cost of cultivation price realization for farmers who are cultivating”*.

Food Chain Structures

In India, according to Interviewee1, there is a lack of welfare support from program *to create marketing models for school or hospital meals. Instead, there is a market driven production, where companies are targeting urban markets and elite market.* Interviewee2 pointed out the negative consequences of having market driven policies inside the country: one example that occurred is when the State asked the farmers to shift to organic farming, promising premium prices for organic food production, whose products are more expensive; consumers preferred the cheaper chemical products to the organic ones and this explain why agroecology transition should not be market driven but should be a “caring” driven and long process *“we want farmers to understand that is for their own good, for their own field, the soil, the water, the social and environmental benefit that transformation goes through”*.

About this Interviewee3 stated *“if there is a seriousness at the policy level to move towards agro ecological model, the pricing support system would have to be completely rethought. And that should be at the regional level because then the diversity of crop mixes would look very different at different in different region”*.

Beside the risk of internal market competition, India should be conscious of external market. Interviewee1 and Interviewee2 stated that a lot of private fundings, coming from companies and philanthropic associations, are going into programs without a transparent goal, but only because is fashionable and it is a potential way to make profits in the future. This emphasises the urgency to make a “Just” transition *“before the big players benefits from the potential that agroecology has to offer”*. However, related to risk of external market, Interviewee4, stated that *“the volume of food production exported is a small percentage, representing an almost neglectable impact on the domestic market”* Actually what Interviewee4 is more concern about is the internal trade, because *“small businesses might be displaced by larger businesses, especially in the organic food market, because large businesses can do data management better, can ensure that the produce that you're selling as organic is actually organic”*.

Another important aspect is with regards to the infrastructure that supports the agriculture sector. Besides switching to a more sustainable way of farming, and entire change in the existing structure is necessary, to adapt to the goals of agroecology. This means that creating roads that reach to the most

remote farmers or dislocated farmer hubs or grating them means for transportation which they can use to explore new markets in the major cities. This infrastructure should also include the support to farmers to acquire the necessary certifications to sell their product in new markets (Interviewee4).

Ecosystem Resources

India is a very rigid and hierarchy society and it's almost impossible for farmers to own land and despite the Program recognizes the importance of farmers in the program, it's actually "*doing nothing to address the land rights*"(Interviewee1). Acquiring land ownership poses a significant challenge for historically marginalized communities, primarily due to the exorbitant costs associated with land acquisition. These groups face limitations in terms of purchasing land outright or inheriting it, which is particularly evident in cases where women are deprived of inheritance rights. Presently, their primary avenue for land utilization and control rests in leasing arrangements. However, it's noteworthy that leasing practices in India and this leads to the prevalence of unofficial and unauthorized leasing agreements (Interviewee1). The same discriminatory situation occurs when it comes to different casts. This generates a gender and cast based unbalance which is mostly not addressed and considered in new agroecology policies.

Knowledge

All Interviewees emphasised that the APCNF Program operates as a conduit of *knowledge dissemination*, thereby yielding substantial impact in farmers being able to access knowledge. Furthermore, it became evident that the program is vigorously endeavouring to foster inclusivity by extending its outreach of knowledge to encompass an expanding demographic, particularly targeting small-scale women, and economically disadvantaged farmers.

In particular, interviewee2 stated "*we are training them, we are grooming them, we are giving them skill sets and we are taking care of it. Currently we are working with 650000 farmers and there are 10000 community resource people who are serving these farmers. The first non-negotiable of our program is to work with small and marginal farmers*". Moreover, interviewee2 affirmed that, even if the process may be time-intensive, it has a "*taking care approach, whose's core objective is to instil an understanding about the indispensability of fostering robust soil health... We need time for trust building: we can't teach all agroecological principles at once otherwise farmers will get overwhelmed*". Moreover, the program follows a standardized approach, that increases the range of farmers and communities as the state has the resources to reach much more people; however, it misses context specific details and therefore according to Interviewee4 "*is something that they've not really been successful in doing, as the training should be more contextual*". In addition, Interviewee2 and Interviewee4 mentioned that, despite the program standardization, farmers are incentivized to tailor it to their specific needs and circumstances, as farmers are recognized to be "*very wise people and they have their own wisdom*".

Having knowledge leads consumers to better decisions about the importance of healthy food: in Andhra Pradesh, if on one side the state is doing substantial effort in disseminating knowledge at the producers level, not enough has been done at the consumers level(Interviewee4).

Future Generations

In Andhra Pradesh, the goal is to achieve a transition to agroecology by 2031 and the urgency to reach this target is motivated by the awareness of the weakness of the current food system and this awareness reached its peak during the COVID, when immune system of the local population was tested(Interviewee2). This realization not only urges the need to address this risk now but also to secure a healthy food system for the future generations, and a better immune system for them to face similar pandemics. Even if the program doesn't address directly future generation, it is promoting practices that enrich the soil with the necessary nutrients to *guarantee nutritional benefits at the future population level*,

take (Interviewee4). Moreover, Interviewee3, mentioned that the program should incentivize and promoting sustainable farming practices as a viable option, especially for the young living in rural areas and future generations.

RECOGNITION JUSTICE

The issue of unrepresented groups in the context of agroecology is a complex and multifaceted challenge. It is, however, encouraging to note that the Andhra Pradesh recognizes the importance of their participation and is actively working towards improving their inclusion. Specifically, efforts are being made to empower women, acknowledge their expertise, and elevate their status as decision makers within the field of agroecology:

“The program is cognizant of problems and inequalities within the society. It has a special focus on engaging with women. In every village where the program is implemented, they work with the women in these villages, actively engaged with women as trainers, but also as extension staff, hired a lot of women for their programs as well” (Interviewee4). Similar opinion had Interviewee2, who mentioned *“women self-help groups and their collectives play a pivotal role as major actors at the grassroots level. These women are driving change in the agricultural sector; working with women is easier than men, as they possess invaluable knowledge and experience”*.

Although woman represents the vast majority of farmers, their decision-making rights are still very limited compared to male farmers.

Even if there is a strong involvement of women farmers movement in Andhra Pradesh, they have very little control over some of the decision making processes on commercially oriented farms (Interviewee3).

However, the policies is aware of this gender imbalance in the hierarchy of the decision makers and there is effort to recognize women as deserving decision makers. Interviewee2 said:

“There is a conscious attempt to ensure that women are part of the grassroots workforce and our field functionaries and we are proud to say that. At the grassroots level, we have more field women than men. But as you climb the leadership levels, the percentage of women goes less” (Interviewee4).

The fact the women are mainly assigned to grassroots corresponds to a double-sided medal as there will be an increase in their workload in early stage according to Interviewee2.

The issue of highly unequal land ownership and production relations in relation to caste and patriarchy has long plagued the agricultural landscape according to Interviewee1 because *women and landless have kept out of the entire narrative of discourse of agriculture*. Adivasi communities have faced marginalization and lack of respect for their land rights, exacerbating the already unequal structure of land ownership.

All interviews agreed on the fact that, despite the program is aware of the issues of access to natural resources and in last few years has taken on a range of welfare schemes targeting women and children, these group of people are still marginalized. The State has been slowly started to address this deeply rooted problem: the promotion of agroecology as an alternative approach to agriculture has unintentionally led to further land concentration in the hands of privileged caste classes. While agroecology emerged as a proposal driven by the needs of the people and aimed at sustainable and inclusive farming practices, the implementation and support for agroecology have not adequately respected the principles of equity and land redistribution.

So, as confirmed by the interviews, there is a recognition of the social issues related to the agriculture, and that there is an effort in the agroecology to address these same challenges. However, given how deep these problems are rooted in the society, agroecology might not be enough to change the paradigm, these

changes demand an involvement of the entire society, government, and organization. Agroecology policies have in some way considered the social dynamics of each country or region, however as tailored as the policies are, there are still social and economic issues rooted into the reality that cannot be solved solely by a set of initiatives. However, the program recognizes the importance of local wisdom and knowledge of the community and that is observed and respected. And it works in that local context (Interviewee4)

In terms of who's knowledge is recognize, nowadays many universities program is contributing with research on agroecology. Many universities disregarded agroecology as a niche and irrelevant field, failing to recognize its potential contributions to sustainable agriculture.

However, as the importance of agroecology in addressing ecological, social, and economic challenges in agriculture gains recognition, there has been a recent push for its integration into mainstream practices: Universities and academic institutions are beginning to acknowledge the value of agroecology, establishing initiatives and programs focused on agroecological research and education. About this, Interviewee3 mentioned:

"Now that there's like a push, they're kind of start doing something. I would say that the knowledge in agroecology doesn't come from universities for the most part. It comes from farmers. Historically, there's been a fight between the state and mainstream universities and agroecology, which was always seen as by the universities as something useless, they were following the Green Revolution."

PROCEDURAL JUSTICE

Decision Making Process

From all interviews it emerged the Program is mainly a centralized top-down approach, in terms of what subjects are taught and what content is taught; however, at the local level, there is an effort to decentralize the decision-making process:

"There are levels of decision making. The state has its own interest, and it has its own partners. But if you look at the grassroots, you see how the whole program is layered upon the self-help groups. There are local groups which are leading the program and they get to have a say on how they are going to implement the program. At that level, you could argue that there is a level of decentralization in decision making taking place" (Interviewee1).

Three interviewees mentioned that even though this top-down approach is antithetical to agroecology and food sovereignty principles and all of them agreed on the role of the Government to scale up the program and having the desired impacts, because only the Government has the financial resources to implement at the State Level. Besides recognizing the role of State in reaching many people, the program recognizes the importance as well to consult and involve farmers. In facts, not only farmers at the grassroot are allowed to use their knowledge (See Distributive Justice session) but they also can decide whether to join the program on a voluntary basis, as emphasised by Interviewee2. The same added on this by providing an example of the negative consequences of imposing a change, in the neighbour country of Sri Lanka, where the Government overnight declared a ban to pesticides.

"It was a disaster because this kind of transformation cannot be an overnight process; you must change the entire infrastructure little by little for the system to change. First you spread knowledge, then you adjust the market "

Despite the effort of involving farmers and marginalized groups in the decision-making process as described above, Interviewee4 stated that the actual impacts of their decision inputs on the big picture of agroecology initiatives are not visible. If the aspects (voluntary basis joining, more flexibility at the

grassroot level) can somehow be considered just, what the interviewees criticized is the lack of transparency in the decision-making process.

Discourse

This government's responsibility on agroecology looks to be a complicated matter with competing interests because of conflicting interests: one side the government is promoting agroecology as a urgent path, on the other side there are other concerns such as food security and this lead the government to promote *both natural and chemical of agriculture* (Interviewee2).

In the recent years the notion of agroecology has gain attention and interest from different actors (*agroecology has become so fashionable now and everybody, like the companies, private sector are jumping on the bandwagon - 1*); this engagement brings into light another important aspects related to the decision making process, i.e the discourse around agroecology, and how government, different institutions and companies are interpretating it based on their own interest (Interviewee2).

Interviewee3 argued that because it's fashionable, the program is receiving financial supports from different kind of organizations, with the long-term goal to enter agroecology business and create elite markets. Agroecology principles are quite different from chemical produced food in a more holistic sense and this difference is being capitalized by the government and business, advocating for agroecology instead of other types of organic farming, and this generates a kind of elite markets for the products coming out of agroecology.

4.2.4 Senegal

DISTRIBUTIVE JUSTICE

Food security

Senegal is ranking 66 th out of 116 countries in the 2021 Global Hunger Index and with 38.5 percent of its population living in poverty (World Bank, 2020) with food insecurity and malnutrition standing at 7.2 percent and 8.2 percent respectively (WFP,2021). There are many spatial disparities between rural and urban areas, for instance, 15% of rural households suffer from food insecurity compared to 8% of urban households (Johnson-Chappell et al., 2018).

The main reasons of food insecurities can be found in climatic factors affecting agriculture production (rainfall variability, drought, floods), land degradation, limited market access and price volatility. The price volatility is main caused by the still highly dependency on import to respond to the needs of the nation (70% of its food needs based on Global Alliance for the Future of Food, (2022)), and therefore is not resilient to price fluctuations (for example the lack of logistic during Covid). Among other initiatives, Agroecology is one of the main initiatives that the Government has implemented in the Plan Sénégal Emergent (2019–2024) and since that moment, various actors started being involved in agroecology and their collaboration resulted in the so called DyTAES (CIRAD, 2021).

As mentioned above, Senegal is a country that is facing many challenges in term of food security, measurable in terms of quantity and quality. In term of quantity, the goal is to achieve a level of production that will guaranty the country its independence, and increase the resilience toward external factors. As mentioned before, the agroecology demands a significant time for the soil to recover, and cannot be a rush process. Unfortunately, the current situation in Senegal doesn't allow for this long waiting, because it will compromise the food security, as declared by Interwiew5:

“We have a great pressure on land because of the demography. Farmers have no choice to leave the land unproductive for one year or two years, according to agroecology principles”

One of the ways for the Government to meet both agroecology and food security goals is to provide incentives for biofertilizers (Interwiew5).

Food chain Structures

The local demand for a higher quality of the food mentioned in the previous paragraph is also having a significant impact on the entire food chain structure. Even in Senegal, where the agriculture is mostly for subsistence purpose, to get their products into the market there is a need to get the necessary certifications and according to Interwiew5 a lot has been done to instruct farmers about food certification in order for them to benefits from it. In this way, the farmers can cope better with the different prices available in the market and add value to their own products.

The interviews provided different perspectives about the current market situation in Senegal: while Interwiew5 said that the market of agroecological products is prosperous, Interwiew7 stated that there is lack of local markets and this discourage farmers to switch to agroecology. Interwiew5 further added that nowadays the country has export markets in France, EU and China which are open to products from Senegal.

Ecosystem resources

Agroecology aims at a good resources management, especially when it comes to key resources such as water and land. In the frame of the agroecology in Senegal there is a very complex situation when it comes to the farmers actually having access to the land, given that the land is owned by the State.

Land cessions in Senegal are facilitated by the national legal framework on property, specifically the 1964 law of the national domain (Loi sur le Domaine National), which designates the State as the owner of all land (Boillat & Bottazzi, 2020). Interview5 and Interview6 confirmed it:

“The ecosystems and many farmers not yet access to land and the financing is very difficult because they are the base [of the society]. There are banks but they have a very strong condition. ... They have very hard conditions almost impossible to be satisfied by women” (Interview5)

In the recent years, even if there has been an effort to change this paradigm by putting in place some new regulations that grants access to the land to the people which can prove that the land is being used to create kind of revenue (Interview5).

A similar situation occurs when talking about water, with different organizations grabbing for the already insufficient water supply system and thus, the Government has to intervene for regulate access to groundwater and consequently the access to it centralized at the national level (Boillat & Bottazzi, 2020).

However, there have been initiatives both at the national and the local level to address the issues of resource rights. At the National level, in 2010, CNCR, ENDA-PRONAT, and other farmer organizations formed CRAFS, a national forum on land policy in Senegal, and proposed reforms to the National Domain Law in their 2016 position statement, aiming to protect smallholder farmers and collective land rights. Unfortunately, the national government has neither adopted nor discussed these proposals, leaving many farmers in the area without formal land rights and vulnerable to governmental expropriation and urban expansion (Bottazzi & Boillat, 2021a). At the local level in 2015 a program, with the support of a Swiss NGO, a program to secure land rights for farmers has been started, involving assisting farmers in obtaining land use and access right titles known as *délibérations*, which are recognized by municipal and traditional authorities. It encompassed activities such as participatory mapping, field measuring, training on land legalization, and GIS training for local assessors (Bottazzi & Boillat, 2021a).

Another initiative mentioned in Interview6 is aiming at changing the current paradigm in Senegal when it comes to land rights is moving towards privatization of the land, however the difficulties to access credit mentioned above will create a blockade to the farmers, as mentioned in

a land reform or enforcing local stakeholders to be part of the decision-making processes is ongoing. They are mainly pushing for privatization of land, which we know that then is making more vulnerable those who don't have the money to purchase the land.

Despite these efforts, a significant number of farmers in the region still lack formal land rights and face ongoing vulnerability.

Knowledge

All the interviews agreed on the fact that all the stakeholders (including youth and woman farmers) involved the agroecology transition should have equal access to knowledge and that's why they launched a platform where everyone can learn, share and debate about agroecology.

We launched a platform locally to allow all stakeholders to work together to keep the exchange, the experience and to build stronger system. All actors, including farmers, are prepared to contribute. In this platform we recruit NGOs, project and programme organizers and we organize training sessions on agroecology. By doing this, they are supporting farmers. All the projects come to support technically with training on equipment and tools to facilitate the integration of everyone, including women and youth.

In spite of that, Interview 6 pointed out that this knowledge sharing is mainly driven by international stakeholders, who in order stay in the country should operate apolitically.

Looking at farmers organization, you see that they are not too much autonomous. Because it depends on international stakeholders. And those stakeholders are allowed to stay in Senegal, but they must be apolitical.

Labor Justice

Labor institutions in Senegal tend to favor precarious employment, particularly in the agricultural sector where labor relations predominantly take on an informal nature. This combination of strong commodification and informality of work perpetuates low wages and precarious working conditions (Boillat & Bottazzi, 2020).

Moreover, agroecological farming is often associated with increasing labour demands, since it requires more hands-on weeding, self-made treatments, organic fertilizers, etc. Despite the effort from the agroecology advocates in providing better working condition, a little progress has been made in improving the situation for vulnerable populations such as migrants, youth, and women in Senegal.

Several rules and norms that are improving, increasing the difficulty the administration and the difficulty of organic farmers. doesn't help them so much to improve their working conditions (Interview6).

Farmers often find themselves compelled to sell their labor power by working on other people's land for meager daily wages (around 2dollars per day) or an uncertain share of the harvest (Boillat & Bottazzi, 2020). Among farmers, women find themselves with the most difficult situation, as they are primarily the ones who undertake the labour-intensive cultivation, and grapple with exceedingly taxing forms of toil. Thus, as mentioned by Interview6 allocating land to women carries within it a dual-edged implication. While it signifies the conferment of land rights to women, it also necessitates their obligatory presence and active participation in the agricultural endeavours, potentially amplifying their workload exponentially. Therefore, the allocation of land to women emerges as a multifaceted phenomenon, entailing both empowerment and the imposition of demanding labour obligations.

The intricate allocation of labor tasks, which includes both laborious and rewarding responsibilities, is another aspect of the Senegalese context that merits scrutiny: the additional labor demanded by agroecology is frequently subject to external control and influence, leaving Senegalese farmers to perform the monotonous tasks. In facts, agroecological pilot programs largely remain managed by a network of NGOs and international organizations dependent on global North country (Why Do We Work? Labour and Agroecological Transition in sub-Saharan Africa – AgroWork, n.d.).

RECOGNITION JUSTICE

An increasing level of recognition has been dedicated to vulnerable groups, such a small-scale farmers or women farmers and they are given the possibility to participate in trainings, workshops and share their experiences, because as stated by Interview5 *farmers are the central key entry, and they are given opportunities to participate*. Moreover, emphasis was put on the creation of a common platform, that facilitates knowledge sharing and increase the level of engagement.

We organized a platform where we use a common language. In this way we understand each other, and we have some formal engagement of farmers during the adopting the technology (Interview8)

The same stakeholder refer to the importance of recognizing women due to their abilities and Interwiew6 added on this, raising the issues of extra work and gender and the lack of effort in the policy arena:

the women are those who are working the land, but this is a very painful type of work. Women empowerment is in this line of ecofeminism, where there is an empowerment that puts an emphasis on a different way to produce, the care economy. This has been completely, avoided or hidden from the different conception of policies. But it's at the heart of the food system. We have discarded one of the most the most important points, those who make the link between consumption and production”.

PROCEDURAL JUSTICE

When it comes to procedural justice, it's important to evaluate both the fairness and transparency of the decision-making process and who consequently control the narrative that leads to decisions.

In Senegal, there has been a collaborative effort among farmers' groups, scientific organizations, and NGOs to establish networks and platforms aimed at advocating for smallholder farmers and promoting the agroecological transition. One notable alliance in Senegal is the Dynamic for the Agricultural Transition in Senegal (DyTAES), formed in 2019, with the main goal to assist the Senegalese government in implementing an agroecological transition program. To ensure an inclusive approach, DyTAES engaged in extensive consultations across rural regions, actively involving farmer groups, NGOs, and local authorities. Interwiew5 highlighted the effort for promoting a platform (TAPE) accessible to everyone, with no distinction of farm's size, where there is sharing of knowledge:

"We the organization worked closely with the farmers..it is a workshop and everyone discussed together to find a common solution”

Despite its inclusive approach and the effort to find a common coordination, two negative aspects can be highlighted. First, Farmers' organizations played a minor role in the campaign due to their limited financial and cultural capital compared to NGOs (Boillat et al., 2021), and second due to concerns about political legitimacy and potential repercussions, the DyTAES proposal maintains a formal and diplomatic approach, carefully avoiding direct scrutiny of the primary objectives of national development policies (Boillat et al., 2021). This cautious stance arises from the leadership of these platforms, predominantly comprise foreign and national NGOs, who lack the necessary credibility within Senegalese politics. Consequently, they are reluctant to take risks that could lead to dismissal or the loss of official recognition (Interwiew6). The same stakeholder, further elaborated on the shortcomings of the international NGOs having big influence on the decision making process and the foreign subsidizing mechanisms and this affects the scope of their work and limits the agroecology potential for structural changes.

The existing program are too much subsidized and this is something to be avoid. This represents a kind of weakness compared to Latin America context or other situation where agroecology is also used as a political, claim to get more access and to protect to resources and give more power to farmers organization and local farmers.

The participation of government officials in public consultation procedures and document validation has at times resulted in the censoring of sensitive issues, including campaigns for water rights and explicit criticism of neoliberal policies:

The central government has more legitimacy than other stakeholders, especially compared to foreigner capitals. The state is a development state, but the major program received big infrastructure that can bring lots of resources to political leaders. And this is the main barrier (Interwiew6).

Despite these challenges, the collaborative efforts of farmers' organizations, scientific institutions, and NGOs through platforms like DyTAES highlight a growing commitment to advancing the agroecological transition and supporting the interests of smallholder farmers in Senegal (Interwiew7 and Interwiew8).

While there is this effort, so far most of the decisions and power have been centralized by NGOs and therefore they end up controlling most of the discourse about agroecology transition. Currently most of the NGOs working on agroecology come from Westerns organizations, who intend to spread this new concept. And unfortunately, in most cases, the knowledge is being implemented locally without considering the local aspects. This causes the knowledge to be a bit alien to the local farmers and clashing with agroecological principles.

I think agroecology is very narrowly defined, especially in the horticultural sector. Horticulture is a very recent practice in Senegal. The notion has been considerably impacted by Western perception of alimentation of food and practices. As conventional agricultural, agroecology is also a product of external knowledge systems and it was imported. But for me, it's contrasting with the principle of agriculture, because agriculture should be like coming from the peasant, like farmers themselves (Interwiew6)

Moreover, for the farmers in Senegal, not only is agroecology an imported notion, but is “*limited to basic knowledge and technical practices* (Interwiew5) that aim to environmental protection. Despite the this and the co-optation from agribusiness, agroecology initiatives were able to create some successful cases, but not enough to generate momentum for structural changes (Interwiew8).

Table 7.

Comparative analysis of the impacts of institutionalization of agroecology in India and in Senegal based on Environmental Justice Framework

	Principle	Policy pathway evaluation	India	Senegal
Distributive	Food security	The policy protects the access to the whole population to sufficient nutritious, adequate and safe food at all time.	<ul style="list-style-type: none"> • Acknowledge and stress of soil health for food quality. Promoting both natural and chemical agriculture to meet country needs	<ul style="list-style-type: none"> • Promoting both natural and chemical agriculture to meet country needs;
	Food chain structures	Equitable access to markets and agroecology markets protection	<ul style="list-style-type: none"> • Market driven production • Lack of infrastructural investments to move food from producers to consumers 	<ul style="list-style-type: none"> • Conflicting data about agroecology market situation;
	Ecosystem resources	The policy guarantees a just accesses to natural resources (water, land and seeds)	<ul style="list-style-type: none"> • The Program is aware of the issues of difficulty to have land rights but is not addressing it. 	<ul style="list-style-type: none"> • Some Local NGOs are raising the issues of land insecurity. • Land and water belong to the State and issues of land rights have been hidden in the Program due to its delicate nature;
	Knowledge	The policy enhances equal access to the information, education, and resources	<ul style="list-style-type: none"> • Knowledge is disseminated widely and make sure that a larger number of farmers have access to information. 	<ul style="list-style-type: none"> • Incredible efforts in making knowledge available for farmers, with different levels of education. • Knowledge is not local but imported.
	Labor Justice	The policy establishes fair payment and working conditions	<ul style="list-style-type: none"> • The Program is not addressing the issue of increased labor intensive for women. • The State insured a minimum wage to the rural households through some cash transfer. 	<ul style="list-style-type: none"> • Precarious working conditions are not addresses. • Required Certification schemes exacerbates inequalities
	Future generation	The policy grants food security, access to both natural resources and to knowledge for future generations.	<ul style="list-style-type: none"> • Not directly mentioned but awareness about the current weak food system 	<ul style="list-style-type: none"> • Not mentioned in interviews
Procedural	Fair Decision-making process. Discourse	The policy provides equal opportunities for different groups to participate and be heard in decision-making;	<ul style="list-style-type: none"> • Top-down approach, but at the grassroot level farmers have some degree of freedom; • Women don't have decision making power 	<ul style="list-style-type: none"> • Collaborative approach and different range of stakeholders involved. • Different power relationship between actors, thus affecting discourse. • Agroecology is an imported notion
Recognition	Recognition and not discrimination	divergent perspectives are acknowledge and not discrimination on ethnic-, gender-, age-related, or other grounds.	<ul style="list-style-type: none"> • Awareness and ongoing effort to recognize vulnerable groups, especially woman, but still not fully addressing woman and vulnerable groups land rights 	<ul style="list-style-type: none"> • vulnerable groups, such a small-scale farmers or women farmers and they are given the possibility to participate in trainings. • Extra work of women recognized but not addressed

5 Discussion

In this thesis, I investigated how the justice perspectives are visible and addressed in the agroecological initiatives in Senegal and in the Indian State of Andhra Pradesh. After the interviews and the desk research, I was able to have a more detailed and realistic perspective about the situation in the two countries and I can better understand the challenges that they face.

Stakeholders in both countries, acknowledge the benefits that agroecology can bring to their respective countries in terms of environmental protection; as mentioned in (CSTEP, 2019), stakeholders are aware that agroecology is good and beneficial for the environment in terms of soil quality. This aspect is being particularly well accepted in India, by women farmers. Even if it may take time for this concept to be disseminated through trainings and discussion sessions, Indian farmers are open to receive it and it motivate them to switch to agroecology. Despite its acceptance, from the literature there is still a lack of scientific studies on the positive impacts of agroecology on the soil in the long term in India (Rose et al., n.d.). In Senegal, the environmental benefit is not the main reason for farmers to move to agroecology. In this case institutionalization has shown a positive impact: they are two developing countries and only the States has the necessary financial and technical resources to put in place a nationwide program to restore degraded land. Regarding the dissemination of knowledge, interviews mentioned that both nations are making commendable strides. They offer platforms through which farmers can gain essential insights into agroecology, facilitating their transition to this sustainable form of agriculture. Nonetheless, a nuanced distinction emerges in India's approach, where farmers are afforded a greater degree of freedom to experiment and integrate their personal experiences. This practice aligns well with the essence of agroecology, which thrives on its inherent locality (Veluguri et al., 2021). As the custodians of indigenous knowledge, local farmers possess insights uniquely attuned to their regions. Consequently, granting farmers the liberty to harness this wisdom amplifies the effectiveness of agroecology's implementation. Meanwhile in Senegal this freedom at the grassroot level has not been mentioned in any of the interviews, and this leads me to conclude that farmers are not active contributors but just passive receivers of the knowledge. In the case of the knowledge sharing, the institutionalization shows limits, because the program at the National level is standardized and lack of the specificity of the local context, especially when country with large areas and different climate pattern and zones. In the realm of labor justice, stakeholders confirmed the findings of the literature with regards to woman role in agriculture by pointing out that both India and Senegal demonstrate an awareness of the pivotal role that women assume in agricultural endeavors (Bottazzi et al., 2020; Veluguri et al., 2021). This recognition signifies a significant step towards a more equal society, given that women are often the driving force behind farming activities. Yet, acknowledgment alone proves insufficient in the context of agroecology. A notable consequence of the heightened demand for labor within agroecology is the inadvertent escalation of women's workload, observed consistently in both countries; this is aligned with the literature (Boillat et al., 2023; CSTEP, 2019) and it has been confirmed by the interviews.

Moreover, in nations where populations are experiencing rapid growth, agroecology emerges as an opportune avenue within the agricultural landscape. Nonetheless, to fully harness this potential, it becomes imperative to instill attractiveness into the sector. The literature (Rose et al., n.d.) mentioned that one of the goal of the program in India is for agroecology to represent an alternative livelihood for youth but from this research it emerged that actually this objective is far from being reached. Interviews suggested several approaches for the government to meet this goal: firstly, through the provision of supplementary financial incentives for those already immersed in agricultural pursuits. Secondly, by actively promoting agriculture as an enticing prospect, akin to opportunities available within the industrial or tertiary sectors. This dual approach serves not only to alleviate the ongoing migration of youth from rural to urban locales but also to address the burgeoning unemployment rates in certain nations. In essence, by crafting a multi-pronged strategy, governments can cultivate a more equitable labor landscape while

simultaneously steering the agricultural domain toward greater allure and vitality. If in the Indian context, the research shows that there is awareness from stakeholders about these aspects, in the Senegal one the concepts are barely touched.

In terms of labor justice, in both countries a lot of improvement still need to be done. Although both countries recognize the importance of minorities, and women farmers, the subdivision of tasks is not fair and equal, both in terms of gender and also the power. In India, the interviews confirmed that woman are increasingly burdened by the increasing demand of labor as mentioned in (Rose et al., n.d.) and the Program has done nothing to improve their working condition. A similar situation is observable in Senegal, where farmers work under precarious conditions and receiving a basic income and they are relegated to the dull work while the rewarding one goes to agroecology advocates as mentioned in (Boillat et al., 2023; Marfurt et al., 2023). In this case institutionalization can bring a positive outcome because only a set of regulations or guidelines can assure an equal treatment for all workers.

One of the pillars of agroecology is sustainable livelihood, that provides the dignified live for all the workers involved in the agriculture sector, from the farmers to all the people involved in the supply chain. Agroecology aims to give the necessary importance to the small-scale food production, by localizing the resources and by making market as accessible as possible to the local people. This implies creating the infrastructure necessary for producers to get access to the local market without unnecessary intermediates. A precondition for achieving this, is the sustainable management of the natural resources that requires a full access and control over them, and this means avoiding the privatization or nationalization of the resources themselves (Anderson et al., 2020). In India, access to land is still a complex issue, because of the societal structure, that makes it difficult or almost impossible for vulnerable groups to have land titles (Khadse & Srinivasan, 2022) and it was confirmed by the interviews. The same occurs in Senegal, but the reasons are different. In Senegal, most of the land is owned by the State (Marfurt et al., 2023), and there is in fact a movement to privatize land but the process discriminates against the farmers, because they can't access the credits necessary to get loans for lands. In this way, the small scale farmers are at risk of losing ownership over land to land grabbing or co-optation, leading to what (Alonso-Fradejas et al., 2020) named "Junk agroecology". It is important to implement rules and guidelines to regulate the access and control over natural resources, in a transparent and reliable way, in order to avoid inequalities, specially towards the most vulnerable. Only such rules in place can start a change in the status quo and bring more justice. My findings shows that institutionalizing agroecology is a necessary step to reach the goals of agroecology, and this is also mentioned in the literature that identifies the institutionalization and one of the key drives of scaling up agroecology (Altieri & Nicholls, 2012; Anderson et al., 2020; CIRAD, 2022; Giraldo & Rosset, 2018).

The distribution of labor aforementioned is strongly connected to the recognition justice. Agroecology initiatives in both countries recognize vulnerable groups and do not discriminate against them. This is evident in Senegal, where for example a platform has been created by the DyTAES, where farmers are allowed and encouraged to participate to gain knowledge and share it as well. In India, interviews stated that farmers (including women and landless farmers) in villages are stimulated to attend workshops or training sections. Moreover, their wisdom is accredited and welcome. This align with the domain of transformation "Knowledge and Culture" mentioned by (Anderson et al., 2020).

Furthermore, the recognition of vulnerable groups is tangible in the decision-making process in Indian context; however, the impacts of their inputs is still questionable. In facts, women are recognized for their role, but their scope of influence is limited to the grassroot levels, far from the decision making.

In Senegal in terms of the decision-making, the literature refers to it as uneven process due to the unbalance in the power between the different actors (Boillat et al., 2021), for example farmers organization have less influence due to less access to resources compared to other actors. Nevertheless, this thesis shows that that there is an ongoing effort to have more inclusive context. Despite the effort from different range of stakeholders to spread agroecology notion, one has to wonder whose knowledge about agroecology is being spread. As found in the literature for Senegal, there are many foreign civil society organizations and many foreign Aids that are the major contributors in the spreading of

agroecology principle (Boillat et al., 2021). In India the situation is different because the core knowledge being spread comes from the State: even if the present research concludes that at the local level farmers are to some extent allowed to use their knowledge and experience to perform daily tasks, the State remains the main entity organizing hubs and trainings to implement new strategies. The present research confirms the literature (Rose et al., n.d.; Veluguri et al., 2021). In both cases, however this is in conflict with the principle of food sovereignty that characterizes agroecology because as mentioned in the (Nyéléni, 2007) agroecology should come from local knowledge. Within this context, a certain level of institutionalization is necessary, because the social construct of India and Senegal demands for rules to be created and implemented to make the desired structural changes. This kind of social inequalities towards vulnerable groups is one of the social aspects that agroecology itself will not be able to solve, but its institutionalization might bring some improvement. Therefore, the knowledge from farmers is in some extent values and cherished. From one side this is positive because it can help in setting some rules and let marginalized people get official recognition that in certain contexts they would not have. On the other side, it formally allows and accept the external knowledge will be disseminated with the potential risk of co-optation.

Another aspect that emerged from the analysis is the connection between the food security and discourse, and this aspect is quite sensitive to the dynamics of each country; consequently, there are different situations in India and Senegal.

In India, the Government still must support chemical agriculture in order to guarantee the food security at least in terms of food quantity. This necessity, due to the demographics of the Country, is the present justification for the discourse for the parallel use of chemical and natural agriculture, at least during the transition phase as mentioned in (Patel et al., 2022) and confirmed by the interviews.

Senegal's food security situation is much more complicated, as the country is not self-sufficient in terms of food production and consequently it must import a significant amount of food from other countries (TEEB AgriFood Initiative & United Nations Environment, 2022). Furthermore, it should be noted that agriculture is primarily subsistence in Senegal. As a result, when the topic of implementing agroecology is brought up in terms of time, most farmers are unwilling to leave the land uncultivated for 1 or 2 years because it would mean less food for them. This leads the Government to subsidies bio fertilizers instead of fully pursuing ecological principles. The narrative made around agroecology is strongly connected with who has the power and the resources to implement it, that in these cases corresponds to the State, and therefore the political spectrum, and the vision and values of the whoever is in power to implement agroecology. It comes without saying the political aspect of agroecology cannot be neglected. My findings confirm that the State has the power and resources needed to scale-up agroecology as in (Altieri & Nicholls, 2012), but this is somehow a paradox considering one of the core value of agroecology, that is food sovereignty proposed by La Via Campesina, that stresses the importance of giving value to the local knowledge and local markets. This raises a couple of questions:

- When should the Government in facts start playing their role in the agroecology transition process?
- Given that the recent generations experienced new methods of agriculture, for example the Green Revolution agriculture in India, what kind of local knowledge would be seen and accepted as traditional and local by these generations?

6 Conclusion

The current agrifood sector has shown to be not sustainable and generated several inequalities around the Globe, therefore a transition towards a more sustainable way of production and consumption of food is needed. Recently in the policy arena, agroecology has been proposed as a solution able to meet ecological principle and social equity, addressing food system issues, climate change and the Sustainable Development Goals. Governments, international organizations, and researchers are incorporating agroecology into policies for sustainable food systems, especially in countries in Africa and Asia: Senegal and the India State of Andhra Pradesh are examples. However, like any other transition, switching from the current agro-food system to agroecology required a deep evaluation where trade-offs between social, environmental, and economic benefits from the policy perspective.

Based on the literature on environmental Justice (Distribution, recognition, procedural justice) and the aspects and principles of agroecology, the thesis first identified evaluation criteria that serve guiding questions that can help policy makers and practitioners involved in agroecology. These criteria are access to adequate and nutritious food, livelihood opportunities from agroecology practices, facilitated access to the market, fair distribution of natural resources, proper working conditions and fair distributions of the tasks, inclusive and transparent decision-making process and value of local knowledge.

I applied the proposed assessment criteria for evaluating the agroecology transition in Senegal and India, which respectively involved in DyTEAS and APCNF. This methodology has been useful to have a deep understanding of the situation in both countries, thus validating this justice perspective approach for agroecology transition. However, some criteria are strongly intertwined to each other that let some concepts to follow under different categories. This shows the complexity of agroecology practices and policies, and it should get the attention from stakeholders, which should address these issues of institutionalization of agroecology in a broader perspective, bringing its potential to its maximum, with the appropriate trade-off between the different aspects.

The main research question "To what extent does the institutionalization of agroecology contribute to a fair/just transition in the agriculture sector in India and Senegal?" raises critical questions about the effectiveness and inclusiveness of these policies.

Overall, India and Senegal face unique challenges and opportunities in promoting agroecology. While both countries strive to address food security, ecosystem health, and livelihoods, they navigate issues of social equity, land rights, market dominance to achieve comprehensive and inclusive agroecological transformations. In India, the focus of the Program is on improving food security, maintaining healthy ecosystems, and supporting livelihoods in the face of a growing population. Nevertheless, agroecology implementation program faces hurdles in terms of addressing social demographic dynamics and uneven salary systems, that affect mainly women. Land rights, especially for women and marginalized castes, remain unaddressed, further exacerbating gender and caste-based imbalances. While some progress has been made in promoting agroecology through government support and certifications, the focus on short-term economic benefits may overshadow the core principles of sustainable and environmentally conscious farming. Senegal, due to its insufficient agriculture production, is still depended on imported food and thus, intense competition from conventional imports and agribusiness products limits the growth of the agroecological and organic sectors, even if efforts have been made to establish cooperatives and niche markets to promote agroecological production practices. In the Country, labor relations in the agricultural sector are predominantly informal, leading to precarious wages and working conditions. When it comes to Senegalese land rights, the land is still governed by the State, limiting the power of farmers on production and leaving them vulnerable to expropriation and urban expansion.

With regards to recognition justice, India and Senegal show some differences. In India, the state recognizes the importance of including underrepresented groups, particularly women and efforts are being

made to empower them and elevate their status as decision-makers. However, granting land to women and giving them the freedom to practice agroecology, increases their workload but not their income. In Senegal, while a significant effort has been made to engage with more farmers, women recognition and women titles still need formal recognition.

In terms of procedural justice, India and Senegal demonstrate contrasting approaches: the Indian government's position on agroecology appears to be complex, as they support both the agroecology initiative and chemical agriculture. This is on the fact that in the short-term solution, chemical agriculture guarantee food security in terms of quantity. While agroecology should primarily be implemented from the ground-up level, the Government has a top-down approach, even if some degree of freedom is given to farmers to experiments new methos based on their own knowledge. On the other hand, in Senegal, farmers' organizations have played a minor role in the agroecology campaign due to their limited financial and cultural capital compared to foreign NGOs, who are the main drivers of agroecology transition. However, there has been a recent collaborative effort among farmers' groups, scientific organizations, and NGOs to establish networks and platforms advocating for smallholder farmers and promoting the agroecological transition, resulting in the DyTAES. However, due to concerns about political legitimacy and potential repercussions, the alliances maintain a formal and diplomatic approach, avoiding direct scrutiny of national development policies.

These results are based on countries that have colonial past: the current agroecology practices and discourses are heavily affected by the geopolitical influence from the previous colonizing Nations: for example of the particular case of Senegal, the French influence on narrative, knowledge, funds and regulations is visible in the vast amount or foreign NGOs and this alienate the local NGOs and farmers unions that ended up being the “Knowledge” receivers instead of active promoters. India was colonized by Great Britain and therefore its judiciary system is still heavily influences by the British.

Related to this it can be mentioned that this research confirms the aspect that has significant influence in the agroecology implementation, special in developing countries, i.e the politics. This research shows that, due to its role of driving the society, and the impact of people`s lives, politics plays an important role in agroecology. Therefore, studying the traditional way of farming developed by the local people should be re discover, studies and disseminated. This need derives from the colonist`s past, which removed old way and new ways were introduces and it required extra efforts to find local traditional ways of farming and then disseminate the ancient knowledge to the farmers.

Overall, we can conclude that institutionalization of agroecology through policies and initiatives is necessary because of the scale it can reach, the resources which can put in place, the legislative power it possesses. Nonetheless, the agroecology transition should not start with the institutionalization as this should come after farmers have brought up willingness and knowledge to switch to more ecological practices. Furthermore, the institutionalization should not overshadow the farmers and should grant them with the necessary autonomy to practice agroecology without interference from external stakeholders.

Based on the analysis, I will suggest the following general recommendations:

- 1) The implementers of agroecology should carefully take into consideration the specific social dynamics of their country and critically reflect upon their capacity; identify the specific elements of success and don't simply carry over the good outcomes from other contexts.
- 2) The State should first finance the research about identification of local, traditional and ancient agricultural practices and diet together with researcher and practitioners. Then disseminate this knowledge.
- 3) The Private or Public institutions involved in agroecology chain should Establish mechanisms of public consultation, participation in decision-making to avoid censorship of sensitive issues and promote openness; the farmers and consumers should simultaneously actively engage with them.
- 4) The State should promote local market by subsidizing and promoting agroecology products int State and Private Institutions, such as school, hospital, orphanage.
- 5) The State should support parallely agroecology initiatives with laws that grant rights to land to small farmers and women farmers.

This research faced some limitations, which are the listed below:

- Time - short time to identify, and find availability from key stakeholders;
- Communication barriers – challenges when conducting the interviews in different languages,
- Research Methodology – lack of strong theoretical background in agroecology,
- Complexity of agroecology – as an open concept, susceptible to different interpretation in different environments, generates a complexities in term of concepts, methods, approaches.
- Small sample group – the present research is based on local cases, specific to the countries and communities where they are implemented, therefore to have more solid conclusions, need a larger samples group.
- Lack of diversify between people that interviews like government and private and NGO.

7 References

- Actionaid. (2018). *Principles for a Just Transition in Agriculture*.
- Alonso-Fradejas, A., Forero, L. F., Ortega-Espès, D., Drago, M., & Chandrasekaran, K. (2020). *Junk Agroecology: The corporate capture of agroecology for a partial ecological transition without social justice*. Friends of the Earth International, Transnational Institute and Crocevia.
- Altieri, M., & Nicholls, C. (2012). Agroecology Scaling Up for Food Sovereignty and Resiliency. In *Sustain Agric Rev* (Vol. 11, pp. 1–29). https://doi.org/10.1007/978-94-007-5449-2_1
- Altieri, M. A. (2018). *Agroecology: The science of sustainable agriculture*. CRC Press
- Anderson, C. R., Bruil, J., Chappell, M. J., Kiss, C., & Pimbert, M. P. (2019). From Transition to Domains of Transformation: Getting to Sustainable and Just Food Systems through Agroecology. *Sustainability*, *11*(19), Article 19. <https://doi.org/10.3390/su11195272>
- Anderson, C., Bruil, J., Chappell, M. J., Kiss, C., & Pimbert, M. (2020). *Agroecology Now! Transformations Towards More Just and Sustainable Food Systems*. <https://doi.org/10.1007/978-3-030-61315-0>
- Anderson, C., Pimbert, M. P., Chappell, M. J., Brem-Wilson, J., Claeys, P., Kiss, C., Maughan, C., Milgroom, J., McAllister, G., Moeller, N., & Singh, J. (2020, February 23). Agroecology now - connecting the dots to enable agroecology transformations. *Agroecology and Sustainable Food Systems*, *44*(5), 561–565. <https://doi.org/10.1080/21683565.2019.1709320>
- Anseeuw, W., & Baldinelli, G. M. (2020). *Land inequality at the heart of unequal societies*. <https://oi-files-d8-prod.s3.eu-west-2.amazonaws.com/s3fs-public/2020-11/uneven-ground-land-inequality-unequal-societies.pdf>
- Bauluz, L., Govind, Y., and Novokmet, F. (2020). *Global Land Inequality*. Rome: ILC, Land Inequality
- Blattner, C. (2020). Just Transition for Agriculture? A Critical Step in Tackling Climate Change. *Journal of Agriculture, Food Systems, and Community Development*, *9*(3), Article 3. <https://doi.org/10.5304/jafscd.2020.093.006>
- Boillat, S., & Bottazzi, P. (2020, May 7). Agroecology as a pathway to resilience justice: peasant movements and collective action in the Niayes coastal region of Senegal. *International Journal of Sustainable Development & World Ecology*, *27*(7), 662–677. <https://doi.org/10.1080/13504509.2020.1758972>
- Boillat, S., Bottazzi, P., & Sabaly, I. K. (2023). The division of work in Senegalese conventional and alternative food networks: A contributive justice perspective. *Frontiers in Sustainable Food Systems*, *7*. <https://www.frontiersin.org/articles/10.3389/fsufs.2023.1127593>
- Boillat, S., Belmin, R., & Bottazzi, P. (2021). The agroecological transition in Senegal: Transnational links and uneven empowerment. *Agriculture and Human Values*, *39*, 3. <https://doi.org/10.1007/s10460-021-10247-5>
- Boillat, S., Martin, A., Adams, T., Daniel, D., Llopis, J., Zepharovich, E., Oberlack, C., Sonderegger, G., Bottazzi, P., Corbera, E., Ifejika Speranza, C., & Pascual, U. (2020). Why telecoupling research needs to account for environmental justice. *Journal of Land Use Science*, *15*(1), 1–10. <https://doi.org/10.1080/1747423X.2020.1737257>

- Bottazzi, P., & Boillat, S. (2021a). Agroecological Farmer Movements and Advocacy Coalitions in Sub-Saharan Africa: Between De-Politicization and Re-Politicization. In N. Räthzel, D. Stevis, & D. Uzzell (Eds.), *The Palgrave Handbook of Environmental Labour Studies* (pp. 415–440). Springer International Publishing. https://doi.org/10.1007/978-3-030-71909-8_18
- Bottazzi, P., & Boillat, S. (2021b). Political Agroecology in Senegal: Historicity and Repertoires of Collective Actions of an Emerging Social Movement. *Sustainability*, *13*(11), 6352. <https://doi.org/10.3390/su13116352>
- Bottazzi, P., Boillat, S., & Marfurt, F. (2020). Channels of Labour Control in Organic Farming: Toward a Just Agroecological Transition for Sub-Saharan Africa. *Land*, *9*, 205. <https://doi.org/10.3390/land9060205>
- Chappell, M. J., & Bernhart, A. (n.d.). *Agroecology as a Pathway towards Sustainable Food Systems*.
- CIAT, & BFS/USAID. (2016). *Climate-Smart Agriculture in Senegal. CSA Country Profiles for Africa Series*. https://climateknowledgeportal.worldbank.org/sites/default/files/2019-06/SENEGAL_CSA_Profile.pdf
- CIRAD. (2022, October 5). *What makes for successful agroecological transition? Lessons from the global South*. CIRAD. <https://www.cirad.fr/en/press-area/press-releases/2022/agroecological-transition-in-the-global-south>
- CIRAD. (2021, April 28). Senegal: getting to work on the agroecological transition. CIRAD. <https://www.cirad.fr/en/press-area/press-releases/2020/agroecology-senegal-public-policy>
- CIRAD. (2020, February 13). Senegal: Getting to work on the agroecological transition. <https://www.cirad.fr/en/press-area/press-releases/2020/agroecology-senegal-public-policy>
- Collins English Dictionary (2010) Available from: <https://www.collinsdictionary.com/dictionary/english/institutionalize> [Accessed 7 June 2023]
- Coq, J.-F. L., Sabourin, E., & Bonin, M. (n.d.). *Public policies supporting agroecology in Latin America: Lessons and perspectives*.
- CSTEP. (2019). *Life Cycle Assessment of ZBNF and NON-ZBNF. A study in Andhra Pradesh*. Center for Study of Science, Technology and Policy (CSTEP).
- Department of Agriculture, Ministry of Agriculture & Farmers Welfare. (2016). All India report on number and area of operational holdings for agriculture census 2015–16
- Dorin, B. (2022). Theory, Practice and Challenges of Agroecology in India. *International Journal of Agricultural Sustainability*, *20*(2), 153–167. <https://doi.org/10.1080/14735903.2021.1920760>
- Durga, L., Bharath, Y., Bliznashka, L., Kumar, V., Jonnala, V., Chekka, V., Yebushi, S., Roy, A., Venkateshmurthy, N. S., Prabhakaran, P., & Jaacks, L. M. (2023). *Impact of a nutrition-sensitive agroecology program in Andhra Pradesh, India, on dietary diversity, nutritional status, and child development* (p. 2023.05.16.23290036). medRxiv. <https://doi.org/10.1101/2023.05.16.23290036>
- FAO. (2004). Voluntary Guidelines to support the progressive realization of the right to adequate food in the context of national food security. <https://www.fao.org/3/y7937e/y7937e.pdf>
- FAO. (2015). *Climate change and food security: Risks and responses*. <https://www.fao.org/3/i5188e/i5188E.pdf>

- FAO. (2016). The state of food and agriculture. Climate change, agriculture and food security. Retrived from: <https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/447856/>
- FAO. (2018a). The 10 elements of agroecology Guiding the transition to sustainable food and agricultural systems, Rome. <https://www.fao.org/documents/card/en/c/I9037EN/>
- FAO. (2018b) SCALING UP AGROECOLOGICAL INITIATIVE TRANSFORMING FOOD AND AGRICULTURAL SYSTEMS IN SUPPORT OF THE SDGS. <https://www.fao.org/3/I9049EN/i9049en.pdf>
- FOEI. (2018). Agroecology: Innovating for sustainable agriculture & food systems (Who Benefits?).
- Geels, F. W., & Schot, J. (2007). Typology of sociotechnical transition pathways. *Research Policy*, 36(3), 399–417. <https://doi.org/10.1016/j.respol.2007.01.003>
- Ghosh, J. (2021, September 20). Time is running out for a new agricultural model for the global south. *Social Europe*. <https://www.socialeurope.eu/time-is-running-out-for-a-new-agricultural-model-for-the-global-south>
- Giraldo, O. F., & Rosset, P. M. (2018). Agroecology as a territory in dispute: Between institutionality and social movements. *The Journal of Peasant Studies*, 45(3), 545–564. <https://doi.org/10.1080/03066150.2017.1353496>
- Giraldo, O., & McCune, N. (2019). Can the state take agroecology to scale? Public policy experiences in agroecological territorialization from Latin America. *Agroecology and Sustainable Food Systems*, 1–25. <https://doi.org/10.1080/21683565.2019.1585402>
- Steve Gliessman (2016) Transforming food systems with agroecology, *Agroecology and Sustainable Food Systems*, 40:3, 187-189, DOI: 10.1080/21683565.2015.1130765
- Global Alliance for the Future of Food,. (2022). *Global Alliance for the Future of Food. Untapped Opportunities for Climate Action: An Assessment of Food Systems in Nationally Determined Contributions*.
- González de Molina, M. (2013). Agroecology and Politics. How To Get Sustainability? About the Necessity for a Political Agroecology. *Agroecology and Sustainable Food Systems* 37 (1): 45-59.
- Gornall, J., Betts, R., Burke, E., Clark, R., Camp, J., Willett, K., & Wiltshire, A. (2010). Implications of climate change for agricultural productivity in the early twenty-first century. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 365(1554), 2973–2989. <https://doi.org/10.1098/rstb.2010.0158>
- Guereña, A. and Wegerif, M. (2019). Land Inequality: Framing Document. Rome: ILC, Land Inequality Initiative. <https://www.landcoalition.org/en/resources/land-and-inequality/>
- Hebinck, A., Klerkx, L., Elzen, B., Kok, K. P. W., König, B., Schiller, K., Tschersich, J., van Mierlo, B., & von Wirth, T. (2021). Beyond food for thought – Directing sustainability transitions research to address fundamental change in agri-food systems. *Environmental Innovation and Societal Transitions*, 41, 81–85. <https://doi.org/10.1016/j.eist.2021.10.003>
- Heffron, R. J., & McCauley, D. (2018). What is the ‘Just Transition’? *Geoforum*, 8, 74–77. <https://doi.org/10.1016/j.geoforum.2017.11.016>

Heldeweg, M.A. (2023). Sustainability and Justice. Introduction [Power Point slides]. Faculty of Behavioural, Management and Social sciences, University of Twente.
https://canvas.utwente.nl/courses/10669/pages/meeting-2-20-slash-12?module_item_id=372259

HLPE. 2019. Agroecological and other innovative approaches for sustainable agriculture and food systems that enhance food security and nutrition. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome.

Holt-Giménez, E., & Altieri, M. A. (2012, September 4). Agroecology, Food Sovereignty and the New Green Revolution. *Journal of Sustainable Agriculture*, 120904081412003.
<https://doi.org/10.1080/10440046.2012.716388>

IPCC. (2019). *Climate Change and Land: IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*. Cambridge University Press. <https://doi.org/10.1017/9781009157988>

Isgren, E., & Ness, B. (2017). Agroecology to Promote Just Sustainability Transitions: Analysis of a Civil Society Network in the Rwenzori Region, Western Uganda. *Sustainability*, 9(8), Article 8.
<https://doi.org/10.3390/su9081357>

Jha, C. K., Ghosh, R. K., Saxena, S., Singh, V., Mosnier, A., Guzman, K. P., Stevanović, M., Popp, A., & Lotze-Campen, H. (2023). Pathway to achieve a sustainable food and land-use transition in India. *Sustainability Science*, 18(1), 457–468. <https://doi.org/10.1007/s11625-022-01193-0>

Johnson-Chappell, M. Jahi & Bernhart, Annelie & Bachmann, Lorenz & Gonçalves, André & Seck, Sidy & Nandula, Phanipriya & Cristo, Alvori. (2018). Agroecology as a Pathway towards Sustainable Food Systems. 10.13140/RG.2.2.12122.59842.

Kaljonen, M., Kortetmäki, T., & Tribaldos, T. (2023). Introduction to the special issue on just food system transition: Tackling inequalities for sustainability. *Environmental Innovation and Societal Transitions*, 46, 100688. <https://doi.org/10.1016/j.eist.2022.100688>

Kaljonen, M., Kortetmäki, T., Tribaldos, T., Huttunen, S., Karttunen, K., Maluf, R. S., Niemi, J., Saarinen, M., Salminen, J., Vaalavuo, M., & Valsta, L. (2021). Justice in transitions: Widening considerations of justice in dietary transition. *Environmental Innovation and Societal Transitions*, 40, 474–485. <https://doi.org/10.1016/j.eist.2021.10.007>

Khadse, A., & Rosset, P. (2019). Zero Budget Natural Farming in India -from inception to institutionalization. *Agroecology and Sustainable Food Systems*.
<https://doi.org/10.1080/21683565.2019.1608349>

Khadse, A., & Srinivasan, K. (2022). Realizing Climate Justice through Agroecology and Women's Collective Land Rights. In P. Kashwan (Ed.), *Climate Justice in India* (1st ed., pp. 207–228). Cambridge University Press. <https://doi.org/10.1017/9781009171908.011>

Khadse, A., Rosset, P. M., Morales, H., & Ferguson, B. G. (2018). Taking agroecology to scale: The Zero Budget Natural Farming peasant movement in Karnataka, India. *The Journal of Peasant Studies*, 45(1), 192–219. <https://doi.org/10.1080/03066150.2016.1276450>

Khurana, A. & Kumar, V. “State of Organic and Natural Farming in India: Challenges and Possibilities.”

<https://www.cseindia.org/state-of-organic-and-natural-farming-in-india-10346> (2020).

Kothari A. (2019). *Pluriverse : a post-development dictionary* (first published). Tulika Books.

- Lamont, Julian and Christi Favor, "Distributive Justice", The Stanford Encyclopedia of Philosophy (Winter 2017 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/win2017/entries/justice-distributive/>
- Lickel, S. (2019). *Public Policies to Support the Agroecological Transition*. 1(19). https://www.coordinationsud.org/wp-content/uploads/notes_19_anglais-1.pdf
- Loconto, A., & Fouilleux, E. (n.d.). *Defining agroecology: Exploring the circulation of knowledge in FAO's Global Dialogue*.
- LVC (La Via Campesina). 2015. Declaration of the International Forum for Agroecology [online]. <https://viacampesina.org/en/index.php/main-issues-mainmenu-27/sustainable-peasants-agriculturemainmenu-42/1749-declaration-of-the-international-forum-for-agroecology>
- Malnutrition-Free India. (n.d.). Press Information Bureau. <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1781673>
- Marfurt, F., Haller, T., & Bottazzi, P. (2023). Green Agendas and White Markets: The Coloniality of Agroecology in Senegal. *Land*, 12(7), Article 7. <https://doi.org/10.3390/land12071324>
- Martínez-Torres, M. E., & Rosset, P. M. (2010). La Vía Campesina: The birth and evolution of a transnational social movement. *The Journal of Peasant Studies*, 37(1), 149–175.
- McCauley, D., & Heffron, R. (2018). Just transition: Integrating climate, energy and environmental justice. *Energy Policy*, 119, 1–7. <https://doi.org/10.1016/j.enpol.2018.04.014>
- McCauley, D., Heffron, R., Stephan, H., & Jenkins, K. (2013). Advancing Energy Justice: The triumvirate of tenets. *International Energy Law Review*, 32, 107–110.
- Meah, N., & Sharma, S. (2020). Climate-Resilient Agricultural Development in the Global South. In *The Palgrave Handbook of Climate Resilient Societies* (pp. 1–24). Springer International Publishing. https://doi.org/10.1007/978-3-030-32811-5_19-1
- Murphy, S. P., Cannon, S. M., & Walsh, L. (2022). Just transition frames: Recognition, representation, and distribution in Irish beef farming. *Journal of Rural Studies*, 94, 150–160. <https://doi.org/10.1016/j.jrurstud.2022.06.009>
- Nelson, E., Scott, S., Cukier, J., & Leyva Galán, A. (2008). Institutionalizing Agroecology: Successes and Challenges in Cuba. *Agriculture and Human Values*, 26, 233–243. <https://doi.org/10.1007/s10460-008-9156-7>
- Nutrition and Food Security. (n.d.). India. <https://india.un.org/en/171969-nutrition-and-food-security>
- Nyéleni. (2015). Declaration of the International Forum for Agroecology. *Development*, 58(2–3), 163–168. <https://doi.org/10.1057/s41301-016-0014-4>
- Oteros-Rozas, E., Ravera, F., & García-Llorente, M. (2019). How Does Agroecology Contribute to the Transitions towards Social-Ecological Sustainability? *Sustainability*, 11(16), Article 16. <https://doi.org/10.3390/su11164372>
- Pandey, G. (2023). *Tenancy and Credit: Exploring Facts Below The Crust In Andhra Pradesh*. Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development.

- Patel, N., Nagaich, R., & Dorin, B. (2022). *A New Paradigm for Indian Agriculture. From Agroindustry to Agroecology*. NITI Aayog.
- Pathak, H. (2022). Impact, adaptation, and mitigation of climate change in Indian agriculture. *Environmental Monitoring and Assessment*, 195(1), 52. <https://doi.org/10.1007/s10661-022-10537-3>
- Petersen, P., Mussoi, E. M., & Dalsoglio, F. (2012). Institutionalization of the Agroecological Approach in Brazil: Advances and Challenges. *Journal of Sustainable Agriculture*, 121005074109006. <https://doi.org/10.1080/10440046.2012.735632>
- Pimbert, M. (2023). Transforming food and agriculture: Competing visions and major controversies: *Mondes En Développement*, n° 199(3), 361–384. <https://doi.org/10.3917/med.199.0365>
- Place, F., Niederle, P., Sinclair, F., Carmona, N., Guéneau, S., Gitz, V., Alpha, A., Sabourin, E., & Hainzelin, E. (2022). *Agroecologically-conducive policies: A review of recent advances and remaining challenges*. Center for International Forestry Research (CIFOR). <https://doi.org/10.17528/cifor-icraf/008593>
- Puupponen, A., Huttunen, S., Kortetmäki, T., Lähteenmäki-Uutela, A., & Kaljonen, M. (2023). Justice in Finnish Food Policies. *Food Ethics*, 8(1), 6. <https://doi.org/10.1007/s41055-022-00117-z>
- RAWLS, J. (1971). *A Theory of Justice: Original Edition*. Harvard University Press. <https://doi.org/10.2307/j.ctvjf9z6v>
- Rose, S., Halstead, J., & Griffin, T. (n.d.). *Zero Budget Natural Farming in Andhra Pradesh: A Review of Evidence, Gaps, and Future Considerations*.
- Sachet, E., Mertz, O., Le Coq, J.-F., Cruz-Garcia, G. S., Francesconi, W., Bonin, M., & Quintero, M. (2021). Agroecological Transitions: A Systematic Review of Research Approaches and Prospects for Participatory Action Methods. *Frontiers in Sustainable Food Systems*, 5. <https://www.frontiersin.org/articles/10.3389/fsufs.2021.709401>
- Schlosberg, D., 2007. *Defining Environmental justice: theories, movements, and Nature*. Oxford University Press, New York.
- Schübel, H., & Wallimann-Helmer, I. (Eds.). (2021). *Justice and food security in a changing climate*. https://doi.org/10.3920/978-90-8686-915-2_0
- Shah, P., Lakhey, S., Kumara, T., Raidu, D., Killi, J., Kalavakonda, V., & Pillai, M. M. (2009). *Ecologically sound, economically viable: Community managed sustainable agriculture in Andhra Pradesh, India*. <https://www.semanticscholar.org/paper/Ecologically-sound%2C-economically-viable-%3A-community-Shah-Lakhey/82ede02a9daf7ed1b830f2001a4a25c16851cf90>
- TEEB AgriFood Initiative, & United Nations Environment. (2022). *A Holistic Lens on Rice Value Chain Pathways in Senegal Application of “The Economics of Ecosystems and Biodiversity for Agriculture and Food” Framework*.
- Timmermann, C., & Félix, G. F. (2015, January 10). Agroecology as a vehicle for contributive justice. *Agriculture and Human Values*, 32(3), 523–538. <https://doi.org/10.1007/s10460-014-9581-8>
- Tribaldos, T., & Kortetmäki, T. (2022). Just transition principles and criteria for food systems and beyond. *Environmental Innovation and Societal Transitions*, 43, 244–256. <https://doi.org/10.1016/j.eist.2022.04.005>

Veluguri, D., Bump, J., Srinivasapura Venkateshmurthy, N., Mohan, S., Pulugurtha, K., & Jaacks, L. (2021). Political analysis of the adoption of the Zero-Budget natural farming program in Andhra Pradesh, India. *Agroecology and Sustainable Food Systems*, 45, 1–24. <https://doi.org/10.1080/21683565.2021.1901832>

Verschuren P. J. M. Doorewaard H. Poper R. & Mellion M. J. (2010). *Designing a research project* (2nd ed.). Eleven International Publishing.

Weller, K. (2018, June 2). Andhra Pradesh to become India's first Zero Budget Natural Farming state. UN Environment Programme. <https://www.unep.org/news-and-stories/press-release/andhra-pradesh-become-indias-first-zero-budget-natural-farming-state>

Wezel, A., Bellon, S., Doré, T., Francis, C., Vallod, D., & David, C. (2009). Agroecology as a Science, a Movement and a Practice. A Review. *Agronomy for Sustainable Development*, 29(4), 503–515.

World Food Program (2021). Senegal Country Brief. Retrived from: https://docs.wfp.org/api/documents/WFP-0000135589/download/?_ga=2.244593605.1731398936.1641888177-1055501472.1562658913

What is Food Security? There are Four Dimensions. (n.d.). World Bank. <https://www.worldbank.org/en/topic/agriculture/brief/food-security-update/what-is-food-security>

Why do we work? Labour and agroecological transition in sub-Saharan Africa – AgroWork. (n.d.). Centre for Development and Environment (CDE). https://www.cde.unibe.ch/research/projects/why_do_we_work_labour_and_agroecological_transition_in_sub_saharan_africa_agrowork/index_eng.html

Wittman, H. (2015). FS - From protest to policy: The challenges of institutionalizing food sovereignty. *Canadian Food Studies / La Revue Canadienne Des Études Sur l'alimentation*, 2(2), 174–182. <https://doi.org/10.15353/cfs-rcea.v2i2.99>

World Bank Group. (2017). Future of food: Shaping the food system to deliver jobs. <http://documents.worldbank.org/curated/en/406511492528621198/Future-of-food-shaping-the-food-system-to-deliver-jobs>

World Bank. (2020). <https://www.worldbank.org/en/country/senegal/overview>

8 Appendices

A. Consent Form

Informed consent form template for research titled “The impacts of the institutionalization of agroecology for a just transition in Global South”

Researcher: Linda Migliorati

Project Supervisors: Steven McGreevy; Athanasios Votsis

Purpose of the research

Sustainable agriculture practices are critical for food security and environmental protection. Agroecology is a widely accepted approach to addressing food system issues, climate change, and the Sustainable Development Goals. Governments, international organizations, and researchers are incorporating agroecology into policies for sustainable food systems, especially in countries in Africa and Asia. However, institutionalizing agroecology needs careful implementation to prevent false agroecology, inequalities, and reduced land and resource rights. Few empirical insights exist on the effectiveness of institutionalizing agroecology, and research is needed to assess its performance in achieving food sovereignty and just and fair transition goals.

The objective of the thesis is to assess how the institutionalization of agroecological practices impacts its ability to realize a just and fair transition in the agrifood sector in emerging economies (Senegal and India). The final goal is to provide recommendations for policymakers who are involved in agroecology.

To comprehensively evaluate the institutionalization of agroecology and food justice issues, the theoretical framework based on the dimensions of social and environmental justice is used. This framework considers the three interlinked dimensions of distributive justice, procedural justice, and recognition justice.

*Please note that this research has undergone a rigorous ethical review process and has been approved by the BMS Ethics Committee (Ethics Committee of the University of Twente). This committee ensures that the research is conducted in an ethical and responsible manner, with participant rights and well-being as the highest priority.

**Consent Form for
“The impacts of the institutionalization of agroecology for a just transition in Global South”**

YOU WILL BE GIVEN A COPY OF THIS INFORMED CONSENT FORM

Please tick the appropriate boxes

Y N
es o

Taking part in the study

1. I have had the purpose and nature of the study explained to me and I have had the opportunity to ask questions about the study.
2. I voluntarily agree to participate in this research study interview.
3. I understand that even if I agree to participate now, I can withdraw at any time or refuse to answer any question without any consequences of any kind.
4. I understand that taking part in the study involves an audio-recorded interview.

Use of the information in the study

5. I understand that all information I provide for this study will be treated confidentially.
6. I understand that in any report on the results of this research my identity will remain anonymous. This will be done by not explicitly mentioning my name and disguising any details of my interview which may reveal my identity, the identity of people I speak about or the organization I work for.

Future use and reuse of the information by others

7. I understand that I am entitled to access the information I have provided after the interview.
8. I understand that I am free to contact any of the people involved in the research to seek further clarification and information.

Signatures

Name of the participant

Date

Signature

**For participants unable to sign their name, mark the box instead of sign*

I have accurately read out the information sheet to the potential participant and, to the best of my ability, ensured that the participant understands to what they are freely consenting.

Migliorati

Linda

03/05/2023

Researcher

Date

Signature

Study contact details for further information:

Linda Migliorati (l.migliorati@student.utwente.nl)

Steven McGreevy (s.r.mcgreevy@utwente.nl)

Contact Information for Questions about Your Rights as a Research Participant If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the Secretary of the Ethics Committee/domain Humanities & Social Sciences of the Faculty of Behavioural, Management and Social Sciences at the University of Twente by ethicscommittee-hss@utwente.nl

B. Interview questions

The following represent the guiding questions for each interview. Please note that light adjustments and changes have been made for each stakeholder, in order to tailor them to their role.

Distributive justice assesses the fair allocation of material and immaterial harms, benefits, and responsibilities of the agroecological transition, for example, appropriate payment and working conditions, access to natural resources (land, water, ..), access to sufficient nutritious food, access to information about the importance of food quality and/or impacts of climate change).

- 1) Considering the relevance of distributive justice to agroecology, are there initiatives that, besides promoting the ecological benefits of agroecology, address distributive justice issues (fair payment, food chain, access to land) in your country? Can you provide specific examples?
- 2) From the examples discussed above, which ones were successful and effectively promoted distributive justice within the agroecology transition in your Country? What were the key factors contributing to their success? (Please provide specific data if available.)
- 3) Based on your knowledge and engagement with the agroecology transition, do you believe there are areas that still need improvement? If so, what specific issues or difficulties do you think should be addressed?

Recognition justice encompasses the acknowledgment, appreciation, and non-discrimination of social and cultural values, as well as the inclusion of various stakeholders (acknowledge divergent perspectives in social, cultural, ethnic, racial, and gender differences)

- 1) To what extent are social characteristics such as local diet, cultural aspects, income, education level and gender are considered while promoting agroecology practices?
- 2) What specific chapter/agreement/legislation in the agroecology initiatives addresses this?
- 3) Are there any methods to measure the degree of engagement from vulnerable groups (women, youth/elderly/ indigenous people, or tribes) within agroecology initiatives? If yes, could you please expand on the current progress of this engagement and what the challenges are in this specific aspect?

Procedural justice refers to participatory parity, i.e., the ability of (affected) stakeholder groups to participate equally and non-discriminately in decision-making.

- 1) What steps did local leaders and decision-makers, take to make the decision-making process more open and clear in the context of the agroecology transition?
- 2) Is there a legal framework that makes sure that all social and economic groups can take part in a fair way while agroecology is being scaled up in your country?