

# **Entangled Fishermen: Fishing Industry and The Evolution of Anti-nuclear Power Plant Movements in Japan**

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## **ABSTRACT (150 words)**

While Japan boasts the most advanced nuclear power plant program in the world, residents have long resisted attempts to site nuclear facilities in their backyards. This article analyzes the conditions that have influenced the outcomes of these movements since 1960. The analysis of a dataset spanning 32 towns' movements shows that the existence of capital-intensive fishing was detrimental to movement success. This occurred because (1) capital-intensive fishing breeds a dominant boss, thereby inducing a vertical decision-making structure in fishing cooperatives; (2) resulting movements led by a single leader create identifiable targets for pro-nuclear groups; and (3) offshore fishing is susceptible to changes in the external environment. Comparisons with movements involved in latter projects indicate that shifts in the design of their movement leadership and demographics have offset the disadvantage. This study helps to understand the relationship among the resilience of movements, organizational structures, and the relative size of key stakeholders.

## **INTRODUCTION**

The relationship between the outcomes of Japan's nuclear power construction projects and the characteristics of towns and their anti-nuclear power plant residents' movements has attracted continuous interest among utilities, citizens, politicians, and scholars of Japanese politics. Records and studies point to the different conditions of towns and characteristics of movements as sources of movement success and failure. For instance, records involving earlier construction projects such as the Fukushima Daiichi Nuclear Power Plant project, revealed in 1960, argue that lower agricultural yields in the districts earmarked for construction generated weak movements (JAIF 1970, 1984). In addition to the low agricultural yields, records on the Hamaoka nuclear power plant project in Shizuoka prefecture highlight the loss of fishing rights prior to receiving the construction proposal in 1967 as a reason for their movement to fade away in three years (Takeuchi 2014).

On the other hand, movement records involved with the latter periods of construction projects, including Kumano City, Mie, and Kubokawa Town, Kochi, which received construction projects in 1969 and 1980, respectively, argue that the inclusion of conservative residents in their movements was a source of their movement successes (Sanki District Labor Union 1999, Leblanc 2010, Shimaoka 2015). The anti-nuclear residents learned that in any residents' movements, including their movements taking place under the democratic polity characterized by one-party dominance by the Liberal Democratic Party (Kitschelt 2000, Scheiner 2005), local conservative residents are indispensable; they serve as a critical engine to bolster the momentum in their movements (Nakai 2016).

These studies are part of the collective scholarly attempts to understand Not In My Backyard (NIMBY) politics, which is the conflict process that unfolds between governments and private companies attempting to construct facilities that serve to increase public good provision for broader society and the residents who receive heterogeneous risk by hosting these facilities (Japan: Dusinger 2012, Nagai et al., 2015, France: Sebastien 2014, US: Dokshin 2015). These studies tend to rely on case study methods focusing on a handful of sites to describe or explore the causal relation of characteristics of each town and the outcomes of the movements. They do so at the expense of the generalizability of their claims. In other words, these studies provide important hypotheses that could develop into theories after being tested by quantitative and qualitative analysis.

Additionally, studies using a few isolated cases make it challenging to identify how pro-nuclear groups, including the government and utilities, and anti-nuclear groups, mainly residents, have adapted their siting and movement strategies over time by learning lessons from previous construction attempts in other locations. The government of Japan promoted the siting and construction of nuclear power plants in anticipation of increased electricity demand resulting from high economic growth that began in the mid-1950s and ended in the 1970s. It would be reasonable to assume that there were some changes made within both the pro-nuclear groups including the utilities and the government, and anti-nuclear groups, mainly residents. Aldrich, one exception, used quantitative and qualitative analysis on data across time and locations, arguing that sustained social resistance forced the government of Japan to move away from deploying riot police and instead develop a vast compensation scheme. That scheme, the subsidy system known as the Three Laws for Power Development, allows the Japanese government to send several billion yen to municipalities in exchange for hosting nuclear power plants (Aldrich 2008). While Aldrich's research covers the changes in macro-level government policies, none of the research, to my knowledge, grappled with changes in the micro-level domain, that is, how Japan's anti-nuclear power plant movements evolved their strategies.

In this article, I address two questions. First, I investigate how the conditions of towns and the characteristics of movements impacted the success and failure of Japan's anti-nuclear movements from the 1960s to the 2000s. Second, I provide evidence that learning was not limited to the government; residents' movements refined their strategies by learning from past projects in other towns. To answer these questions, I employ multi-methods qualitative approaches, specifically fuzzy set qualitative comparative analysis (fs/QCA), utilizing a new dataset derived from fieldwork in seven towns, 30+ interviews, and archival research on movement records in 32 towns. This approach aims to illuminate the relationship between six conditions and the success and failure of anti-nuclear power plant residents' movements. Following this analysis, I conducted three comparative case studies to validate the results of fs/QCA and to track the change in movement strategies.

As records by activists suggest, it is highly likely to be proven that the latter anti-nuclear movements also succeeded through the coordination between conservatives and progressives. However, other factors that impacted the outcomes of anti-nuclear movements have not been examined; the presence and absence of multi-partisan coordination does not account for all the variation in the success and failure of their movements. Particularly, the construction projects of

nuclear power plants are different from the construction of facilities that potentially cause NIMBY reactions, such as railroads or industrial waste incineration facilities; these projects do not involve compensation for fishing cooperatives.

It is also different from constructing hydroelectric and thermal power plants that include compensation for fishing cooperatives. First, the nuclear power plant accident inflicts impacts on incomparably wider areas and populations. Second, due to the size of potential impact, the government of Japan developed a scheme to send several billion yen to host communities of nuclear power plants. It is likely that these features of nuclear power plants may have generated additional factors that impact the outcomes of movements, and thus are central to this research. Indeed, the results of sufficiency analysis show that movements in towns known for capital-intensive fishing tended to fail at an overwhelming rate. Comparing data from the 1960s and 1970s, however, this dynamic may have shifted due to the intentional design of movement strategies in fishing cooperatives and the absolute and relative decline in the population of fishermen in towns.

This study contributes to theorizing two aspects that have not received much attention in the literature on social movements. First, it explores the relationship between the character of social movement organizations (SMOs) in towns and their major industries. The organizational structure in SMOs mirrors those of key stakeholders in major industries. The anti-nuclear power plant movements in fishing towns where they held capital-intensive fishing tended to fail because offshore and set-net fishing induced vertical decision-making structures in their SMOs, resembling their organizational structure. When bosses of offshore and set-net fishing leaned towards accepting nuclear power plants due to the oil shocks, the introduction of exclusive economic zones, and the poor catch during the 1970s to 1980s, the momentum of movements was significantly dampened. On the other hand, fishing towns where they engage in less capital-intensive fishing, such as aquaculture, induced horizontal decision-making processes, reflecting existing social relations in their fishing cooperatives and towns. These aquaculture fishing towns produced movements led by small, diverse leaders who held their own means of life through independent aquaculture business.

In addition to the organizational character of key stakeholders and industry, towns known for one industry are already placed in a more disadvantageous position than ones with diverse industries. Much like the trajectory of the offshore fishing industry, residents in the Akasumi district of Shika town, known for its seafaring community, agreed to sell their land for the plant after the government of Japan relaxed regulations on foreign ship crews working in Japanese foreign trade ships (Asahi 1992). These towns became vulnerable when the recession hit their industry. Thus, offshore fishing towns faced dual setbacks: concentration on one industry and vertical decision-making structures within key stakeholders. When one major industry sustains the livelihood of many, the industrial structure that induces horizontal relations among stakeholders becomes more critical.

Secondly, the changes in movement strategies and the decline in the population of fishermen altered this dynamic. For instance, members of the anti-nuclear movement in Suzu City, Ishikawa Prefecture, asked local fishing cooperatives to select leaders for their movement organizations from fishermen who were neither the actual leader of the fishing cooperatives nor the owners of large fishing vessels. In Miyama, due to the severe decline in the proportion of

fishermen, their anti-nuclear movement, once led by fishermen in the 1960s, was led by residents in 2000, offsetting the disadvantage of offshore fishing. These movements succeeded even in towns that operated high capital-intensive fishing, while none of the movements in these towns that received construction projects in the 1960s succeeded.

## **BACKGROUND: NUCLEAR POWER PLANT PROJECTS AND THREE MILESTONES**

During Japan's rapid economic development periods from the mid-1950s to the 1970s, the government of Japan promoted the siting of nuclear power plants in anticipation of increased electricity demand, resulting in the construction and operation of 54 nuclear power plant reactors across 22 municipalities right before the Fukushima Daiichi Nuclear Power Plant meltdown on March 11th, 2011. Simultaneously with the first peak of the construction projects in the mid to late 1960s, some residents started to worry about the safety of the nuclear power plant projects by observing accidents. For instance, the leader of the anti-nuclear movement in Namie Town, Fukushima Prefecture, Masukura Takashi, worked as a temporary maintenance worker in the first reactor of the Fukushima Daiichi Nuclear Power Plant, which had been in operation since 1971, to gauge the risk and safety (Onda 1991).

In response to the growing concerns among citizens about domestic and international nuclear accidents, scientists and activists founded an NGO, the Citizens' Nuclear Information Center in 1975. It archives records on nuclear power plant projects across Japan and serves as a hub connecting residents who participate in anti-nuclear power plant movements in their towns. Additionally, the meltdown of Fukushima Daiichi Nuclear Power Plant on 11th March 2011, has increased momentum among some Japanese residents towards initiatives that sustain community memory. Consequently, residents began to publish records and diaries of their towns' anti-nuclear power plant movements from the 1960s to the 2000s.

These records show that the electric companies and the government approached as many as 70 municipalities with hopes of building nuclear power plants in their towns. The number remains unclear because there are no concrete records left for 30 projects, and some of them were retracted due to the quality of ground or were rejected by veto players (Tsebelis 2002, Hymans 2015) such as mayors sometimes even before anti-nuclear power plant movements materialized. Conversely, if nuclear power plant projects were not rejected due to these factors, residents mobilized some forms of anti-nuclear power plant movements in almost every town. Across Japan, 22 municipalities accepted nuclear power plants while more than 32 municipalities rejected them.

When utilities draft nuclear power plant siting proposals, they need to ensure that candidate sites meet technological and geographical criteria. Nuclear power plants need to be placed along shorelines or rivers to take in and discharge cooling water and close to large seaports to facilitate the transportation of construction equipment. In addition, the pro-nuclear industry forum argues that they ought to be built in locations with sturdy ground not susceptible to earthquakes (Japan Atomic Energy Agency 2007). Finally, construction proposals regularly go to towns and villages experiencing depopulation (Aldrich 2008). After passing these criteria, the electric utilities need to achieve 3 political milestones to build a nuclear power plant: land acquisition, buying out fishing rights, and consent from nearby communities (Nishio and Ban 2016). As with other facilities,

nuclear power plants require a large amount of land but also need agreement from local fishing cooperatives which would lose a large part of their fishing rights and various forms of agreement from communities often represented by a majority vote of town council members. While acquisition has been initiated concurrently, the utilities and municipal government office regularly achieved these milestones in this order.

Both anti-nuclear and pro-nuclear groups fought over these three milestones. When all three milestones are achieved by the utilities, it indicates the defeat of the anti-nuclear movements. One of the participants in the anti-nuclear power plant movement in Suzu city, Ishikawa prefecture, used the analogy of soccer to illustrate the characteristic of their movements. The decision of landowners and fishermen that do not sell lands and fishing rights serves as goalkeepers and defenders who protect first and second milestones. On the other hand, elected anti-nuclear power plant city council members play the role of forwards; the third milestone is used as leverage to launch anti-nuclear residents' offense. Electing anti-nuclear candidates in the prefectural council allows them to serve as midfielders who bridge defenders and forwards (Kitano 2005).

## **RESEARCH DESIGN: MULTI-METHODS QUALITATIVE APPROACHES**

To test the relationship between conditions of towns and movement strategies employed at three milestones and the outcomes of anti-nuclear movements, as well as to identify changes in movement strategies, I designed a research framework based on multi-methods qualitative approaches. These approaches included archival research, fieldwork, interviews, and fuzzy set qualitative comparative analysis (fs/QCA). Initially, I conducted archival research and reviewed existing literature to generate hypotheses and determine the selection of data to collect. Subsequently, I refined these hypotheses through fieldwork and interviews, discarding trivial ones and focusing on more significant ones while also identifying potential data to support them. I then proceeded to construct a dataset for fs/QCA and conducted the analysis.

The findings of the fs/QCA analysis were further substantiated and contextualized through three comparative case studies. It is worth noting that the research process was iterative, particularly between archival and fieldwork research stages, as suggested by Ragin, who notes that QCA involves a back-and-forth movement between theories and cases (Ragin 2000). Based on the archival research and fieldwork, I collected two sets of data for each milestone, 6 sets of data in total. These data, hypotheses, and measurement methods are discussed in detail in the following section.

To identify changes in movement strategies, I conducted fieldwork in seven municipalities that received nuclear power plant construction proposals or had town governments resolve to attract such plants over time. Five towns—Nanto, Miyama, Onagawa, Hamaoka, and Shika-Togi—received proposals in the 1960s, while three towns—Kumano, Suzu, and Miyama—received proposals or the majority of their town councils endorsed after the 1970s. Miyama appears as a town that was involved with construction projects in both the 1960s and after the 1970s due to its involvement with the projects in 1963 and 2001. With a focus on conditions that either strengthened or weakened residents' movements, I designed fieldwork to cover municipalities where movements succeeded (Nanto, Miyama, Kumano, and Suzu) and failed (Onagawa,

Hamaoka, and Shika-Togi). At each fieldwork site, I conducted semi-structured interviews with an average of four anti-nuclear residents. These informants included participants in the movements, fishermen, farmers, their spouses, members of labor unions, local council members, journalists, and academics.

Additionally, I conducted two interviews with pro-nuclear residents and local council members to supplement perspectives from pro-nuclear factions. Before visiting the fieldwork site, I prepared roughly 10 questions reflecting common factors related to nuclear power plant planning and residents' movements, along with another 10 questions intending to capture characteristics specific to each town's conditions. In total, I conducted more than 30 interviews, with interview lengths ranging from one to three hours each. Following the principles of Human Subject Research Protection and in compliance with the exempt category of review from the Institutional Review Board at the University, I ensured that participant information was either hidden or modified unless participants agreed to disclose their actual identifiers, such as their names and job titles. There was no financial compensation made to informants. I found that the likelihood of informants to experience conflicts of interest and violations of ethics are very low. Rather, their involvement in this study helped them to better understand important interactions between residents and pro-facility groups. During the write-up period, I received a semester fellowship from the University.

## **HYPOTHESES: SIX SETS FOR THREE MILESTONES**

The first and second sets include the amount of sales in crops per farmer and catch per fisherman which correspond to the first and second milestones, respectively. Records of the anti-nuclear power plant residents' movement in Namie, Fukushima Prefecture, and Kubokawa Town, Kochi Prefecture, attribute the success of their movements to higher agricultural sales per farmer (Onda 1991; Shimaoka 2015). When utilities targeted districts with fertile rice paddies yielding higher crop amounts or towns boasting agricultural prominence, landowners and farmers established strong anti-nuclear power plant movement organizations out of fear of losing fertile lands and experiencing declines in agricultural commodity prices. In addition, data on catch per fisherman is included, for two reasons deemed more important than agricultural data.

First, nuclear power plant proposals tend to target coastal towns known for fishing rather than agriculture. Secondly, and perhaps more importantly, compensation for fishermen due to the loss of fishing rights tends to be larger than for landowners facing land loss. While land acquisition occurs in a one-time transaction, utilities must compensate the fishing cooperative each time they add a nuclear reactor to the site for the loss of fishing rights in additional sea areas. The increase in cooling water leads to an expansion of the area where fishing rights are given up (Interview by author 2019).

The third data falls within the second milestone, which pertains to whether a "boss" existed in the fishing cooperatives in neighboring towns that received construction proposals. While each fishing cooperative appoints a leader, the distinction between a boss and a leader depends on the ability of fishermen to express opposing views. According to a study on stratification in a fishing village, the prestige of a family is correlated with the scale of the fishing business that the family holds rather than its establishment in the past (Tahara and Tanosaki 1955). When one or a small

number of families engage in offshore and set-net fishing with large ships, many fishermen are employed by the breadwinner of this family, known as the fishing boat boss/net-holding boss (*funanushi/aminushi*). His opinion in the fishing village carries considerable weight (Sanki District Labor Union Center 1999), and employed fishermen (*funako/amiko*), cannot dissent, leading to the emergence of a boss rather than a mere leader. When a boss leaned toward accepting a nuclear power plant, true preference held by employed fishermen tended to be disregarded. To measure the existence and proportion of capital-intensive fishing in a town, I collected data on the average weight of one ship with engines from governmental fishing statistics dating back to the 1960s and continuing into the 2000s. This measure serves as a considerably precise indicator of capital-intensive fishing because even with just a few vessels, the presence of offshore fishing ships significantly elevates the average weight of ships in fishing cooperatives.

The fourth set falls within the first milestone: co-ownership of landmass. This approach represents residents' efforts to strengthen their defense against land acquisition maneuvers by utilities and municipal governments. Land acquisition is the starting point for utilities and governments; without landmass, they cannot construct nuclear power plants, regardless of agreements on compensation for the loss of fishing rights or community consent. When utilities began acquiring land under co-ownership agreements, they realize that they need approval from all individuals involved, leading to delays or the loss of will among employees of the utilities to construct a nuclear power plant. Residents followed the principle of "the best defense is a good offense." Based on interviews and archival data, it is found that the effectiveness of this strategy increases with both the relative and absolute size of shared landmass. However, even if it constitutes only a small percentage of the entire nuclear power plant site, it can halt (Kuwabara 2023), or significantly delay construction in many cases. Although data on the size of shared land was not available, information on whether anti-nuclear power plant residents' groups in a town adopted a land-sharing strategy was collected and coded as binary data.

The fifth and sixth set capture the third milestone, which is consent from communities, through two approaches: referendums and partisanship of social movement organizations. The government of Japan acknowledges that its citizens have the right to make direct claims to complement the indirect and representative democratic system. Japanese voters can recall mayors and council members of their towns, call for the dissolution of town councils, and enact town ordinances. Anti-nuclear movements such as those in Maki town in Niigata prefecture and Nanto town in Mie prefecture, have shown that movement strategies based on direct democratic measures have brought victories to them. In addition, records written by residents and literature indicate that the partisanship of leadership in SMOs and the coordination between the conservatives and progressive residents influences whether movements gain momentum in their towns. (Nakaaki 1996; Leblanc 2010). Thus, I collected data on whether movements enacted referendums as well as the partisanship of leaders in the social movement organizations.

## **DATA AND MEASUREMENT**

Records show that approximately 50-70 municipalities received nuclear power plant plans from prefectural offices and electric companies during the 1960s to 2000s. Among them, around 30 cases left few or virtually no written records of the planning and the resulting social movements. Reasons for cases with scarce records vary, but common characteristics are that these nuclear

power planning efforts fell through within a year due to the existence of an anti-nuclear mayor, strong anti-nuclear movements by fishermen and farmers, and/or the results of borehole investigations showing weak foundations, making the location unsuitable for siting. Excluding these cases leaves, at most, 40 cases. Among these 40 cases, qualitative and quantitative data were collected on six critical conditions that strengthened and captured the strength of the social movement. There are 32 cases that left records of all six conditions, and a QCA dataset was created based upon them. Table 1 shows the list of municipalities with the names of companies that proposed construction plans, the year municipalities received construction proposals, the year construction planning has ended, and the results of anti-nuclear power plant movements.<sup>12345</sup>

In sum, each municipality data unit contains six sets capturing three milestones: average agricultural yield per farmer (CROP), the existence of residents' strategy, co-ownership of land (LAND\_SHARE), the average catch of fish per fisherman (CATCH), the average weight of the fishing ship (SHIP\_WEIGHT), the existence and type of referendum (REFERENDUM), and the partisanship of movement organization (PARTY\_ORG). Three continuous sets of data — average agricultural yield, fishery yield, and the weight of ship—are calculated by the author based on the World Agricultural Census Municipal Statistics Table and Coastal Fisheries Interim Survey in 1960, which provide more accurate data (Ministry of Agriculture, Forestry, and Fisheries, 1960, 1961). When there were multiple fishing cooperatives in a town, the sum of catch across all fishing cooperatives was divided by the number of fishermen in all fishing cooperatives to calculate the average catch. Similarly, the sum of ship weights in all fishing cooperatives was divided by the number of ships in all fishing cooperatives to calculate the average weight of the ship. Considering that many neighboring fishing cooperatives receive compensation in exchange for accepting nuclear power plants, data from all fishing cooperatives in a town should be used, rather than data from only one fishing cooperative closest to the planned site. To check the robustness of the average yield of crops, I calculated the average of crops in a town and in a town district earmarked for nuclear power plant siting. Conversely to fishing, district-level data is more important than town-level data for agriculture because only residents who live in the district lose landmass and receive compensation.

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<sup>1</sup> START shows years when newspaper companies scooped on the projects, town councils adopted the petition for the environmental impact assessment, or revealed the resolutions of the attraction, whichever the earlier. END shows years when nuclear power plants started to operate, utilities announced the suspension of projects, or towns deleted a word of nuclear power plant in town' development planning.

<sup>2</sup> In Suzu city, Kansai, Chubu, and Hokuriku initially planned a joint construction project.

<sup>3</sup> In Miyama town, there were a few rounds of the siting attempts. The author could not locate the record regarding the first round that started in 1963. This article only discusses the last round.

<sup>4</sup> In Miyama town, the pro-nuclear town governor initiated a referendum, marking the only instance of a referendum called by a pro-nuclear group. Not surprisingly, the result favored the anti-nuclear residents, mirroring the outcomes of other towns that conducted complete referendums.

<sup>5</sup> The Fukushima Daiichi Nuclear Meltdown halted two ongoing projects: Oma and Kaminoseki. I coded the result of movements in Oma as 0 and Kaminoseki as 1, based on progress in construction. At Kaminoseki, land reclamation had been underway, but actual construction of the plant had not started.



The data on movement organization and referendum were coded into three levels (1, 0.67, 0) and four levels (1, 0.67, 0.33, 0), respectively. Social movement organizations in municipalities received the lowest membership score, 0, when the movements were led by progressive leaders, 0.67 when they held diverse leadership encompassing both influential conservative and progressive residents, and 1 when their movements appointed conservative residents as leaders. Referendums in municipalities received the lowest score, 0, when referendums were absent, 0.33 when partial, district-level referendums were voluntarily coordinated by residents, 0.67 when residents succeeded in making municipal governments create towns' ordinances on referendums for nuclear power plant construction, and 1 when referendums were conducted. The existence of a strategy of co-ownership of land was coded as a binary condition, 0 indicates the absence of land-sharing strategy while 1 indicates the existence.

After coding these conditions, an iterative process of visual inspection, testing of skewness, and calibration of scores were conducted following the protocol by Oana et al. (2021). Oana et al. recommend that when data are categorical, there should generally be at least 20% of the data in each category. This dataset largely meets their recommendation, except for the data for the referendum, due to the small number of referendums that occurred in municipalities. However, merging levels in referendums will cause a loss in the nuances among different types of referendums.

Table 1: List on 32 Japan's Municipalities Involved with Nuclear Power Plant Projects and the Results of Anti-Nuclear Residents' Movements

No.	MUNICIPALITY	PREFECTURE	COMPANY	START	END	REJECT
1	Oguma	Fukushima	Tokyo	1961	1971	0
2	Futaba	Fukushima	Tokyo	1961	1971	0
3	Tsuruga	Fukui	Genden	1962	1970	0
4	Mihama	Fukui	Kansai	1962	1970	0
5	Nanto	Mie	Chubu	1963	2000	1
6	Sendai	Kagoshima	Kyushu	1964	1984	0
7	Higashidori	Aomori	Tohoku	1965	2005	0
8	Matsue	Shimane	Chugoku	1966	1974	0
9	Genkai	Saga	Kyushu	1966	1975	0
10	Takahama	Fukui	Kansai	1966	1974	0
11	Togi	Ishikawa	Hokuriku	1967	1993	0
12	Shika	Ishikawa	Hokuriku	1967	1993	0
13	Hamaoka	Shizuoka	Chubu	1967	1976	0
14	Kodaka	Fukushima	Tohoku	1967	2013	1
15	Namie	Fukushima	Tohoku	1967	2013	1
16	Onagawa	Miyagi	Tohoku	1968	1984	0
17	Obama	Fukui	Kansai	1968	1976	1
18	Tomari	Hokkaido	Hokkaido	1969	1989	0
19	Maki	Niigata	Tohoku	1969	2003	1
20	Kashiwazaki	Niigata	Tokyo	1969	1985	0
21	Kariwa	Niigata	Tokyo	1969	1985	0
22	Ikata	Ehime	Shikoku	1969	1977	0
23	Oi	Fukui	Kansai	1969	1979	0
24	Houhoku	Yamaguchi	Chugoku	1971	1978	1
25	Kumano	Mie	Chubu	1971	1987	1
26	Suzu	Ishikawa	Joint	1975	2003	1
27	Kumihama	Kyoto	Kansai	1975	2006	1
28	Oma	Aomori	Dengen	1976	2030	0
29	Kubokawa	Kochi	Shikoku	1980	1988	1
30	Kaminoseki	Yamaguchi	Chugoku	1981	2024	1
31	Kushima	Miyazaki	Kyushu	1992	2011	1
32	Miyama	Mie	Chubu	2001	2001	1

## RESULTS

Table 2 shows the results of sufficiency analysis. The visualization of the sufficiency plot in Figure 1 reveals that the parameter of fit surpasses the thresholds of consistency ( $\text{inclS} = 1 > 0.75 \sim 0.8$ ), proportional reduction inconsistency ( $1 > 0.5$ ), and a small number of deviant cases in kind, allowing me to gauge the empirical relevance of set relations. It reveals three different sufficient terms. When combined, these terms explain 66.9% of the occurrence and non-occurrence of Y, with coverage sufficiency ( $\text{covS}$ ) = 0.669. Three terms show support for several hypotheses regarding conditions that led to the success of movements: (1) Municipalities where residents generated movements based on multi-partisan coordination or placed influential conservative figures in leadership. (2) Municipalities where the average weight of fishermen's ships is lighter

(3) Municipalities where residents conducted land sharing of planned construction sites and took on referendums.

While I assumed that movements in municipalities with a high average catch per fisherman and crop yields per farmer tended to succeed in rejecting nuclear power plant projects, the results show that both conditions did not support these hypotheses. Conversely, it shows that municipalities with a smaller catch of fish tended to see successful movements. This is probably analogous to multicollinearity in regression. Some municipalities with higher average catches of fish tended to operate capital-intensive fishing that used large vessels. These results may indicate that the internal hierarchical structure of the fishing cooperative and susceptibility to changes in the external environment were more important than the average catch of fishing. For agricultural yield, I ran three different models using data on primary products: agricultural yield alone, both agricultural yield and catch of fish, and the sum of average yield and catch. None of the models revealed results that support the relation between agricultural yield and the fate of the movements, unlike the conjectures put forth by movement records. I discuss this point further in the limitations section.

Table 2: Logical Minimization of Truth Table for REJECT

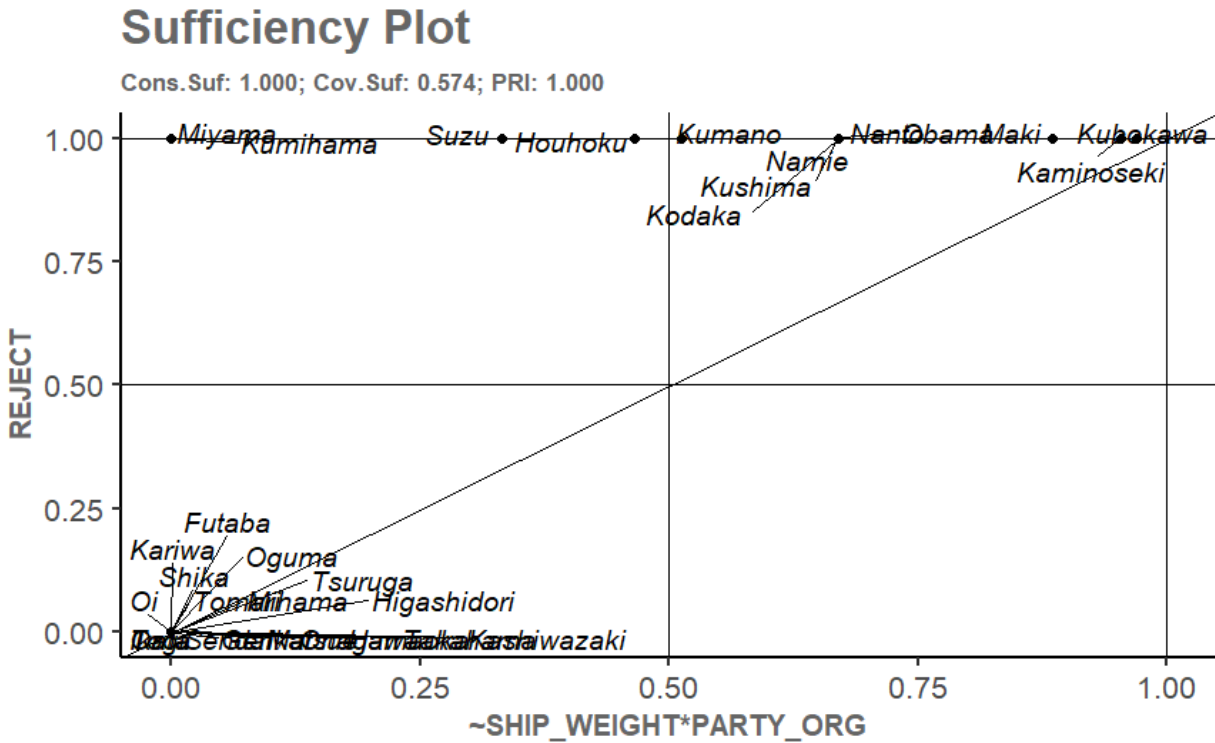
	inclS	PRI	covS	covU
$\sim$ CATCH*PARTY_ORG	1	1	0.481	0.032
$\sim$ SHIP_WEIGHT*PARTY_ORG	1	1	0.574	0.137
LAND_SHARE*PARTY_ORG*REFERENDUM	1	1	0.205	0.049
Solution	1	1	0.669	

Figure 2 shows a radar chart of the results. In combination with the result, a radar chart is useful to identify which terms are most frequently included in sufficient conjunctions. The partisanship of leadership in SMOs appears in all three sufficient terms, indicating that it was indeed critical to the success and failure of the anti-nuclear residents' movements as qualitative studies and the record expect. The absence of capital-intensive fishing, indicated by lighter weight of ships, was also critical; the coverage sufficiency of sufficient terms including the average weight of a ship shows the highest score (0.57) in the model. Finally, land sharing of planned sites and referendums were also effective. The third term covers the least to explain set relation, due to the limited number of municipalities having conducted any forms of referendums.

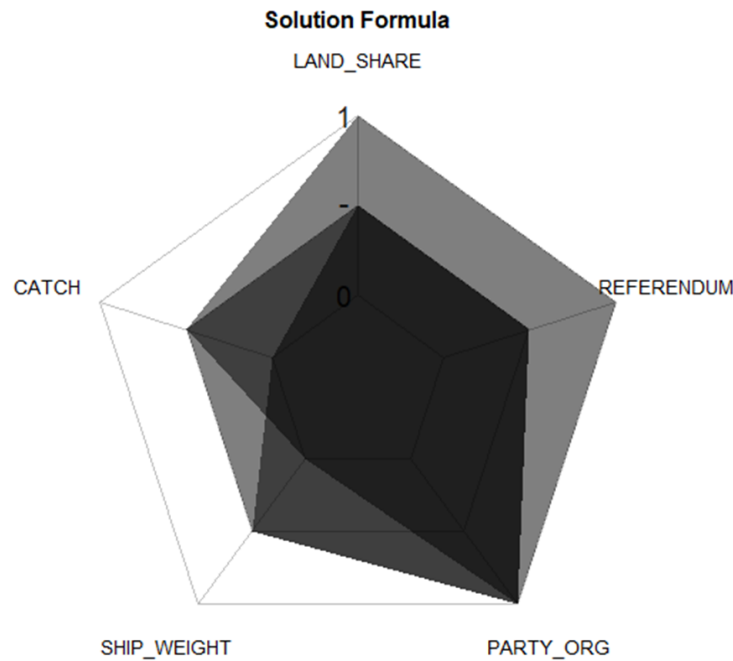
To contextualize how the capital intensity of fishing businesses influenced the strength of anti-nuclear movements, I conducted three comparative case studies based on fieldwork that explains the variation in the success and failure of the anti-nuclear movements. First, the comparative studies on Onagawa and Nanto compare the same periods but different locations. It illuminates the tendency of capital-intensive fishing to affect the long-term movement resilience against buying-out tactics by electric companies and governmental offices. The second comparative study between Suzu and Shika-Togi is based on the comparison between closely located towns in the same prefecture but the different time periods. It shows that the latter movements diversified the leadership of key stakeholders, worrying that a prominent leader would be an ideal target for pro-nuclear groups. The third comparative study of Nanto and Miyama is

based on the comparison of the same location but different time periods and the comparison of changing processes between them. It shows that the severe decline of fishermen in Miyama town resulted in the transformation of their anti-nuclear movement. These latter movements indicate that the intentional design of leadership of key stakeholders and unintended changes in demography have potentially offset the disadvantages of capital-intensive fishing.

**Figure 1: Sufficiency Plot**



**Figure 2: Radar Chart**



### **THREE COMPARATIVE CASE STUDIES**

#### **SHOCKS IN FISHING COOPERATIVE: ONAGAWA (1968) AND NANTO (1963)**

Onagawa town and Nanto Town were mirror images of each other, except for one condition. Both were fishing villages: they host ria coasts, which are deeply indented coasts formed when mountain ranges directly meet the sea. The ria coast offers good fishing grounds because nutrition from the mountains is directly carried to local seas by rainwater. The high depth of the sea near ria coasts also serves as an ideal location to build a seaport that can anchor large ships and set up aquaculture rafts. However, the ria coast is not suitable for farmland. For instance, only six households in Onagawa are full-time farmers out of approximately 400 households that run farmland; the breadwinners of these households were fishermen making a living from fishing while managing a tiny farmland on the side, solely for their self-consumption (Miyagi Prefectural Agricultural Census 1960). Typically, nuclear power plant planning that targeted towns with a ria coast generated strong anti-nuclear power plant movements by fishermen who worry about potential radioactive contamination to their catch if an accident occurs. Additionally, the rise in seawater temperature, accompanied by heated water discharge from the power plants, reduces the catch. On the other hand, electric companies were able to conduct land acquisition for a shorter amount of time because they buy barely used woodlands that are sold at a cheap price during ordinary times, at several times higher rates.

Indeed, the statistics of Onagawa and Nanto show that their agricultural yields have been low, but the catch of fish per fisherman is high in the dataset. Tohoku Electric Power Company and Miyagi Prefectural Office achieved their first milestone with ease. They could buy out the land of Onagawa within two years after the time that Onagawa town council resolved to attract nuclear power plants in 1968 (Shinohara 2019). Chubu Electric Power Company could buy out the landmass of Nanto town even more quickly: land acquisition maneuvers were already done in secrecy before the Nanto town council revealed the resolution of nuclear power plant attraction in 1963. While the anti-nuclear residents' movements lacked the means to resist the planning through leveraging the first milestone, fishermen played a central role in the anti-nuclear residents' movement for 17 years in Onagawa and 38 years in Nanto. While fishermen in Nanto and Onagawa town showed strong and consistent anti-nuclear residents' sentiment, the movement in Onagawa ultimately failed and it hosted a nuclear power plant, whereas Nanto town succeeded, raising a question on what condition impacted the strength of and resulting fate of their movements in towns that share similar geographic characteristics and industrial foundations. A fisherman and activist, Nakabayashi argues that the size of the ship had a large influence on determining the attitude on nuclear power plant planning.

Among the seven seaports in Nanto town that form their own fishing cooperatives, only one fishing cooperative, Nishiki, agreed to nuclear power plant siting, while the other six fishing cooperatives declared opposition to the plant. The difference between Nishiki and the other six fishing cooperatives was that Nishiki hosted offshore convoy-style purse seine fishing ships ranging from 200 to 300 tons, while the rest relied on pearl aquaculture operated in small ships ranging from two to three tons. Nakabayashi explains that Nishiki's offshore purse seine fishing had been operated by employed fishermen, and a fishing boat boss who employs them (Nakabayashi 1982). The employed fishermen are dependent on employers. When a boss leans toward accepting nuclear power plant construction, the employees cannot reveal opinions against their boss. A boss's opinion exercises a large influence on determining the attitude toward nuclear power plants (Sanki District Labor Union Center 1999).

On the other hand, a powerful boss did not exist in the rest of the fishing cooperatives whose fishermen operate independent aquaculture with small ships. In addition, offshore fishing has faced more uncertainty. The introduction of the Exclusive Economic Zone (EEZ) in 1977, which limits offshore fishing to operate within 200 ocean miles of foreign countries, caused a significant drop in catch among Japanese offshore fishing (Lesbriell 1998). Aside from the introduction of the EEZ, the oil shock in the 1970s and the poor catch of tuna and bonito, which offshore fishing targets, led to a chain of bankruptcies among offshore fishing companies in Onagawa town (Onagawa Town 1991).

As recorded by fishermen and activists, the utilities might find that it was easy to coordinate buying out maneuvers in fishing cooperatives that hosted capital-intensive fishing through using the power of bosses. The vulnerability characterized by hierarchical structure, vertical decision-making coupled with the susceptibilities to shocks from the change of environment surrounding the offshore fishing industry, some bosses might have leaned toward accepting nuclear power plants to repay their debts or to protect the livelihood of employees. Records also indicate the relationship between a boss and employees (funanushi-funako) as father-child. Akin to a father holding absolute power over children and responsible for children's livelihood, perhaps there was

also a consideration on the livelihood of the employees. On the other hand, the utilities might find it hard to buy out independent fishermen who did not have any obstacles to voice their opinion. The sufficiency analysis of the fs/QCA dataset is in line with this comparative analysis. The existence of bigger ships was detrimental to the success of anti-nuclear residents' movements.

### **DIVERSIFYING FISHERMEN'S LEADERSHIP: TOGI (1967) AND SUZU (1975)**

The movement in Suzu city, Ishikawa prefecture whose council revealed the resolution of attracting nuclear power plants in 1975, Anti-nuclear residents in Suzu city expressed concerns during their first meeting, acknowledging that past anti-nuclear movements led by prominent leaders in other locations had failed. They understood that having a conspicuous leader could make the movement vulnerable to targeting by electric companies. When anti-nuclear movement leaders leaned toward accepting the planning, the movement could lose momentum. For this reason, residents in Suzu city aimed to design their movement with a horizontal network led by small but diverse leaders.

Their reference on "previous movement" during the first meeting by anti-nuclear residents in Suzu, was about the movement against Noto nuclear power plant project originally planned to be placed between Shika and Togi town in the same Ishikawa Prefecture in 1967 (Kitano 2005). This movement ended in failure and the Shika power plant was built. The leader of the anti-nuclear power plant movement, Shigeru Kawabe, was also the leader of the largest fishing cooperative, Saikai, in Togi town. Kawabe and Saikai fishing cooperatives had become isolated in later periods of contention between the pro-nuclear group Hokuriku Electric Power Company and Ishikawa prefecture and anti-nuclear residents.

Although the completion of half of the land acquisition weakened the anti-nuclear movements, nominating the leader of the fishing cooperative as the leader of the movements allowed electric companies to identify a weakness. The catch of Saikai fishing cooperative was by far the largest, ten times higher than the other seven fishing cooperatives in Shika and Togi towns that would receive compensation. Ishikawa Prefecture cooperated with Hokuriku Electric Company to pressure the Saikai fishing cooperative when it became the last remaining stronghold of anti-nuclear movements and the fishing cooperative. Ishikawa prefecture threatened that unless Kawabe resigned as the leader of Saikai fishing cooperative, Saikai's main fishing business license, purse seine fishing, would not be renewed. Kawabe described the situation as feeling "like being strangled with silk" (Kawabe 1984).

Learning lessons from the past movements in the same prefecture, the residents of Suzu city aimed to design their movements without a prominent leader. They asked the largest and also an anti-nuclear fishing cooperative, Takoshima, to elect a leader for the movement from individuals who were neither leaders of the fishing cooperative itself nor the owners of large ships (Interview by author 2019). Like the Saikai fishing cooperative in Togi town, the purse-seine fishing by mid-scale vessels was the main fishing business at Takoshima cooperative in Suzu city. Movements led by diverse individuals instead of a single leader posed more challenges for electric companies because it made them uncertain about who to target for their buying out maneuvers and forced them to divide their resources among various leaders.

This comparative case study also sheds light on the movement in Onagawa. Initially, Onagawa nominated the leader of the Onagawa fishing cooperative who is also the owner of the largest offshore fishing ships, known as the "boss," as the leader of the anti-nuclear power plant alliance. However, when the boss compromised and accepted the nuclear power plant, coinciding with a period of bankruptcy among offshore fishing companies due to the oil shock and poor catch, the anti-nuclear residents in Onagawa had to establish a new movement organization (Abe 2022). The defection of the initial leader of the movement could have dampened the movement's momentum and darkened its prospects for success.

The results of the sufficiency analysis on the QCA dataset align with the insights generated from the comparative case studies on movement design. These refined movements emerged after around 1970, nearly a decade later from nuclear power plant construction projects experiencing their first round of peak in the early 1960s. Learning was not limited to the government of Japan, residents refined their movement strategies by consulting with fishermen by learning from past interactions between residents and utilities in other locations.

## **INHERITANCE AND TRANSFORMATION OF MOVEMENTS:**

### **NANTO (1963-2000) AND MIYAMA (1963, 2001)**

While the successful movement in Suzu City intentionally diversified the leadership of a fishing cooperative that operates mid-scale purse-seine fishing, the decline in the fishing population—an unintentional change in nature—altered the dynamics of movement and capital-intensive fishing in Miyama Town, Mie Prefecture, leading to their success. Due to the remarkable persistence of the utilities to execute projects despite the opposition, the conflict between pro-nuclear groups and anti-nuclear groups in some towns had spanned nearly 40 years, causing demographic trends to change in their towns.

For instance, Chubu Electric Power Company continued to hold land in Nanto Town that it had secretly acquired, waiting for an opportunity. It took the residents of Nanto 37 years to learn that their movement had succeeded, when the governor of Mie, Kitagawa Masayasu, officially stated the withdrawal of the nuclear power plant plans in the prefectural assembly. During these 37 years, pro-nuclear groups intensified their efforts in the 1960s, mid-1980s, and early 1990s. In response to these peaks of construction efforts, the anti-nuclear movement in Nanto also bolstered their momentum. Thus, citizens in Nanto Town expressed that their fights consisted of three waves. During the first wave in the 1960s, the anti-nuclear movement was led by local fishing cooperatives. However, residents including housewives, schoolteachers, and small business owners started to participate in the movement from the second wave (Shibahara 2020).

Looking at the statistics (MAFF 1961, 2001, Bureau of Statistics 1961, 2001), in 1960, Nanto Town's population was 15,262, with 3,750 residents working in the fishing industry, accounting for 24.6% of the population. By 2000, the population had significantly declined to 7,969, with 1,241 residents working in the fishing industry, accounting for 15.6%. Considering the decline in the absolute and relative size of fishermen in the town, it was necessary for the anti-nuclear movement to succeed by inviting residents both within and outside the town. The Three Mile Island accident in 1970 and the Chernobyl disaster in 1986 triggered broader participation of



residents in their movements. Despite the decrease, with 15.6% of the population working in the fishing industry, the anti-nuclear movement in Nanto Town has been passed down through generations of fishermen over the course of three waves with expanding support from residents.

Similarly, Miyama Town, in the same Mie Prefecture, was involved in two rounds of nuclear power plant projects in 1963 and 2001. What was different for Miyama was that the decline in the population of fishermen was more severe. It was 17.5% in 1960 and dropped to 4.2% in 2000. In addition, unlike Nanto Town where the construction project persisted for 37 years, whispers of hosting nuclear power plants in Miyama Town had been silent after residents rejected the plan in the early 1960s. While scarce records illustrate that the first round of the anti-nuclear movement in Miyama was led by fishermen (Akahata 2011), records for the second-round show that fishermen later joined residents' movements formed by resident groups. While both Nanto and Miyama experienced a decline in fishermen in their towns, a more significant drop in Miyama Town facilitated the transformation of their movements from fishermen's movements to residents' movements. The decline in the population of fishermen generated a change in dynamics in the strength of the movement and the organizational structure of key stakeholders.

Throughout the 1960s to today, Miyama Town anchored offshore fishing in the Hikimoto fishing cooperative. Miyama receives the second-highest score for the average weight of a ship in the dataset, signifying the substantial presence of offshore fishing. While the blunder by the pro-nuclear groups, calling for the referendum, prompted a counterattack by anti-nuclear movements, Miyama became the only town that succeeded in rejecting nuclear power plant construction projects even though it hosts the most capital-intensive offshore fishing.

## **LIMITATIONS AND FUTURE RESEARCH**

While some records suggest that the strength of anti-nuclear movements may be impacted by the amount of agricultural production, the sufficiency analysis does not fully support this hypothesis. This discrepancy could be attributed to measurement issues. Data on agriculture typically covers total crop sales at the town and district levels but does not account for variance within districts of towns. For instance, the Tanashio Anti-Nuclear Power Plant Alliance in Namie town was formed by farmers who owned fertile rice paddies. However, as the contention between Tohoku Electric Power Company and the movement prolonged, residents in Northern Tanashio, where there were more settlement farmers engaging in agriculture on smaller and lower-quality farmland, gradually shifted towards supporting nuclear power plants (Onda 1991, 126).

Utility companies and governors became aware that some of the early nuclear power plant planning achieved success in districts and towns founded by or receiving settlement farmers. Settlement farmland was designed to address post-war food scarcity immediately after Japan's defeat in World War II. Due to poor initial planning and a lack of consideration for climate and soil conditions on the settled land, many of these settlers abandoned their settlements and cultivation by 1975 (Zenkoku Kaitaku Nogyo Kyodo Kumiai Rengo Kai 1977). The presidents of the Development Bank of Japan and TEPCO and Kansai Electric Power Company established the former Japan Atomic Industry Forum (JAIF) and the forum hired professors to investigate reasons

why the early periods of nuclear power plant projects, specifically TEPCO's Fukushima Daiichi and Kansai's Mihama nuclear power plants, succeeded.

These academics identified that settlement farmers lacked attachment to their lands compared to farmers who had inherited their land for generations, accompanied by economic hardship due to relative and absolute lower agricultural yields in settlers' farmland, creating an opportunity for a smooth land acquisition maneuver scheme (JAIF 1970, 1984). The case of Hamaoka nuclear power plant projects also indicates the relationship between nuclear power plant projects and settlement farmland. A local high school teacher in Hamaoka town left a record that the plant was constructed in a part of the district with poor-quality farmland owned by settlement farmers that had been repurposed from the Imperial Japan Army's shooting range (Asaoka 1985). It is possible that the model would yield different results with more granular agricultural production data and proportion of settlement farmers, though the availability of such data is uncertain.

Existing research by Aldrich shows the macro-level changes in government strategies and this article shows the micro-level changes in movement strategies. Another promising direction for future research is to analyze changes in mezzo level, that is changes of siting strategies by the utilities. While the source of funding remains unclear, in 1986, a TV network broadcast a documentary program aimed at dealing a blow to fishery cooperatives in Nanto town by lowering the price of aquacultured yellowtail, a major income source for Nanto's fishermen at the time. In the documentary, key figures of pro-nuclear power plant residents appeared disguised as fishermen, raising concerns about the use of excessive antibiotics and organic phosphoric acid in aquaculture cages, attempting to draw attention to the perceived dangers of aquaculture yellowtail. However, their testimony was baseless and far from reality (Shibahara 2020). Fishing cooperatives gathered their members to watch the program (Interview by author 2021).

It is possible that the utilities became aware that aquaculture fisheries make fishermen more resilient against their maneuvers by providing their own means of livelihood and making them less susceptible to shocks from changes in the external environment compared to capital-intensive fishing. It is also possible that pro-nuclear groups conspired to engineer external shocks, such as lowering the price of cultivated fish species themselves. States and companies promoting national policies remained vigilant for opportunities to counterattack even after they had been rejected by residents. Existing studies on state-society reaction grappled with the interaction between citizens and the governments. Analysis of changes in siting strategies by electric power companies that promote national policy on behalf of the government would advance theory of state-society relation.

## **ENTANGLED FISHERMEN**

The first interpretation derived from my findings is that the strength of anti-nuclear power plant residents' movements is largely determined by the organizational character that shapes the decision-making structure of key stakeholders. Indeed, movements in towns with a higher average weight of a ship tended to fail and accept nuclear power plants because (1) the hierarchical

organizational structure does not allow employed fishermen to dissent from their boss, (2) the structure of social movement organizations (SMOs) tends to mirror those of major industries, thus producing movements led by a single, salient leader, creating an identifiable target for pro-nuclear groups, and (3) offshore fishing is susceptible to changes in the external environment, including oil shocks, the introduction of the EEZ, and poor catches in the 1970s. On the other hand, towns where fishing cooperatives ran less capital-intensive fishing, such as aquaculture, succeeded in rejecting the plant construction because aquaculture provides fishermen with their own means to live. SMOs in these towns tended to be characterized by a non-hierarchical, horizontal network led by small, diverse leaders that facilitated autonomous decision-making, action, and collaboration by residents.

Through their study on LNG projects in California, McAdam and Boudet (2012) emphasize the importance of reintroducing capitalism or political economy into the study of contentious politics, echoing concerns raised by Hetland and Goodwin (2010). They identify a "strange disappearance of capitalism from social movement studies," noting a lack of articles grappling with the relationship between political economy and social movements in major English-language journals on social movement studies for several decades since the 1990s. McAdam and Boudet describe that at the time of the election of Bush in 2000, gas and oil companies increased the number of LNG projects.

This article goes further by showing that the outcomes of movements are contingent on the interaction of changes in political economy, the size of key stakeholders, and their organizational character, which shapes the decision-making process in their organizations. The organizational characters are determined by capital intensity, or the mode of production. Influential research on NIMBY politics assumes that social capital or civic capacity explains the variation in mobilization (McAdam and Boudet 2012) and thus, the likelihood of receiving construction proposals (Aldrich 2008). This research argues that a mode of production that shapes social hierarchy and decision-making structure holds overriding significance compared to social capital and civic capacity. To put it another way, social capital serves as a driving force, with its trajectory determined by the production structure.

The second interpretation I offer from my findings is that, learning from past siting attempts in other locations, residents in towns that received the plant construction proposal after 1969 intentionally designed social movement organizations (SMOs) to diversify the leadership of key stakeholders. As Ganz (2000) and Ganz and McKenna (2019) argue, the distribution of leadership allows participants of movements to access salient knowledge and thus tends to generate successful movements. These efforts helped residents overcome disadvantages—these latter movements succeeded even in towns that anchored capital-intensive fishing, despite none of the anti-nuclear movements in these towns that received construction projects before 1969 succeeding. Just as small fish form a bait ball to disrupt predators, successful SMOs confronted the government of Japan and the utilities through diverse leadership and widespread participation.

The latter anti-nuclear movements in towns with the disadvantage including towns like Houhoku and Suzu, succeeded despite the records showing that these towns have hosted mid-scale vessels for capital intensive purse seine fishing. Still, it is unclear that the strategic diversification of leadership in key-stakeholders' SMO were viable options to any towns, or it always

compensated for the disadvantage even when residents could take on this option. The average weight of a ship in Onagawa was 21.5 tons, twice as high as the 10.6 tons in towns of Tomari and Miyama, the second highest in the dataset, indicating greater influence a boss held in Onagawa. It is arguable that if the influence of the boss is particularly strong, the diversification of leadership among fishermen might not be possible, nor enough to compensate for the disadvantage. It would be necessary for future research to investigate the relationship between the availability for strategic design and the intensive capital that entangles stakeholders with a vertical decision-making network.

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### Source for QCA Dataset

AUTHOR	YEAR	NAME OF SOURCE	SET	MUNICIPALITY
MAFF	1961	Interim Fisheries Census 6th Report Municipal Survey.	CATCH SHIP_WEIGHT	ALL
MAFF	1961	World Agricultural Census Municipal Statistics Table 1960.	CROP	ALL
Yasuda Rie	2012	Genshiryoku Hatsudensho Kanren Shisetsu Jumin Tohyo Nenpyo.	REFERENDUM	ALL
CNIC	1997	Hangenpatsu Undo Mappu. Ryoku Fu Shuppan.	Qualitative-ALL	ALL
CNIC	1975	Hangenpatsu Zenkoku Shukai Shiryo.	Qualitative-ALL	ALL
JAIF	1970	Chiiki Shakai to Genshiryoku Hatsudensho.	Qualitative-ALL	Futaba Mihama
Shibahara Yoichi	2020	Genpatsu No Kotowarikata - Boku no Ashihama Tosoki. Gettoshu.	Qualitative-ALL	Nanto
Hashizume Kenro eds	2011	Kyushu no Genpatsu	Qualitative-ALL	Sendai Kushima
Sato Mitsuru	1996	Fukui Ken Shi Tsushi Hen 6. Fukui Prefecture.	Qualitative-ALL	Takahama
Ishikawa Labor Union	1990	Tomeyou Noto Genpatsu.	Qualitative-ALL	Shika-Togi
Takeuchi Yasuto	2014	Hamaoka Hangenpatsu no Minshu Shi. Shakai Hyoron Sha	Qualitative-ALL	Hamaoka
Onda Katsumasa	2011	Genpatsu ni Shison no Inochi ha Urenai. Nanatsumori Shokan.	Qualitative-ALL	Kodaka-Namie
Shinohara Hironori	2019	Genpatsu no nai Onagawa e. Kurashi Insatsu.	Qualitative-ALL	Onagawa
Nakajima Tetsuen	1988	Genpatsu Ginza: Wakasa Kara. Seiunsha.	Qualitative-ALL	Obama
Kashiwa Yotaro	1993	Warera Sabishiki Genjumin. Office Omaju.	Qualitative-ALL	Tomari
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Hatanaka Kengo	1972	Genshiryoku Hatsudensho Kensetsu Hantai Undo. Jurist. Vol 508.	Qualitative-ALL	Oi
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Sanki Labor Union	1999	Ichiura - Kumano Genpatsu Hantai Toso Shi.	Qualitative-ALL	Kumano
Kitano Susumu	2005	Suzu Genpatsu Soshi e no Ayumi. Nanatsu Mori Shokan.	Qualitative-ALL	Suzu
Nagai Tomoaki	2023	Tango ni Ikiru. Kamogawa Shuppan.	Qualitative-ALL	Kumihama
Nomura Yasuko	2015	Oma Genpatsu to Nihon no Mirai. Jurosha.	Qualitative-ALL	Oma
Yamado Sadao	2013	Iwashima no Tatakai. Iwanami Shoten	Qualitative-ALL	Kaminoseki
Okamura Tetsuo	2002	Miyama Cho Genpatsu Yuchi Hantai Jumin Undo wo Oete.	Qualitative-ALL	Miyama