

Forest in Almora district, India (6)

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1 Part I: Static Analysis - Collective action

The community forests discussed in this case study are called panchayat forests. They are managed by local institutions called van panchayats. The forests and van panchayats all lie in the middle Himalayan ranges in Almora district, India. Almora is one of the eight mountainous districts that together comprise the Uttarkhand in Uttar Pradesh. The analysis focuses on the effects of institutional rules on fodder and fuelwood use in community forests. Village 6 is one of six villages located in the Almora district.

The key resource is fodder from the community-managed forests. In village 6, the resource condition is very poor (p. 270).

The original CPR report may be found at <https://seslibrary.asu.edu/seslibrary/case/186/cpr>. Coupled Infrastructure Systems framework is explained in more detail in Anderies (2014) <http://link.springer.com/article/10.1007/s11538-014-0030-z>

1.1 The Commons Dilemma

- The potential appropriation problem / poor coordination of appropriation

Villagers in village 6 did not successfully create appropriation rules that could prevent users from overexploiting and degrading resources (p. 282). First, village 6 is one of the villages where panchayats have not designed rules to match withdrawn regeneration. Resource users in village 6 are allocated spaces on the commons where they must harvest grass. Although this prevents disputes among the users by solving an assignment problem, users still attempt to harvest as much as they can from the area allocated to them (pp. 272-3). Secondly, village 6 did not emphasize monitoring. The community forest in village 6 was highly dispersed. The panchayat considered monitoring important but was unable to devise a system of salary payments to guards that could allow it to employ two guards for the dispersed panchayat forest compartments (p. 277). Thirdly, villagers have created rules for sanctioning rule breakers. In the absence of accurate information about rule breaking, however, sanctions could not be imposed in village 6 (p. 282). Lastly, the panchayat acts as arbiters over disagreements that arise when it imposes sanction on rule breakers, interprets institutional rules, and resolves disputes over the creation of rules (p. 280). However, panchayat

officials in village 6 could not assert their authority as arbiters due to the absence of accurate information about rule breaking (p. 282).

- The potential under provision of public infrastructure

According to Anderies et al. (2004), public infrastructure combines two forms of human-made capital: physical capital including any engineered works, such as dikes, irrigation canals, etc; and social capital including the rules actually used by those governing, managing, and using the system and those factors that reduce the transaction costs associated with the monitoring and enforcement of these rules. This paper does not report which physical capital have been made by villagers. In terms of social capital including the rules for withdrawing resources, monitoring the monitor, and sanctioning rule breakers, village 6 failed to solve the dilemmas involved in providing public infrastructure.

1.2 Biophysical Context (IAD)

- **Natural infrastructure**

Village 6 lies in the middle Himalayan ranges in Almora district, India. Almora is one of the eight mountainous districts that together comprise the Uttarkhand in Uttar Pradesh. Natural infrastructure in village 6 is the community-managed forests that provide resource users with fodder as a main resource from the forests. The community forest is too large and dispersed to monitor all behavior (p. 274). In spite of this weakness arising from natural infrastructure, villagers did not create the rules-in-use for selecting their forest guards and encouraging them to monitor rule infractions by linking their performance to their salary. The forest condition in village 6 is very poor (p. 270). There are no reports that the natural infrastructure helps to have clearly defined boundaries and generates asymmetries of power and information. Yet, conversely, the community forest too dispersed to employ enough forest guards (p. 277).

- **Hard human-made infrastructure**

There is no explicit information about hard human-made infrastructure such as roads and fields of seedlings.

1.3 Attributes of the Community (IAD)

- **Social Infrastructure**

Village 6 lies in the middle Himalayan ranges in Almora district, India. Almora is one of the eight mountainous districts that together comprise the Uttarkhand in Uttar Pradesh. Natural infrastructure in village 6 is the community-managed forests that provide resource users with fodder as a main resource from the forests. The community forest is too large and dispersed to monitor all behavior (p. 274). In spite of this weakness arising from natural infrastructure, villagers did not create the rules-in-use for selecting their forest guards and encouraging them to monitor rule infractions by linking their performance to their salary. The forest condition in village 6 is very poor (p. 270). There are no reports that the natural infrastructure helps to have clearly defined boundaries and generates asymmetries of power and information.

Yet, conversely, the community forest too dispersed to employ enough forest guards (p. 277).

- **Human Infrastructure**

The provisions of the Van Panchayat Act aims to facilitate collective action by villagers (p. 270). But village 6 failed to solve the dilemmas involved in designing suitable monitoring and sanctioning rules. For example, there were not institutionalized mechanisms through which adequate information on rule breaking could be collected (p. 282).

1.4 Rules in Use (IAD)

Position Rules

- Panchayat officials: To create the van panchayat, panchayat officials must be elected regularly by villagers (resource users) (p. 270).
- Forest guards: The panchayat considered monitoring important but was unable to devise a system of salary payments to guards that could allow it to employ two guards for the dispersed panchayat forest compartments (p. 277).

Boundary Rules

- Resource boundary: According to the Van Panchayat Act, villagers must demarcate the boundaries of the panchayat forest (p 270).
- Resource users boundary: They must be residents of the village where the forest is located (p. 271). Resource users in village 6 are allocated spaces on the commons where they must harvest grass. Although this prevents disputes among the users by solving an assignment problem, users still attempt to harvest as much as they can from the area allocated to them (pp. 272-3).

Choice Rules

- Resource users: They can elect their panchayat officials who can design the rules and select forest guards (p. 270; 272). All resource users cannot make animals graze in the forest for most of the year. Villagers can harvest fodder only for 2-12 weeks (p. 271). The auction winner is free to cut grass from that section of the community forest for which he or she has successfully bid (p. 272). Villagers must protect forests from illegal tree felling, fires, encroachments, and cultivation (p. 270). They must demarcate the boundaries of the panchayat forest. In addition, 20 percent of the area of the forest must be closed to grazing every year (p. 270).
- Panchayat officials: The elected panchayat officials must design soft human-made public infrastructure and meet three to six times every year (p. 270). Once the auction has been held, however, the panchayat officials need no longer worry about regulating and supervising the removal of fodder from the resource (p. 273). Due to the winner-takes-all rule, the officials do not have to make an eyeball estimate of the total amount of fodder bundles to assess regeneration level. So they do not need to select forest guards.
- Forest guards: The panchayat considered monitoring important but was unable to devise a system of salary payments to guards that could allow it to employ two guards for the dispersed panchayat forest compartments (p. 277).

Aggregation Rules

The community forests are managed by local institutions called van panchayats literally, councils of five individuals who are responsible for making collective choices about the rules to be used in a particular forest.

Scope rules

- Appropriation rules: All resource users cannot make animals graze in the forest for most of the year. Villagers can harvest fodder only for 2-12 weeks. When cutting leaves from trees for fodder, villagers must leave behind at least two thirds of the leaf cover on the tree (p. 271).
- Provision rules: : Panchayat officials elected by resource users must design soft human-made public infrastructure. But the winner-takes-all auction system gives the officials little incentive to create the rules for monitoring and sanctioning.

Information Rules

- Panchayat officials: There were not institutionalized mechanisms through which adequate information on rule breaking could be collected (p. 282).
- Forest guards: The panchayat considered monitoring important but was unable to devise a system of salary payments to guards that could allow it to employ two guards for the dispersed panchayat forest compartments (p. 277).

Payoff Rules

- Benefits: Resource users in village 6 are allocated spaces on the commons where they must harvest grass. Although this prevents disputes among the users by solving an assignment problem, users still attempt to harvest as much as they can from the area allocated to them (pp. 272-3).
- Costs: If users break the rules for appropriation, panchayat officials ask them to render written or public apologies, confiscate cutting implements such as scythes, strip villagers of use rights, impose fines, report villagers to government officials, and sometimes, seek redress in courts (p. 278). In the absence of accurate information about rule breaking, sanctions could not be imposed in village 6, nor could panchayat officials assert their authority as arbiters (p. 282).

1.5 Summary

Resource

The key resource is fodder from the community-managed forests whose quality is very poor (p. 270).

Resource users

They must be residents of the village where the forest is located (p. 271). Resource users in village 6 are allocated spaces on the commons where they must harvest grass. Although this prevents disputes among the users by solving an assignment problem, users still attempt to harvest as much as they can from the area allocated to them (pp. 272-3).

Public infrastructure providers

- 1) Panchayat officials: The elected panchayat officials must design soft human-made public

infrastructure and meet three to six times every year (p. 270). The panchayat considered monitoring important but was unable to devise a system of salary payments to guards that could allow it to employ two guards for the dispersed panchayat forest compartments (p. 277).

2) Forest guards: There are no explicit mentions about forest guards as public infrastructure providers.

Public infrastructure

1) Natural infrastructure: Natural infrastructure in village 6 is the community-managed forests that provide resource users with fodder as a main resource from the forests. The community forest is too large and dispersed to monitor all behavior (p. 274). In spite of this weakness arising from natural infrastructure, villagers did not create the rules-in-use for selecting their forest guards and encouraging them to monitor rule infractions by linking their performance to their salary. The forest condition in village 6 is very poor (p. 270). There are no reports that the natural infrastructure helps to have clearly defined boundaries and generates asymmetries of power and information. Yet, conversely, the community forest too dispersed to employ enough forest guards (p. 277).

2) Hard human-made public infrastructure: There is no explicit information about hard human-made infrastructure such as roads and fields of seedlings.

3) Soft human-made public infrastructure: See 1.4 Rules in use (IAD)

2 Part II. Dynamic Analysis - Robustness

This update to the Forest in Almora district, India (6) case was made in 2015 by Hoon C. Shin at Arizona State University. In-text parenthesis indicate corresponding links in the system representation (Robustness diagram) on the SES library.

2.1 Update on the Commons Dilemma

2.2 Shocks, Capacities, Vulnerabilities

...to and of the Resource (link 7 to R):

There are no explicit mentions of biophysical disruptions (Arrow 7) such as floods, earthquakes, landslides, and climate change that impact the resource.

...to and of the Public Infrastructure (link 7 to PI):

There are no explicit mentions of biophysical disruptions (Arrow 7) such as floods, earthquakes, landslides, and climate change that impact the public infrastructure.

...to and of the Public Infrastructure Providers (link 8 to PIP):

One of major socioeconomic changes (Arrow 8) in village 6 is the establishment of the Van Panchayat Act of 1931. From the 1840s, the British government asserted its absolute rights over all land and forests. The Imperial Forest Department protected state forests from trespassing, unauthorized tree felling, grazing, and firing. In response to the states control over forests by limiting villager access and use rights to the resource, villagers protested incessantly against encroachments by the state on their traditional rights in the forests. As a result, the Forest Grievances Committee, set up in 1921, recommended the government

to reclassify forests into class 1 and class 2 forests. And the Van Panchayat Act of 1931 permitted resource users to create community-managed forests from the class 1 forest controlled by the Revenue Department.

The Van Panchayat Act prescribes the process of forming van panchayats and imposes certain duties on village forest councils. This means that the Van Panchayat Act contributed to changing public infrastructure provider from central government to self-governing community. The panchayat officials are elected by villagers to design soft human-made public infrastructure, e.g. a variety of the rules-in-use described above, and enforce it. However, panchayat officials did not need to play a role in providing soft human-made infrastructure.

...to and of the Resource Users (link 8 to RU):

The Van Panchayat Act aims to facilitate collective action in managing community forests. First, the Act requires villagers to create boundary rules. Villagers must demarcate the boundaries of the panchayat forest (p 270). In order to become legitimate resource users, they basically must be residents of the village where the forest is located (p. 271). Secondly, resource users can elect their panchayat officials who can design the rules and select forest guards (p. 270; 272). Yet, the lack of soft human-made infrastructure still leads resource users to harvest as much as they can from the area allocated to them (p. 273).

2.3 Robustness Summary

In this case study there is no explicit information about ecological shocks to resource and public infrastructure. But the Van Panchayat Act of 1931 can be regarded as a major socioeconomic change from outside of village 6. The act affected both resource users and public infrastructure providers in that it permitted resource users to create community-managed forests and their self-governing institutions including the van panchayat and a variety of rules-in-use. However, the absence of monitoring rule infractions makes sanctions impossible. As a result, villagers fail to create rules that distribute benefits efficiently and/or equitably (p. 282) and it leads to very poor quality of community-managed forests (p. 270).