

Tasucu Bay Coastal Fishery, Turkey

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1 Part I: Static Analysis - Collective action

- The Taşucu Bay coastal fishery in Mersin Province, Turkey, involved about 140 fishermen and 90 small boats, all from the same town and members of the Taşucu Cooperative, founded in 1968 by a local businessman–fisherman. Before then, fishing was open-access with dynamite use and few motorboats.
- The cooperative banned destructive fishing, provided \$3,000 credit, guaranteed seasonal prices, subsidized gear, and operated a freezer/cold-storage facility to stabilize markets. These benefits made membership highly desirable, creating effective local control and protecting the bay from trawler intrusion.
- Operating in an oligotrophic Mediterranean environment, fishers targeted demersal species (sea breams, basses, mullets, groupers, snappers). The system remained robust until 1983, when the government lifted the three-mile trawl ban, triggering renewed conflict and threatening the sustainability of this locally managed commons.

1.1 The Commons Dilemma

- Before 1968, the Taşucu Bay fishery was open access, with few boats and destructive dynamite fishing. In response, a local businessman–fisherman founded the Taşucu Cooperative, which banned destructive methods, helped members access credit and gear, and protected the bay from trawlers.
- The cooperative could not legally restrict access, but it effectively limited fishing to local members by offering strong economic incentives—credit, guaranteed prices, and market support. This created de facto local control over the resource.
- In 1983, the government lifted the three-mile trawl ban, allowing shrimp trawlers to return and reviving conflict between small-scale and industrial fishers. The cooperative later joined with two neighboring co-ops to petition for reinstating the ban, showing local capacity for collective political action.

1.2 Biophysical Context (IAD)

- *Natural infrastructure:*

- The Taşucu Bay fishery lies near Silifke, on Turkey's southern Mediterranean coast, an area characterized by oligotrophic waters, low in nutrients and naturally low in biological productivity.
- Fishers target demersal (bottom-dwelling) species of high market value, mainly sea breams, basses, mullets, groupers, and snappers.
- The cooperative operates within Taşucu Bay and nearby coastal waters, while another cooperative fishes in the Göksu River lagoons. Despite their close proximity, there is no conflict between them.
- Although fish stocks are not abundant, local fishers report they can make a good living without fishing hard, likely due to the control of destructive practices and the natural replenishment capacity of the bay.
- ***Hard human-made infrastructure:***
 - About 140 fishermen operate 90 small inboard boats, typically 8–10 m open boats with 10–25 HP diesel engines, usually crewed by two or three fishers. A few boats have simple depth recorders or fish finders. The main gears are trammel nets, bottom-set gillnets with small or large mesh depending on the target species and longlines with baited hooks. Boats return to port daily, and catches are sold locally.
 - The cooperative maintains a freezer and cold-storage facility to stabilize prices, sells subsidized gear, and controls destructive fishing. These facilities form the key physical infrastructure supporting both livelihoods and local resource management.
 - Occasionally, shrimp trawlers 15–25 m wooden schooner-type boats with 7–8 crew operate illegally inside the bay. Their bottom trawls catch shrimp but also damage the seabed and discard juvenile demersal fish, depleting the small-scale fishers' target species and creating recurrent conflict.

1.3 Attributes of the Community (IAD)

- ***Social Infrastructure:***
 - There are 140 fishermen in the fishery all from the same town of Taşucu and all belong to the same cooperative of Taşucu Bay Co-op, which was founded in 1968.
 - The right to fish is not legally restricted to members, but membership provides strong incentives such as credit, guaranteed prices, subsidized gear, and access to cold storage, making participation nearly universal. The community is small and cohesive, which enables effective local coordination.

- There exists conflict between small-scale fishermen and large-scale shrimp trawling fishermen who in 1983 were allowed, by government decision, to fish within the 3-mile limit off the coast.
- ***Human Infrastructure:***
 - The human infrastructure of the Taşucu Bay fishery reflects a mix of traditional and newer fishermen. The percentage of traditional fishermen is well under 50%.
 - New membership to the cooperative is encouraged to help the cooperative build a stronger financial position and political power.
 - The lifting of the 3-mile trawling ban was brought upon by a strong representation of trawlers (100 fishermen as of 1985) who claimed they were otherwise unable to make a living.
 - The Taşucu cooperative has joined forces with two neighboring cooperatives (totaling 1,000 members) to try to have the 3-mile ban reinstituted.

1.4 Rules in Use (IAD)

- ***Position Rules:***
 - i) Small-scale fishermen (140 members of the Taşucu Cooperative) – local fishers organized under the cooperative formed in 1968.
 - ii) Cooperative leaders – manage credit, markets, rule enforcement, and coordination among members.
 - iii) Large-scale shrimp trawling fishermen – work on 15–25 m wooden schooner-type boats with 7–8 crew; their nearshore operations created major conflict with small-scale fishers after 1983.
 - iv) Government officials – national authorities responsible for setting, lifting, and enforcing the 3 mile trawling limit.
 - v) Dynamite fishermen (historical) – destructive users common before 1968; their practices were banned with the establishment of the cooperative.
 - vi) Members of neighboring cooperatives (institutional allies) – two eastern Mediterranean cooperatives that later allied with Taşucu to petition for reinstating the trawl ban ($\approx$ 1,000 members).

- ***Boundary Rules:***

Fishing in Taşucu Bay is not legally restricted to cooperative members, but in practice nearly all local fishermen belong to the cooperative because membership offers strong incentives e.g., credit, guaranteed prices, subsidized gear, and access to cold storage.

These benefits create de facto boundaries, effectively limiting access to local participants while excluding outsiders such as shrimp trawlers and former dynamite fishers.

- ***Choice Rules:***

- In 1983, a government decision allowed shrimp trawlers to fish within three miles of the coast (except mid-April to mid-July), a policy strongly opposed by the cooperative. Cooperative leaders also make collective decisions about marketing, cold storage, and price stabilization to maintain economic and social coordination.

- ***Aggregation Rules:***

- Decisions about trawling regulations, including the lifting and potential reinstatement of the three-mile coastal ban, are made by the national government, outside the control of local fishermen.

- The Taşucu Cooperative manages local-level organization and enforcement, such as banning destructive fishing and coordinating marketing and pricing among members.

- In 1985, the cooperative joined two neighboring cooperatives to petition the government for reinstating the trawl ban, showing their capacity for collective regional action, even though final regulatory authority remains centralized.

- ***Scope rules:***

- After the 1983 government decision, trawling is legally permitted within three miles of the coast east of Silifke, except from mid-April to mid-July.

- The Taşucu Cooperative explicitly bans dynamite fishing and opposes trawling inside the bay as destructive practices.

- The scope of small-scale operations is limited to demersal fish in nearshore waters, reflecting the gear capabilities and fishing range of small 8–10 m boats.

- ***Information Rules:***

The study does not explicitly describe formal information-sharing mechanisms.

But, cooperative management likely facilitates regular communication regarding prices, equipment, and storage access through shared facilities.

Information exchange between Taşucu and neighboring cooperatives (especially during joint campaigns) indicates informal inter-cooperative coordination networks. (Inferred)

- ***Payoff Rules:***

- Members of the Taşucu Cooperative receive a \$3,000 bank credit, a year-round, seasonally adjusted guaranteed price for fish, and access to a freezer/cold-storage facility that stabilizes prices and controls marketing.
- The cooperative also sells fishing gear at subsidized rates, providing strong economic incentives for membership and compliance with cooperative rules.

1.5 Summary

The Taşucu Bay fishery demonstrates how a local cooperative transformed an open-access fishery into an effectively managed commons. By offering credit, stable prices, and market support, the cooperative made membership nearly universal and fostered strong reciprocal relationships within a small, cohesive community. These arrangements sustained both livelihoods and fish stocks for over a decade. Yet, the 1983 government decision permitting trawling within three miles of shore and the cooperative's lack of legal authority exposed the fragility of this local success under shifting national policy, illustrating both the potential and the limits of community-based governance in small-scale fisheries.

2 Part II. Dynamic Analysis - Robustness

Although Berkes (1986) is not a time-series study, it provides rich evidence of institutional change, feedback, and adaptive responses between 1968 and 1985. The Taşucu Bay fishery evolved through distinct phases that reveal how local institutions emerged, stabilized, and were later tested under external shocks.

Phase 1: Pre-1968 – Open Access and Destructive Practices

Before the cooperative's formation, the bay was an open-access system with three rowboats, two motorized boats, and numerous dynamite fishers. Resource exploitation was unregulated and destructive, leading to ecological stress and minimal institutional control, an unrobust regime with high vulnerability to overfishing.

Phase 2: 1968–1971 – Institutional Formation and Early Consolidation

In 1968, a local businessman–fisherman (Aslan Eyce) founded the Taşucu Cooperative, banning dynamite fishing and helping members acquire proper gear. By 1971, members owned 40 motorboats and collectively enforced local rules, repelling trawlers that operated illegally inside

the bay. This phase marks rapid institutional innovation, shifting from destructive open access to coordinated, rule-based governance.

Phase 3: 1970s – Expansion and Conflict Management

During the 1970s, cooperative membership expanded, and the group gained economic stability through credit access, market control, and cold storage facilities. The cooperative acted as a collective defense institution, protecting the bay from trawler intrusion and stabilizing fishers' incomes. Positive feedback loops between cooperation, compliance, and ecological stability strengthened the system's robustness.

Phase 4: 1983–1985 – Policy Shock and Institutional Stress

The 1983 government decision allowing shrimp trawling within three miles of shore introduced a major external disturbance. The cooperative's ability to enforce local rules was undermined by national policy, threatening both livelihoods and resource sustainability. In response, Taşucu allied with two neighboring cooperatives (around 1000 members) to petition for reinstatement of the trawl ban, a sign of institutional maturity and adaptive political response, though ultimate authority remained centralized.

Drawing from Berkes (1986), the Taşucu Bay fishery illustrates how ecological fragility and social adaptation coevolved through local institutional innovation (Table 1). The resource subsystem, composed of low-productivity demersal stocks in an oligotrophic Mediterranean setting, remained highly sensitive to overexploitation, making rule enforcement essential for robustness. i) Resource users: 140 fishermen integrated through the cooperative demonstrated institutional learning, passing ecological and social norms across generations. ii) Public infrastructure, including credit, subsidized gear, and cold storage, reduced income volatility and reinforced sustainable practices. iii) Infrastructure providers, led by Aslan Eyce and allied cooperatives, enabled effective co-management when national and local policies aligned but faced destabilization under conflicting state interventions. iv) External disturbances, such as the 1983 trawling policy reversal, tested the system's resilience, prompting (v) adaptive feedback through cooperative rule enforcement, economic coordination, and political advocacy.

Table 1: Subsystem Dynamics and Robustness Links *[This synthesis represents a personal interpretation of the dynamic and robustness dimensions derived from Berkes (1986)]*

Subsystem	Evidence from Berkes (1986)	Dynamic Interpretation and Robustness Link
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Resource	Demersal fish stocks in an oligotrophic Mediterranean ecosystem; low productivity; threatened by trawlers and dynamite fishing.	Ecological subsystems exhibit low redundancy and are sensitive to overexploitation; robustness depends on rule enforcement and exclusion of destructive methods.
Resource Users	140 local fishermen (<50% traditional) integrated through cooperative membership.	Human subsystem adapts through institutional learning, new fishers acquire ecological and social norms via the cooperative.
Public Infrastructure	Cooperative's freezer, subsidized gear, and \$3,000 credit scheme stabilize income and market access.	Enhances robustness by reducing volatility and linking economic stability with ecological stewardship.
Public Infrastructure Providers	Cooperative leadership (Aslan Eyce); allied cooperatives; state agencies setting policy.	Co-management hybrid: robust when state policies align with local rules; destabilized when top-down policies conflict with community norms.
External Disturbances	1983 trawl policy reversal; illegal trawler intrusion; market pressures.	Exogenous shocks expose vulnerability; system resilience depends on collective advocacy and alliances.
Feedback and Adaptation	Banning destructive fishing; building market infrastructure; political petitioning for policy reform.	Positive feedback: institutional consolidation strengthens resilience. Negative feedback: national interventions erode local autonomy.

3 Part III. Case Contributors

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