

FROM AGROECOLOGY TO DEMOCRATIC RESILIENCE: COMMUNITY-BASED FOOD SECURITY AND CLIMATE ADAPTATION IN WEST SUMATRA

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ABSTRACT. The West Sumatra has a high index of food security and because of its dependence on modern farming systems that are chemical based, farmers are susceptible to environmental degradation and market forces worldwide. Through the Critical International Relations (CIR) approach of Robert W. Cox, this paper analyzes how community-based agroecological practices can be the solution to a transition between climate change adaptation and democratic resilience in West Sumatra. The current study is dedicated to the case of Cheap Staple Rice Fields (*Sawah Pokok Murah* - SPM) an agroecological farming system, a grassroots movement that helps to break free of the company inputs and promotes the self-reliance of farmers. The results demonstrate that SPM does not only lead to climate adaptation and food availability, but also transforms the community-based innovations into the inclusive local governance, in which local governments adopt the grassroots initiatives into their policy-making. This research paper addresses a gap in the literature by demonstrating that food security is not merely associated with the production of adequate food, but also with promoting ecological justice and enhancing the community capacity towards participatory decision-making. Theoretically, the study suggests that agroecology can serve as a deliberative democratic mechanism, allowing local communities to build democratic resilience through daily food governance practices.

Keywords: climate change adaptation; food security; agroecology; democratic resilience; deliberative governance; food sovereignty

INTRODUCTION

The relationship between climate change, agriculture, and food security is inseparable because the climate variability directly affects the agricultural productivity, food availability, and food systems stability in general. Increasing climatic variability has enhanced the frequency and severity of extreme weather conditions including prolonged drought, floods, and varying rainfall patterns, which disrupt crop production and food supply chains to an extent of threatening the livelihood of smallholder farmers (Ortiz-Bobea et al., 2021; FAO, 2022). The Sixth Assessment Report by the IPCC emphasizes the fact that the climate-related destabilization of food systems has become common and that its impacts are particularly prevalent in the Global South, and further increases existing disparities in food access and rural livelihood (IPCC, 2022).

In this regard, adaptation measures play a critical role in maintaining food production in the face of increasing climatic stress. Empirical evidence shows that climate change may reduce yields on staple crops by 30 percent, mostly because it affects productivity, leads to more crop failure, and exposes crops to climate extremes (Aryal et al., 2020; Ortiz-Bobea et al., 2021). To address those difficulties, farmers have

implemented various adaptive measures, such as changes in planting timing, better irrigation practices, inter-cropping, conservation agriculture, better seed and crop storage processes, and the use of climate-resistant varieties of crops (Aryal et al., 2020; FAO, 2021).

Besides technical adaptation policies, agroecological systems have also grown to be of concern as an alternative approach to addressing climate change. Agroecology is emerging as a key paradigm for transforming food systems by integrating ecological principles, social justice, and economic sustainability. Globally, evidence suggests that agroecological practices—such as polyculture, agroforestry, reduction of chemical inputs, and pest biomanagement—generally increase land productivity, especially when compared to input-free monoculture systems in Africa, although the magnitude of the impact is highly dependent on the type of practice, commodity, climate, and soil traits (Romero Antonio, et al., 2025). Conceptually, agroecology is positioned as a cross-disciplinary approach that focuses not only on improving yields, but also on biodiversity conservation, strengthening food security, and mitigating climate change, while improving the socioeconomic conditions of smallholder farmers and rural communities (Vikas

& Rajiv, 2024). Consequently, agroecology is increasingly being known as a transformative and participatory approach that bringing together climate change adaptation, food system sustainability, and social equity (IPES-Food, 2021). Agroecology, in many cases, relates with organic farming practices and mainly focuses on the utilization of local seeds and natural inputs rather than chemically manufactured fertilizers and pesticides. By using local seeds, organic fertilizers and natural pest control, agroecological farming has helped in enhancing the quality of the soil, environmental sustainability and minimization of greenhouse gases. At the economic level, this system will decrease production expenses, decrease the reliance of farmers on corporate inputs, and facilitate the process of achieving food sovereignty (Bainus & Yulianti, 2018).

In addition to its technical and ecological aspects, agroecology also poses more general questions of governance, involvement, and community agency about the formation of food systems. Agroecological initiatives are not only made successful in relation to top-down policy or field level technical practices, but also the ability of local communities and institutions to enhance resilience to economic, climatic, and political forces. In this context, the concept of democratic resilience becomes relevant, which refers to the capacity of democratic actors and institutions to survive, adapt, and recover from crises through participatory, inclusive, and sustainable processes. (Merkel, 2025).

The West Sumatra Province offers a significant empirical setting to explore these dynamics. Despite the fact that the province has a rather high index of food security, it is exposed to climate-related issues. There have been extreme climatic conditions like El Nino and La Nina, which is associated with long droughts and heavy rainfall, which have led to the reduction in production of food crops over the past years (Hendra, 2023). According to the statistics provided by the National Food Agency, the West Sumatra Food Security Index has a positive trend and increased by 83.22 in 2023 compared to 79.45 in 2022, which is why the province occupies the top positions in the country (DPRD Sumbar, 2025).

However, the dependency on the contemporary agricultural systems that rely on the chemical inputs produced by corporations still exposes the farmers to the ecological deterioration, variable weather conditions, and pest infestations. Under these circumstances a local civil society movement called Sawah Pokok Murah (SPM), or low-cost rice farming has developed at West Sumatra. SPM encourages agroecology-based agricultural system

which minimizes reliance of chemical fertilizers and pesticides by farmers. Local governments have shown interest in the initiative, with a number of district heads adopting it as a regional food security policy, and this illustrates the potential of grassroots innovations to be realized in the form of a public policy (Dinas Pertanian Agam, 2025).

The relationship that exists between climate change adaptation, agriculture, and food security has been widely studied in the past. The study by Masturi et al. (2021) mentions the agricultural mitigation and adaptation measures that would allow decreasing greenhouse gas emissions and promoting soil carbon and nitrogen cycles. In other studies, adaptive agricultural technologies, such as crop varieties that are resistant to climate, efficient irrigation methods, no-till practices, and institutional fortification with the help of proper price policies are highlighted (Rozci, 2023; Ihsan and Derosya, 2024). But much of this literature is still preoccupied with technical adaptation strategies and national policy regimes, and not much is said about the relationship between local agroecological projects and democracy. On the same note, the research done between climate change adaptation and democracy has also focused on concerns like participation of the people and gender mainstreaming in climate policy. Handayani (2024) shows that the mobilization of women groups through the use of the public space helps them to express interests related to climate, whereas Hardenta and Rahmawan (2022) examine that the inclusion of the public is critical to the fulfillment of the Nationally Determined Contributions of Indonesia under the UNFCCC, despite the ongoing implementation issues.

Although previous literature has studied climate adaptation to agriculture and participatory governance individually (Dryzek et al., 2019; Newig et al., 2019), not much has been done to study the connection between the two as a form of climate adaptation and the pathway to democratic resilience. Additionally, the scholarly work on food sovereignty has also been used to highlight the democratic aspect of community-based control of food systems, but the empirical research on how these debates connect to local practices of climate adaptation is scarce (Edelman et al., 2018; Anderson et al., 2019).

Such studies, however, seldom address the arenas of democratic practice, namely agriculture and food security. As a result, research has not yet been done that clearly links the aspects of agriculture, climate change adaptation, food security, and democracy at a subnational level, especially in the West Sumatra case. To be even more precise,

very little focus has been given to the contribution made by local efforts like SPM to both climate and democratic resilience empowerment, achieved by the participation of the community and the responsiveness of the local government.

The present research fills these gaps by posing the following research questions: (1) how the local communities execute the SPM initiative due to the pressure of climate change, and food security; and (2) to what extent do the local communities-based initiatives influence the food security policy-making of the local governments.

This study is based on two complementary theories. The first is democratic resilience, defined as the ability of democratic systems to resist, respond and rebuild from internal and external pressures in an inclusive and non-violent way. Democratic resilience emphasizes the safeguarding and revitalization of democratic institutions, norms, and practices in times of crisis, rather than the survival of the regime (Merkel, 2025; Croissant and Lott, 2024). The key point of this study is that democratic resilience is not an institutional characteristic, but a process that is locally constructed through everyday participation, community building, and policy engagement (IFES, 2023). The local level dynamics between grassroots efforts and local governance come into focus when examining how inclusive and responsive governance emerges in the face of climate and food security challenges, at the subnational level. The second is Cox's Critical International Relations (CIR) that places local dynamics in the context of structure and political economy. Cox (1981; 1983) maintains that world orders are the result of dynamic interaction between material capacities, ideas, institutions and social forces. When applied to food security, this approach highlights how structural inequalities in the global food system situate Global South countries as subordinate players within corporate-dominated food systems and make food insecurity a symptom of power dynamics, not a technical issue (Clapp, 2014; McMichael, 2016). Cox (1992) also argues that globalization restricts substantive democratic participation, by putting political rights under the pressure of market forces, thus requiring and contesting structural transformation towards social justice and ecological sustainability.

This study combines both approaches, going beyond a macro-level structural analysis to investigate how local agroecological projects, such as Sawah Pokok Murah, operate as a tool for climate adaptation, a critique of dependency on the food system and a reinforcement of participatory local governance. In this context, democratic resilience is defined as the

result of daily relationships between communities, ecological practices, and public policy processes.

In analyzing Sawah Pokok Murah as a community-based intervention, the current research study can add to the existing body of knowledge by revealing how food security policies can promote ecological justice and establish more inclusive and participatory local governance.

METHODS

This study employs a qualitative descriptive case study approach to examine how a local agroecological initiative contributes to climate change adaptation and democratic resilience. In line with Yin (2016), descriptive case studies are especially appropriate to investigate modern-day phenomena in their real-life settings, in the case where the demarcation between the phenomenon and the context of the latter is not clearly visible. In this way, one can gain a more detailed and contextualized interpretation of the social processes and at the same time be very much tied to the realities of the empirical world. Although it is descriptive, the study takes a descriptive-analytical orientation as it puts the empirical findings into a well-articulated theoretical framework. This analysis is guided by the Critical International Relations (CIR) school of thought developed by Robert W. Cox, as supplemented by the literature of democratic resilience and community-based governance. Instead of giving a chronological account, the study analytically looks at how the local agency engages with the structural constraints in determining the food security and climate adaptation outcomes.

Analytical Dimensions

This paper is analyzed in terms of three major dimensions of analysis to operationalize the relationship between climate adaptation and democratic resilience, namely:

- a. *Community Participation* - analyzing how much the local farmers and community actors are included in the processes of making decisions associated with agricultural activities and food security programs.
- b. *Policy Responsiveness and Institutional Uptake* - at this point the researcher evaluated the responsiveness of local governments towards the use of grassroots innovations, specifically the incorporation of Sawah Pokok Murah (SPM) initiative into official food security policies.
- c. *Autonomy and Reduction of Dependency* - the researchers examined agroecological practices

of SPM that lessen dependence of farmers on corporate agricultural inputs and increase local control over food systems.

Such steps of analysis allow exploring systematically how agroecological practices can be operated not only as technical strategies of adaptation but also as a mechanism capable of enhancing democratic resilience in the form of participatory governance and the empowerment of communities.

Data Collection and Sources

The key informants who participated directly in the Sawah Pokok Murah (SPM) initiative were interviewed (semi-structured) to provide primary data. The informants were initiators and activists of SPM, with the initiator of the movement being the most prominent one, Ir. Djoni. The study was carried out in the Padang City in April 2025 where the SPM initiative has implemented and institutionalized. The interviews were centered on the origins of SPM, how it is implemented, community involvement, their interaction with local government, and how they believed it influenced food security and autonomy of farmers. To further deepen the analysis, the interview data were complemented with document analysis, which comprised the local government policy documents, reports prepared by agricultural agencies, and any other statement made by the people concerning the inclusion of SPM into the regional food security programs. This mix of sources made it possible to track the process of translation of community-based practices into the public policy.

Data Analysis and Validity

The thematic coding was used to analyze the data based on the above analytical dimensions. The interpretation of empirical findings was applied against the theoretical context of the study and it was possible to engage in an analysis of the interaction between local agency, institutional relationships and structural limitations in influencing climate adaptation and democratic resilience at the subnational level. In order to achieve the validity and reliability of the research results, the study utilized the data triangulation between interviews and documentary materials and member checking by verifying the main interpretations with the chosen informants. The strategies are useful in making sure that the analysis is empirically based but theoretically informed which adds to the strength of the conclusions of the study to be discussed in academic and policy circles.

RESULTS AND DISCUSSION

Sawah Pokok Murah (SPM) as Agroecological Practice and Community Innovation

Sawah Pokok Murah (SPM) is agroecological model of agriculture that is designed to help minimize reliance of farmers on chemical fertilizers, pesticides, and synthetic fertilizers. SPM is supposed to make farmers more independent, focusing on environmentally friendly activities that are both affordable and convenient to adopt and low-risk in health and financial cost. The initiative leads to efficiency of resources, reduction of pollution and greenhouse gases and regeneration of agroecosystems that can support productive plant growth in the long term.

A defining characteristic of SPM is the absence of conventional rice field tillage. Rather rice straw is kept and it is used as mulch which does not expose the soil. This method also eliminates the practice of burning agricultural residues. Water management in the SPM system avoids continuous flooding, allowing soil moisture to be controlled without submerging the straw-covered soil.

This will promote soil regeneration, since organic mulch will increase the soil structure and the microbial activities which will in turn help in seed growth. In the real world, SPM would save the production costs dramatically, since farmers will not have to plough the land, irrigate fields, or frequently weed them. Chemicals and pesticides are also removed, also reducing input dependence (Osmet et al., 2024).

From the perspective of democratic resilience, these agroecological practices are not merely technical innovations but form the material foundation for community autonomy. The decrease in the dependence on the externally-provided agricultural inputs means that SPM would increase the control of farmers over the production decisions, which would, in turn, improve their ability to respond to the environmental and economic shocks collectively. This capacity to adapt through locally controlled practices reflects what Merkel (2025) conceptualizes as adaptive democratic resilience, where communities develop self-organizing mechanisms to manage crises without resorting to coercive or exclusionary measures.

From Agroecology to Food Sovereignty: Community-Based Outcomes

Such practices, which are technical and ecological in nature, have brought some socio-economic results. The use of organic fertilizer and

natural ways of controlling pests have enabled farmers who initially experienced scarcity or fair prices of chemical inputs to stabilize the cost of production. Consequently, the SPM also helps in enhancing the local food security as the farmers are no longer subject to the unstable international input and food prices. This finding is in line with those that argue the community-based agricultural practices can empower food sovereignty, autonomy of farmers, and lessen reliance on state-led or corporate-led food policies that marginalizes small producers in most instances (Gordillo & Jeronimo, 2013).

In addition to its direct agronomic advantages, SPM also serves as an example of a community-level model of agriculture that strengthens food autonomy. The grass root innovation not only enables farmers to reap higher economic yields, but also enables them to have more control on land management decisions. This type of autonomy is indicative of the main objectives of food sovereignty, which focuses on the right of the communities to shape their own food system according to the local knowledge, ecological sustainability, and social justice (La Via Campesina, 2021).

In Coxian terms, this shift represents an important reconfiguration of social forces at the local level. Farmers organized around SPM operate as collective agents capable of challenging dominant food regimes that prioritize market efficiency and corporate profit over ecological and social sustainability. While these local practices do not immediately dismantle global food structures, they constitute what Cox (1981) describes as counter-hegemonic social forces that open space for alternative institutional arrangements.

Democratic Resilience and Local Governance Dynamics

SPM provides a concrete illustration of how democratic resilience operates at the subnational level. When community-generated innovations receive institutional recognition and policy support, they create spaces for inclusive and adaptive democratic practices. Democratic resilience, in this sense, is reflected not only in the endurance of formal institutions but in their ability to learn from grassroots initiatives and incorporate them into policy frameworks.

The institutional uptake of SPM by local governments in West Sumatra demonstrates this learning process. The adoption of SPM by three regents and its formal launch by the Governor of West Sumatra in April 2025 illustrate how local governance structures can respond constructively to bottom-up initiatives (Antara, 2025). This

responsiveness enhances democratic legitimacy by recognizing community knowledge as a valid input into public policy, consistent with broader conceptions of democratic resilience that highlight participation, deliberation, and the active role of civil society (Croissant & Lott, 2024).

From a governance perspective, SPM has helped to establish new ways of interaction between farmers, civil society actors, and local authorities. These relations push the limits of participation in democracy past the electoral politics to daily decisions on food production, environmental management, and rural livelihoods. Such practices embody democratic resilience as an ongoing process and not a fixed state of institution.

Climate Change and Food Security Structure: A Coxian Analysis

From a Coxian Critical International Relations (CIR) perspective, food insecurity in West Sumatra cannot be attributed solely to technical challenges posed by climate change. Rather, it needs to be interpreted in larger systems of world power politics and capitalistic production relations (Cox, 1981). International food system is marked by unequal power relations that place the countries in Global South as being reliant on imports, foreign capital, and corporate-controlled agricultural inputs (Cox, 1983).

Although the index of Food Security in West Sumatra is relatively good, the province is still integrated into the food-based regimes of the world, which limit the local freedom. Reliance on imported farm inputs puts farmers at the risk of price fluctuations and supply shocks. National and international markets control prices of seeds, fertilizers, and agricultural tools, whereas market mechanisms are used to control crop prices, which systematically discriminates against small producers. The conditions represent structural imbalances that restrain the capacity of the local food systems to respond.

At the local level, production relations further reproduce inequality. In West Sumatra, a big number of farmers are tenants who are farming on land belonging to others which limits them on their productive resources. According to Coxian perspective, such an arrangement represents interplay between material capacities and institutional structures which maintain the status quo of power relations. These underlying inequalities are often concealed by discourses of food self-sufficiency which emphasize aggregate production only, which form an ideological narrative to legitimize the neoliberal food order and dismiss alternative ways of addressing the problem.

Global–Local Linkages and Structural Constraints

Indonesia is located within global climate governance and international trade regimes which also influence the food security issues in West Sumatra. The attendance of forums like the Conference of the Parties (COP) makes Indonesia a part of the international mitigation and adaptation processes, but its bargaining power is limited by its economic reliance on the export of commodities and food imports. The conditionalities and trade rules advocated by organizations like WTO and IMF also restrict the policy space in protecting the smallholders and encouraging agroecological alternatives (Schlosberg, 2007).

On the domestic level, the responses of the state to the climate and food crisis tend to be technocratic and large-scale programs such as land conversion schemes or food estate projects frequently discriminate the smallholders and indigenous people by restricting them to land and resources. These policies as viewed through the CIR lens are reproduction of dominant ideas and institutional settings that are in line with global market logics, and not community-driven resilience strategies.

Local initiatives such as SPM demonstrate how community agency can respond to structural constraints in transformative ways. The SPM can help farmers to regain control of production processes as well as re-establish collective capacity through reducing dependency on corporate agricultural inputs and improving food sovereignty. The fact that the local governments have institutionalized SPM is a confirmation that the democratic resilience is not just manifested in their ability to endure crises but also in their willingness to learn policies by adopting bottom-up policies and being adaptable.

In the Coxian model, SPM is a structural evolution of embryonic nature. Although small in size, such projects provoke the mainstream food regimes by reorganizing the correlation between material practices, the concept of sustainability, and institutional reactions. This enhances the role of social forces on the local level through SPM, which brings about a progressive process of counter-hegemonic transformation where ecological sustainability is coupled with democratic participation. On the whole, the results suggest that community-based food security governance is very crucial in creating democratic resilience. By actively participating, learning together, and interacting with the local institutions, farmers who participated in SPM transition into active participants of food and climate governance, instead of mere recipients of

the policy. This change highlights the significance of basing climate adaptation and food security policies on locally enshrined democratic actions with the capacity to address structural limitations as well as environmental issues.

Previous explanation can be summarized in the following Figure 1.

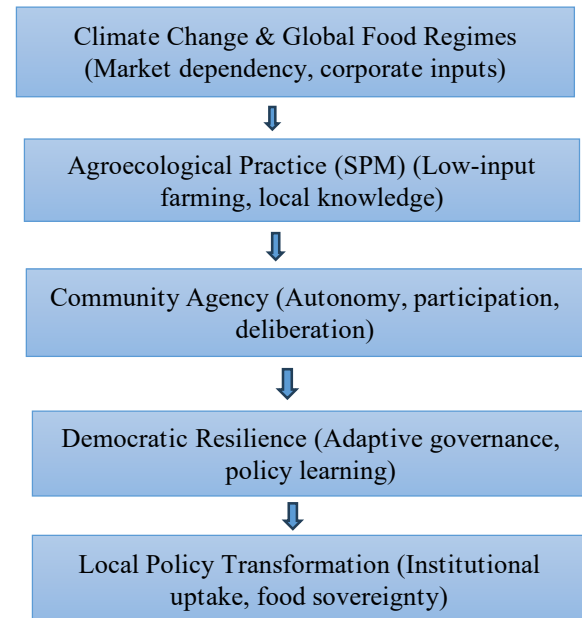


Figure 1. Coxian Model of Agroecology, Democratic Resilience, and Structural Transformation

CONCLUSIONS

In West Sumatra, food security and climate change adaptation are not sufficiently perceived in a strictly technical perspective where emphasis is put on the measure of production output or self-sufficiency. Food security, as it can be seen in this paper, is entrenched in the wider structural circumstances informed by the global political-economic factors, the local relations of production, and the hegemonic policy discourses. In Coxian Critical International Relations, unequal food regimes around the world, corporate domination of agricultural inputs, and low bargaining power of the developing nations remain to limit the local food systems and intensify vulnerabilities, especially to the smallholder farmers. The results indicate that although the West Sumatra has a relatively high food security index, structural reliance on world markets and agricultural inputs that are controlled by corporations is a constant source of vulnerability. Climate change also magnifies these vulnerabilities by increasing the environmental risk and at the same time, unequal access to resources and control over decisions. In this regard, agroecological projects like Sawah Pokok Murah (SPM) cannot be perceived as alternative production methods, but as a form of local agency that can confront the

dependency and develop more resilient food systems. This research paper makes a contribution to the body of literature because it shows how community-based agroecological activities can be viewed as both climate change adaptation and democratic resilience mechanisms. Using SPM, farmers can not only minimize the cost of production and environmental risks, but regain control over land management and agricultural decisions.

The institutional uptake of SPM by local governments illustrates how democratic resilience is enacted through responsiveness to grassroots innovation, policy learning, and inclusive governance at the subnational level. Theoretically, this research advances debates on democratic resilience by grounding the concept in everyday practices of participation and community organization, rather than treating it solely as a macro-level institutional attribute. The paper connects democratic resilience with Coxian Critical International Relations, demonstrating how bottom-up initiatives may work within and potentially reorganize larger political-economic restrictions. This integrated perspective offers a more nuanced understanding of how democratic governance can emerge from local responses to climate and food crises.

From a policy perspective, the results indicate that food security policies can no longer adopt a technocratic and top-down intervention approach but rather acquire a policy that embraces and empowers local solutions. To make democracy more resilient, it is necessary to build institutional spaces in which local knowledge, agroecological practices, and participation of farmers can have a significant role in the design and implementation of policies. In the absence of such inclusiveness, food security initiatives risk reproducing existing inequalities and undermining their own long-term sustainability.

Several limitations of this study should be acknowledged. The findings are situation-specific and cannot necessarily be generalized to other regions as it is a single-case qualitative analysis. Future studies can further this analysis by conducting comparative analysis across provinces or nations, or by using quantitative indicators of participation, institutional uptake, and impact of the policies. The analysis of long-term viability of grassroots initiatives after institutionalization would enhance the knowledge of the connection between local agency and structural change as well.

To sum up, as seen in the Sawah Pokok Murah experience, food security and climate change adaptation are inseparable from questions of power, participation, and justice. In the Critical International Relations

approach, food security is not only to be understood as the ability to survive within the established systems, but as a social capacity to transform food systems to be more ecologically sustainable, more democratic, and more socially just. This paper highlights the strategic significance of local agroecological projects as the basic building blocks to more just and resilient food systems in the face of escalating global climate and economic challenges.

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