

Screeener Report:

The information regarding the following common-pool resource system was taken from empirical evidence from a field setting. Data on the system was extracted from a paper issued by a scholar or research institution. Currently, there are no additional documents to cite which may provide further information about this common-pool resource.

These documents describe one resource in detail. The primary resource is the Parwara Van Panchayat Forest, situated in Parwara of India. More generally, it is located in Middle East & South Asia. The system's sector is that of forest products. Relatively good information has been collected about the stakes of participants who appropriate from Parwara Van Panchayat Forest. The condition of this resource is well understood. Complete information is not available regarding the strategies used by key groups interacting with the system. There is thorough documentation of the operational rules for this resource. This is the result of a high level of confidence that the authors who recorded the features of Parwara Van Panchayat Forest have a complete knowledge of its particulars. Furthermore, the authors have provided sufficient data to formulate a structured coding process.

There are 101-200 total appropriator teams appropriating from the resource. Appropriator teams for the resource are sometimes formally organized.

Van (forest) Panchayats (people's bodies) in the hill districts of Uttar Pradesh in India have been formed at the village level from 1931 onwards. These Panchayats were formed through popular elections to manage Class I forests. This paper investigates the functioning of the Parwara village van Panchayat in the context of the general state of Van Panchayats in the state. The Panchayat enacts and enforces rules for the day-to-day management of the forests - and functions under the supervision of the district government officials. With increased access to outside markets, greater pressure on resources owing to population increase, and politicization of the village, the Van Panchayats are becoming less effective in managing the village forests.

Resource Report:

The main appropriated resources are, grass and forest trees; these resources are both stationary and renewable. The growth/replacement rate for grass is not represented explicitly, but as far as grazing is concerned, 1.186 acres is available per head of cattle without needing to worry about the problem of overgrazing. Parwara currently supports 677 heads of cattle, which requires a total of about 802.922 acres per year, the Parwara VP forest has 797.1446 acres; and thus, overgrazing has become a major issue for this system. The state Forest Department has tried for many years to rehabilitate some of the degraded grasslands by planting new trees, and restricting grazing activities in those areas; with the shortage of grass, there has also been restrictions placed on grass cutting, which will be discussed later in this report. The growth/replacement rate for forest trees is also described in a vague way, and must be inferred a little. The rate of use is not exactly known, but it is clear that the growth/replacement rate of forest trees is not fast enough for demand, as most trees in the Parwara VP forest are either stumps or saplings; and the Parwara VPC (along with the Forest Dept.) have placed severe restrictions on the extraction of forest trees.

Since the late 1800's, usage of the forest trees (esp. the oak species) has increased quite severely. The increase caused the first restrictions on use in 1878, with the Indian Forest Act, limiting use of trees to those that were already dead (unless otherwise specially authorized). Since that time, the trees in the Parwara VP forest has continued to decline, and it's been reported, "most oak trees [in Parwara] have been severely lopped and many have been reduced to stumps" (2007 p.1448). The state Forest Department has even introduced a new species (*Pinus caribaea*), a fast growing chirpine species, to pick up the slack in satisfying the growing demand for timber and resin.

The size of the resource system is 707.1446 acres, which has increased over time due to a donation of 92.9096 acres of civil forest from the state Revenue Department in 1990.

The economic value of resource units is broken down in such a way, each bundle of grass (20-30 kg) taken by members during times of 'collective harvesting' is at least Rs.1 per bundle (US\$1 = Rs. 48 in 2001), since the Parwara VPC charges the Rs.1 fee per bundle during this time.

One bundle (approx. 20kg) of fodder tree material is worth at least Rs. 5; and, oak trees are ranked to be much more valuable than chir pine, as well as being worth more than the fines attributed to illegal lopping.

The productivity of the system has been threatened by overgrazing, which have led to soil erosion, and degrading growing conditions. The VPC (with help from government 'experts' in the Forest Dept.) have increased restrictions on grazing and grass cutting on a relatively small part of the Parwara VP. Users have not taken any initiative to increase the quality of the forest products, nor the distribution of these products in this respect at least. In the case of forest trees, the excessive lopping (both legal, before 1990, and illegal) combined with ineffective attempts by the VPC at stopping illegal activity, and new tree plantations by the Forest Dept., private households have decided to raise oak trees on their lands themselves. Most households in Parwara have a few oak trees on their lands for fodder and fuel wood use. Fodder trees have faced increasing overuse to the point that older oak trees usually don't reach full growth; and to further complicate matters for users, there are no alternatives in the area to use for timber and fuel wood.

In an effort to provide equal distribution of grass over time, the VPC (with help from the Forest Dept.) have taken measures to regulate/restrict use and increase forest quality (overall). Right-holders are restricted from collecting bundles of grass to certain days and months of the year, and the Forest Dept. has increased plantation projects to improve soil conditions and increase tree counts. As far as forest trees are concerned, lopping by villagers has been prohibited since 1990; when increasing demands was leading to rapid oak tree loss. Even though, market and population pressures have still increased since then, as well as, severe degradation in the oak tree populations in Parwara, there doesn't seem to be a crisis situation (or panic) among regulators or users. The Forest Department has introduced the chirpine species to the area to provide timber for construction, and households in Parwara have begun to grow their own oak tree supplies; which have shown to take very little pressure off of the rest of the forest, but still, the people and governing bodies in the area do not seem alarmed. [2007]

Ground cover tree species have faced serious decline due to overgrazing and soil erosion, which have led to rather poor growing conditions; thus, the forest may not be able to handle massive growth (or storage) of trees. Also, most trees are stumps or saplings, very few reaching a diameter wider than 20 cm. [2007]

In a flow chart form, that has led to poor storage abilities, the system looks like this: Overuse of fodder trees → decreased seed production → poor oak tree regeneration → excessive lopping to meet needs → prevention of oak trees to grow properly or fully → serious forest degradation and decreased storage ability of the system. [2007]

There are no distinct and/or stable microenvironment or ecological zone(s) within the resource system; nor are there any strategic points within the resource system where the main flow of resource products can be controlled.

There is variation over space in the availability of resource products within the resource system, in the form of many degraded patches that cannot grow forest products; as well as, restriction on use of products grown in rehabilitation areas.

The flow of resource products, and their changes, are documented as yearly/generational changes in flow of resource products; changes in operational rules to keep up with increasing demand and degradation have been done mostly on a generational basis, and not due to any sudden shocks. The restriction in the flow of resource products is done with equitable distribution among users in mind, always.

The topography of the location in and around the resource system appears to be, according to the map below, moderately dense to open forest - Nainital has been described in several articles as a hill district, so the terrain is most likely not completely even.

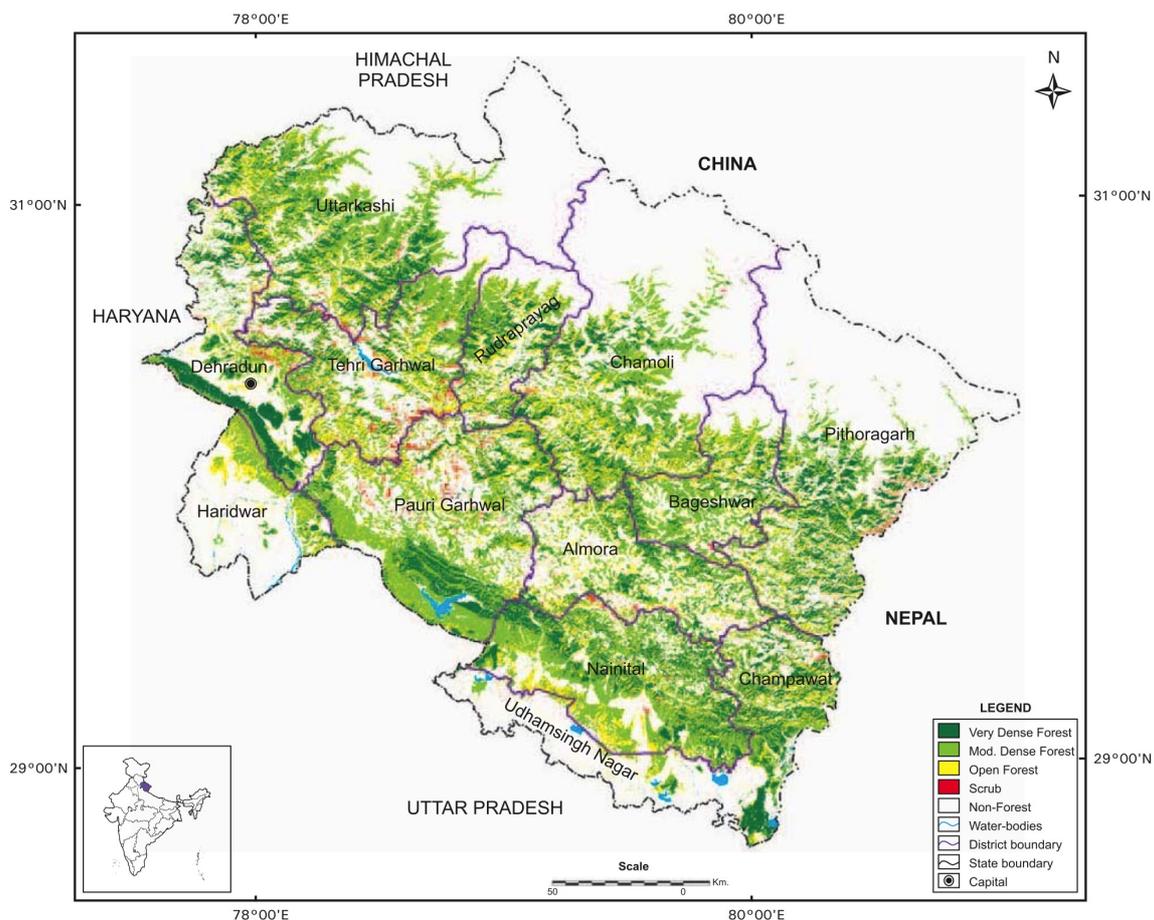


Fig. 7.28 : Forest cover map of Uttarakhand

Source: State of Forest Report, 2009, Forest Survey of India

If no rules were being followed, the relationship among the appropriation processes would most likely not be chaotic or conflicting, and there would likely be no additional adverse effects to the forest. Most users have lost faith in the regulatory system of forest resources, and are not afraid to take measures into their own hands if necessary (i.e., by planting oak trees on private lands to obtain fodder and fuel wood). Also, the sanctions for illegal use do not deter illegal use at all, as violators can reject fines assigned to them (thus, making the fines invalid) and have also figured out ways to benefits from illegal lopping without getting caught actually cutting down the trees.

Boundaries:

The boundaries for the appropriation resources (grass and forest trees) include the entire Parwara VP forest, and are institutionally defined. The boundaries of the production resources, dry leaves and fodder from forest trees, lie within the Parwara VP forest and are defined institutionally. The boundaries of the distribution resource also lie within the Parwara VP forest and are also defined institutionally. The boundaries for all three classifications of resources are roughly equivalent to one another are within the boundaries of the location, which includes Parwara village and the reserved forests.

There is no division among multiple general-purpose local jurisdictions at a single level in this system, but there is division across levels, from the Parwara VPC to the state Forest Dept.

The Parwara VP forest is reportedly within 50 km of Nainital City, the largest city in the Nainital District and the home of the district level government, which helps regulate the activities of the Parwara VPC and use of the appropriation resource.

The scalar relationship between resources is that the appropriation resource encompasses the production resource, which in turn, encompasses the distribution resource.

Independent of development projects designed by non-residents, mostly because there aren't any reported development projects (at all); the state Forest Dept. was supposed to design development principles for the village, but has yet to complete this task.

Location Report:

The nearest large city, and closest administrative center, is Nainital City; and Parwara is located approx. 50 km away from Nainital City, on the Ramgarh Nainital Rd., about 2 km off of the main road.

The boundaries seem to be largely institutional, and no distinct ecological boundaries appear to be present.

The population is mostly permanent, except for a few (apparently) nomadic encroachers that come during certain seasons; also, there is a number of right-holders that, while holding rights to the Parwara VP, also have rights to other forests - and may reside in those other areas (and visa versa).

The communication between the population and officials in a nearby administration center is almost non-existent for villagers, and very little for the Parwara VPC. The higher levels of governance share less and less information with the users every year, and actually, the state Forest Dept. did not even consult or discuss the plantation of chirpine with any area residents before going ahead with that project. The communication between the villagers and the VPC seems to be regular, however, villagers view the VPC as powerless and as such do not always report problems in the forest.

Institutional Analysis:

The institutions for this system have changed severely over time, in order to try and reconcile demand for forest units and the physical condition of the forest as a whole. The presence of state level government has increased dramatically, from being barely noticeable in 1988 to an everyday sighting in the 2000's, through state level coordinated forest plantation/rehabilitation projects. As state level presence has become more apparent, local level control of forest management has declined significantly - changing the relationship between local government and higher levels. Although no violent conflict has been linked to Parwara village, specifically, the national government has instituted new programs to help ease the growing tensions between local residents and higher-level government officials.

Institutional Changes:

Over the time period, approximately 75-80 years, there have been numerous institutional changes in attempt to more efficiently and equitably distribute resource units from the system. Since 1988, the most recent changes include:

- Acquisition of approximately 92.9 acres of van panchayat forest from the Revenue Dept. controlled civil forests in 1990. The effects of this acquisition have been minimal in forest degradation, as well as no reported conflict.
- Van Panchayat Inspector position created in the 1990s, the role of the Van Panchayat Inspector is to regulate activities undertaken by the Van Panchayat Committees in the state of Uttarakhand, and to report to the state Revenue Dept. Parwara villagers have expressed that the Inspector only visits once a year to do an audit of the Committee's account, and does little to regulate the actions of the Committee.
- Multiple-Property Rights describes the situation for residents, and non-residents, that have proprietary rights to the Parwara VP forest, as well as, another forest in another part of the country. This has caused a lot of confusion when trying to decipher who is a primary stakeholder, one who uses the forest regularly, and who is not; there has been no reported conflict, as of 2007.
- Joint-Forest Management is a program introduced by the national government, to a selection of states (including Uttarakhand), with the goal of improving relations between villagers/local governments and state-level governments. This program, in the case of Parwara, has decreased

the Parwara VPC's capacity to manage the VP forest dramatically. To the point where all rule changes must be approved by the Sub-Divisional Magistrate and the Forest Dept. staff, increasing the power of these two entities. There has also been increased power given to the Revenue Dept. and state Judiciary in overseeing all sanctioning procedures for illegal users.

- Relaxing of fine collection for illegal users has also increased over time in Parwara, due to the underlying tensions between the village and higher levels of government. The most important instance being the reluctance of the Parwara VPC to report serious pilferage or non-payment of fines to the Patwari (sub-division level), out of fear the offender will be taken advantage of by the Patwari. Also, the Parwara VPC has been known to report a lesser charge for local offenders, than what these offenders had actually done - because, if the fines assigned exceed Rs. 500, the Patwari and state Judiciary must become involved, and the VPC does this to protect the offenders from this higher government officials.
- There have also been several changes to the operational rules in the Parwara VP forest, in order to deal with increasing demand. Grazing and grass cutting are now prohibited in newly planted rehabilitation areas that are controlled by the Forest Dept., but enforcement of this new regulation is very difficult - and most users allow their cattle to graze wherever they like. Collection of dry leaves, once so unrestricted a neighboring village had user rights, is now restricted to March-May collective harvesting time periods. And finally, lopping of fodder trees is now totally prohibited, and collective harvesting for bundles of fodder occur September-October.

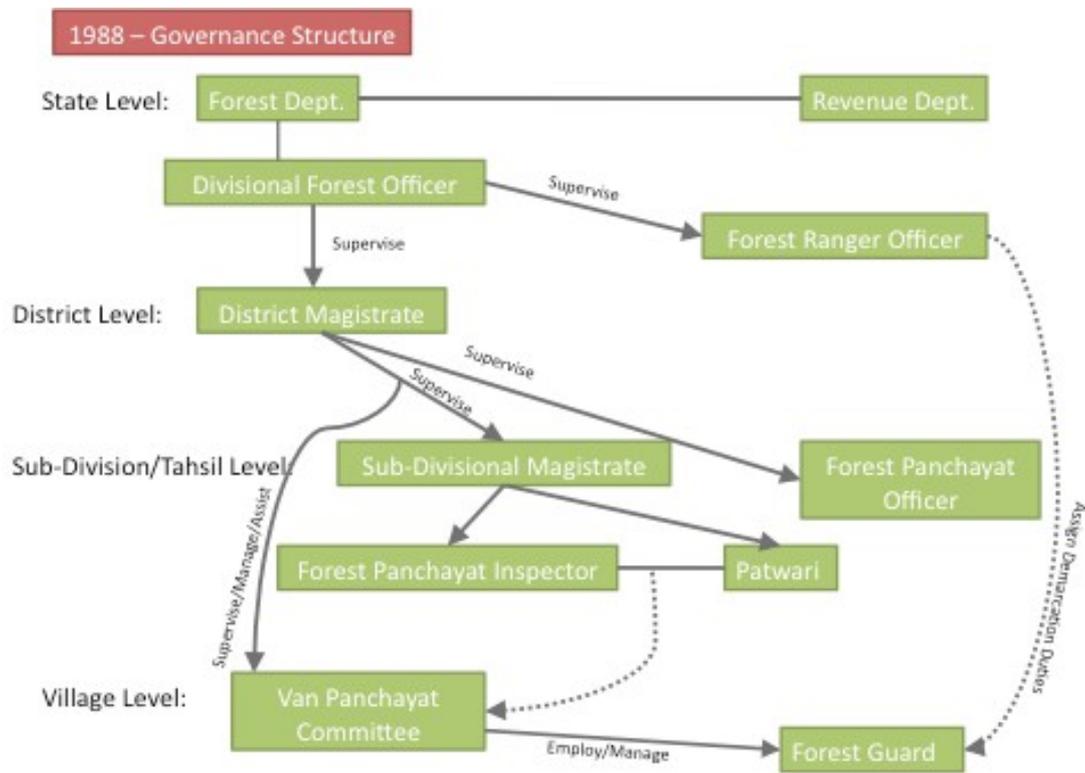
Forest Condition Changes:

- Soil Erosion from excessive grazing has made it difficult for grass to regenerate in many areas, and has also made it very difficult for oak trees to develop correctly - leaving many areas in the forest dry and uninhabitable for plant life.
- Oak tree decline has become rather severe in recent years, of the sample taken in 2007, most oak trees are either saplings or stumps. Locals have taken to growing oak trees on their own property if possible, however, many families are not able to do this.
- Erratic behavior of overall species richness also showed up in the study done in 2007, species richness for all plants (trees, shrubs, woody and herbaceous climbers, etc.) was very uneven between sample plots; while this is important information to keep for the future, no previous study had been done for this forest in this way - so comparison over time is very difficult.

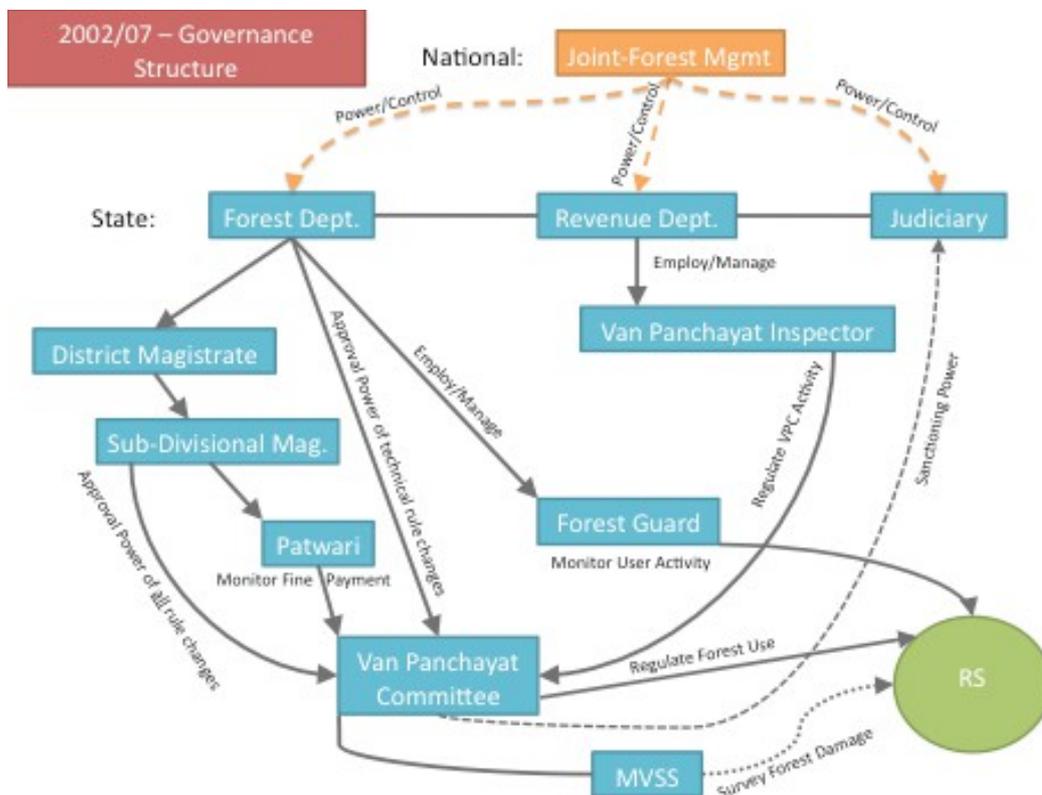
Charts:

The charts and diagrams below help illustrate the institutional relationships of the Parwara Van Panchayat Forest system.

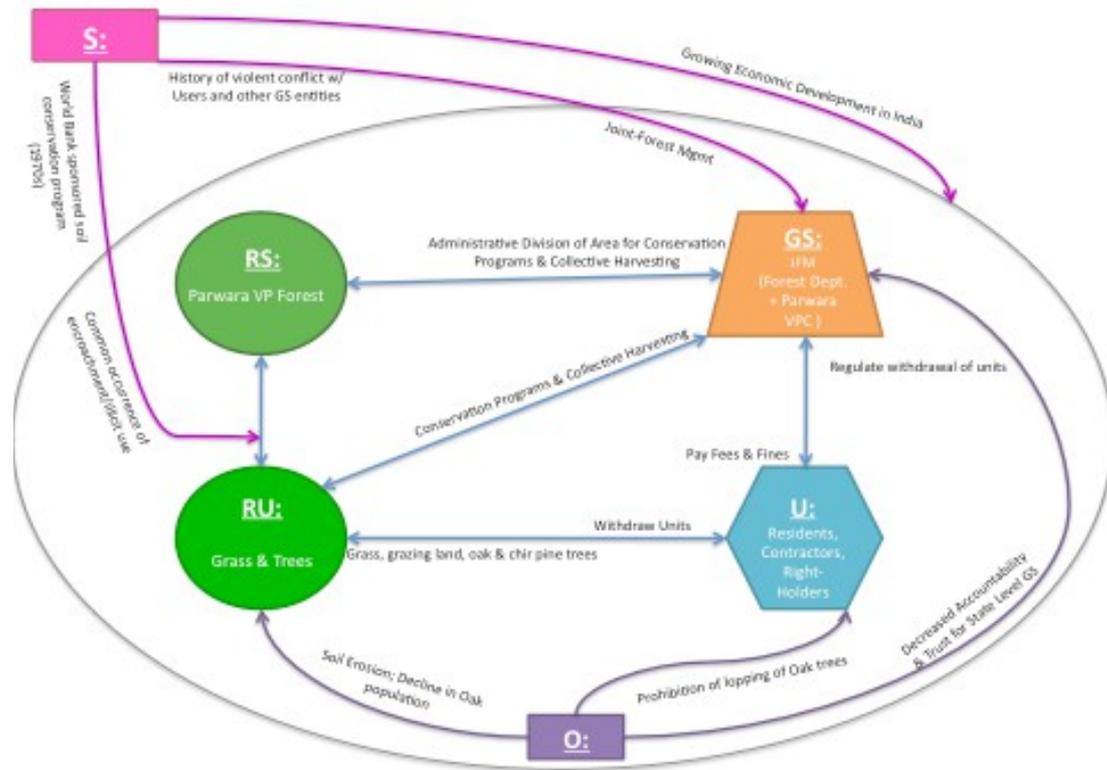
This diagram below is of the government structure of the 1988 time period, this structure depicts the relationship between the different governing entities from the state level through the village level.



Below is the 2002/07 Governance Structure diagram, which illustrates the changes in relationships between the different entities since the 1988 time period. Including the implementation of Joint-Forest Mgmt (JFM): a national level program, intended to bridge the gap between State level entities and villagers; however, it has ended up actually reducing the control of the VPC and giving more power to State entities to manage forest products.



* * *



The above diagram is a modified version of the Ostrom 2009 Robustness Diagram, used here to illustrate the institutional relationship of all parts of the system.

RS: Resource System

RU: Resource Units

U: Users

GS: Governance Structure

O: Outcomes

S: Social, economic, and political settings

Operational Level:

Type of Situation:

The process of appropriation is laid out in the table below, which is administered by the members of the Parwara VPC, the Forest Guard, and occasionally the Forest Dept. staff.

Rules by activities:

Grazing: Prohibited only in areas handed over to the FD for rehabilitation, otherwise unrestricted.

Grass Cutting: Restricted in newly planted areas. Collective harvesting for 15 days, Sept. -Oct.

Fodder: Lopping prohibited for villagers (since 1990). Collective harvesting of fodder trees Mar. - May

Fallen Twigs/ Dry Leaves Harvesting: Unrestricted

Timber: Prohibited (since 1981)

The formal owners of the resource are the Parwara citizens (some residents, some non-residents) these citizens are the right-holders. These rights are well defined, and there is little confusion over who is and who is not a right-holder; right-holders have formal citizenship to the village of Parwara (or have a contract with the VPC, government, or citizens), and there are clear methods where one can obtain citizenship.

The time period covering the situation begins around 1931, when the Parwara VPC was founded, and ends in about 2007, when the last official article was written about the Parwara VPC, covering a time of approximately 76 years.

As of the beginning of this period, there has been little trouble for owners to have access to the resource, the resource is open-access and it is nearly impossible to exclude non-owners anyway.

Throughout the time period, there have been few attempts to restrict access to the resource, to non-owners, as restricting access is nearly impossible anyway. The VPC has tried to deter illicit users with fines, but it does little to help the excessive illegal use - and the villagers have made almost no attempt to restrict access to anyone; the villagers feel it is the job of the government (mainly, the forest guard) to keep illegal users out.

Events Marking the Beginning Action Situation:

Throughout the duration of this time period there have been few overt rule changes, but the changes that have occurred have been significant. In the case of operational rules, changes have included, the prohibition of lopping for fodder in 1990, and the restrictions on grazing and grass cutting. Constitutional rule changes were, the Joint-Forest Management programs, and that the Parwara VPC no longer has the power to make their own rules - requiring approval from the sub-divisional magistrate and the state Forest Dept.

Throughout the time period, the size of the resource system has increased; in 1990, the state Revenue Dept. gave their civil forest holdings in the Parwara area to the Parwara VPC.

The only reported technology that has been introduced to this system, during the time period, has been for rehabilitation/plantation purposes by the Forest Dept.; mostly to help speed up the rehabilitation process (while meeting market demand) through the introduction of the new chir pine species.

The most substantial external changes in the value of the units appropriated have been timber and fodder has risen due to its increasing scarcity, during the time period.

Increases in population/demand have led to an increase in the rate of degradation of resource units, making the quantity of units available much less, and not having enough to go around to meet all of the user's needs; patterns of withdrawal, however, has remained intact (for the most part) as the increased demand has just led to decrease in overall individual harvest levels - as distribution has, in the opinion of the users, remained fairly equitable, throughout the time period.

Throughout the time period, there have been changes to variables internal to the operational level; for instance, the introduction of the joint-forest management (JFM) program has changed the operation processes for the VPC and government especially. As time has gone by, and this new program has been introduced, the VPC (who in the past was in charge of operations) has been less and less involved - and has experienced a rapidly decreasing rate of power over the operations in the forest.

Conditions at the Beginning and End Period Covered:

At the beginning of the time period, the balance between quantity of units withdrawn and the number of units available (for biological resources) was described as a mild shortage on trees, as population was increasing rapidly in the early 20th century; but there was no shortage on grass for grazing and cutting.

At the end of the time period, the balance between quantity of units withdrawn and the number of units available (for biological resources) was described as now having a severe shortages in trees available, so much so the chir pine has been introduced to the area; and there has been increasing shortages in grass available, and new restrictions in collection and grazing have been put in place (likely, with more to come).

At the beginning, the balance between the quantity of units withdrawn and the quantity of units needed, given the usual patterns of use for these units (for physical resources) for grass was rather equal in need and withdrawal, as there were no restrictions on withdrawal; for trees, the need was more than the withdrawal rate, but the shortage was not a crisis for users.

At the end, the balance between the quantity of units withdrawn and the quantity of units needed, given the usual patterns of use for these units (for physical resources) in the case of grass, was that the need was a little bit more than the withdrawal rate, since new restrictions have been put in place with an increasing user population; and for trees, the need is severely greater than the withdrawal rate, esp. since there are just not enough units to meet the needs (and even illegal users are not to blame).

In the past, residents of Parwara were the primary consumers of the resource units; while, recently, residents are estimated to be the primary consumers - those with multiple property-rights and private contractors working with the government and private right-holders have made a huge impact on the level of use.

The quality of units withdrawn has severely decreased over time; most of the trees are stumps and there are many patches of degraded area where grasses cannot grow fully to feed cattle and provide grass to the people.

There are no problems with pollution in this or any other local resource systems due to the way units are being appropriated in this system.

The extent of technical externalities resulting from the appropriation activities of participants from this resource system is very low, there is little/no reported affect on other groups/SES's by the activities in the Parwara VP forest.

There is no interference reported between the appropriation technologies for this resource system and the appropriation processes for other systems in this location.

The level of maintenance, of the appropriation resource, has been rather intermittent and not very affective, there are many new plantation sites (by the Forest Dept.) that have kept the tree population semi-level; but the area is still facing an increasing rate of soil erosion and dead patches where trees have trouble growing naturally (without help) and grass cannot grow fully (in thickness and height). Villagers have done almost no work to keep up maintenance.

The level of trust among appropriators has decreased quite a bit over the time period, across all levels of use and governance. The higher levels of government no longer seem to consider impact on residents, for their projects, and don't seem to initiate any communication with residents unless absolutely necessary. The villagers no longer trust that the VPC has the power to do anything about illegal use, degradation, or interference from higher levels of government - and thus, don't see a point to communicate with them. However, there are no reported findings that villagers feel that the VPC is doing anything unfair, just that they (the VPC) has no power. The villagers, however, actively do not trust (nor have very much respect for) the higher levels of government (i.e., the Patwari, Forest Dept officials, and the VP Inspector).

There have been some informal changes to the property rights regime, over time. Over the years, through immigration and emigration, many right-holders now hold 'multiple property-rights' in Parwara and other areas.

Information Levels:

There are almost no maps and/or charts of the appropriation resource available (at least not on the internet, or offered by the authors). There are maps of the state of Uttarakhand provided by (the government); but it is not possible to find any maps at any smaller scale than state level.

If the appropriators have Internet access, then they can access these state maps, but there is no reported efforts of appropriators taking advantage of this.

For the most part, appropriators can be seen by each other while withdrawing units during collective harvesting times - but it is not hard to hide illegal use, as many violators commit their crimes in the dark nighttime.

It is not known if there are any appropriators in radio communication with each other while appropriating from the resource system.

The actions being taken, by appropriators or officials, to generate information about the condition of the resource include the JFM program, for the most part. The purpose of the JFM

program is to increase information sharing and communication between the different levels of use/governance to improve/sustain the resource system.

The only systematic records describing withdrawal from the resource system include the 2002 article, when some of the researchers took down information of average annual harvesting levels (2002, Table 3).

The only systematic records describing the physical factors that directly affected the resource system are provided by the various state and national forest agencies, esp. the Forest Surveyors, that take note of forest fires and the damage - also, there is a forest-mapping project underway through the national government level. Also, the volunteer group Mahlia Van Suraksha Samitis (MVSS) and the VPC take note of damage occurring in the forest by illicit use on the monthly basis.

The systematic records describing appropriators' contributions to monitoring of the resource system include the information provided by MVSS and VPC, the only appropriators that voluntarily monitor resource damage/conditions on a regular basis - there is also a forest guard, but his impact is little to none.

The indication as to whether or not there are arenas being used for the exchange of info about conditions of the resource system is provided by the monthly VPC meetings allow residents, other appropriators, and MVSS to discuss the condition, and other mutual problems, in the resource system - and possible solutions/actions they are capable of achieving.

Appropriators are rather familiar with the characteristics of this system in that they are mostly residents and have a local knowledge of the system - but this does little to halt degradation of the system.

Potential Actions and Levels of Control:

The specialized staff or workers to undertake system maintenance are the Forest Dept. staff that undertakes rehabilitation/plantation projects - including the forest guard, who is hired by the Forest Dept.

The quantity or quality of units available to the appropriators has been adversely affected by the strategies of prior appropriators; due to the lack of restrictions may have led to the excessive use of resources; also, the weak sanctions make it much more difficult to increase the level of sanctions for illicit use now.

There are no problems with pollution resulting from activities of other who are not appropriators of this resource or inhabitants of this location.

It is not known if there are any insurance mechanisms available to the appropriators related to variability of income from the resource system, but there most likely is not for the majority of the users (highly confident).

Patterns of Interaction:

The vast majority of the population is completely homogeneous, only about 3 households belong to a different caste than the rest of the population; therefore, there is little to no conflict/affect on communication among and between subgroups based on: ethnicity, clan, race, caste, religion, language spoken, and/or general cultural views of the resource system.

Violating the rules-in-use related to the appropriation of the resource may result in: very weak social sanctions, those that have been reported have been social out casting - but it has not been utilized as of late. There are not physical sanctions for violating the rules-in-use to the appropriation resource; and the only official sanctions permitted are fines, that are generally considered low and rather easy to evade payment.

As of the end of the time period, violations must now go through the Judiciary (state) and Revenue Dept. (state) after being recorded by the VPC. If the VPC has trouble-collecting fines - they may enlist the help of the Patwari (sub-division level). The VPC rarely reports offenders to the Patwari, as they fear the Patwari will take advantage of the offender (which means that the Patwari probably does take advantage on a regular basis).

Positions and Participants:

As of the beginning and end of the time period; the position of non-appropriator is held by non-citizens, and those not contracted by citizens, of Parwara village

As of the beginning and end of the time period; the general estimate of any undocumented number of appropriators was not known.

As of the end of the time period, the general estimate of appropriators was 875 residents; this number does not include residents of other places that hold proprietary rights in Parwara.

As of the end of the time period, the 'official' position of monitor (apart from willingness of all appropriators to monitor) is held by the forest guard (hired by the Forest Dept, but paid from the VPC acct.). This forest guard is not employed full time. There are also two VPC hired forest guards, but they have not been able to receive payment because of conflicts between the VPC and the Forest Dept. The forest guard monitors the rules-in-use and (increasingly often) the Forest Dept.'s plantation projects (as many illicit users have targeted these areas for easy extraction). Throughout the time period, appropriators have not monitored appropriation activities of each other, apart from the monitoring 'official' guards perform. The residents feel that it is the forest guard's job (since he's paid), and that it's not their problem.

Evaluation of Results:

No appropriators were consistently disadvantaged during this time period.

There was no indication of whether or not the relatively worse off appropriators have or have not been cut out of their benefits from this resource system or substantially harmed.

The distance between those who were least disadvantaged and most advantaged could be characterized as negligent over time; overall, the users themselves feel that units are distributed rather equally.

Author's Evaluation of Results:

The author doesn't really focus on the readers' concept of results and the evaluation of results.

The forestland is protected; however, the author's consistently overestimate the condition of the forestland - usually by comparing it to other forests in the area.

The authors give information on the results in mostly a general form (but the 2007 article does have a lot of specifics about the trees); the evaluation consists of comparing the forests to other forests in the areas (and different management types), and discussing possible causes - some of which are discussed entirely too generally (i.e., the market pressures).

There is consideration for potential threats, the ones commonly listed are: market pressure, population increase, and "politization" of users.

There is no significant, or specific, discussion on withdrawals per unit of effort.

Subgroup Level:

Participants:

Membership of the subgroup is defined as, citizen of Parwara (but not necessarily a resident).

Occupation(s) of members of the subgroup is, mainly agriculture, but there are many construction and mining activities reported.

The different castes include: Kshatriya (though, none of the households define themselves that way anymore), Brahmins (the old Kshatriya's), and Scheduled. The proportions of castes to one another are: of approx. 135 households, 129 identified as Brahmin, and the rest are assumed Scheduled [2007]. There has been no reported conflict between caste types - and the village has worked out ways to include everyone (see 1988 VPC election information).

To obtain citizenship, an individual or household must immigrate to Parwara for a number of years (at least 10 yrs.) and be ready to contribute to their share of total expenditures; and then apply for permanent citizenship to obtain full rights (1988), this criteria is well defined.

The estimated membership total is 875 individuals that are residents, there is no estimate of non-resident right holders.

Characteristics of the composition of this subgroup population with respect to variables that may affect the capacity to communicate effectively are: ethnic/cultural identification, most identify as Hindi (no non-Hindi residents listed); racial identification, n/a - all the same race; caste identification, most are Brahmin; religious identification, there are no non-Hindu right holders reported; languages spoken, the only language reported to be spoken is Hindi, and all of the right holders speak Hindi.

Legal Rights:

Right-holders have legal rights to access the entire VP forest, and cannot be excluded.

Right-holders have lawful rights to withdrawal, as regulated by the VPC and other government entities. In terms of grazing, withdrawal is unrestricted, except in areas designated for rehabilitation. In terms of grass-cutting; withdrawal rights include 1 bundle per day during the 15 days from Sept. to Oct. designated for collective harvesting. For dry leaves, unlimited withdrawal from March to May is allowed. For logs (for fodder/construction), each household has the right to chir pine logs from the reserved forests (regulated by the Forest Dept).

Right-holders (adults) may participate in management by running for election to the nine member VPC in Parwara, right-holders may voice complaints/concerns/suggestions to the VPC during monthly meetings, and right-holders may help monitor forest damage/activity voluntarily (i.e., MVSS).

Exclusion from use of the resource is attempted, but not usually successful. In the case of encroachment, regulators serve evictions notices - but are usually ignored, and have no authority for any other action. In the case of illegal lopping, violators have developed methods that prevent the VPC (and others) from having evidence as to the identity of the violators - and the VPC end up auctioning off the lopped trees to villagers anyways.

There are separable rights of transfer to the flow of units from this resource held by this subgroup; mostly done through private contracts, or auctions facilitated by the VPC or the Forest Dept.

Stakes and Resources:

The subgroups has regularly appropriated from the system year-round, but different units have different seasons of use. Dry leaves and fodder are appropriated from March to May, grass-cutting is done from Sept. to Oct.; grazing is done year-round, and logs are collected periodically based on availability.

The estimated proximity of member residences to the resource is extremely close (for residents), most live right against the resource system. Non-resident right-holders usually live pretty close (within the Nainital District) [highly confident].

Children of appropriators do inherit appropriation rights when they become adults; that is how the multiple-property-rights situation came up (for the most part, immigration and emigration was also part of it).

The members are completely dependent on the resource, cattle/agriculture/construction are the prime income generators for villagers in Parwara - so much so, that many now grow their own oak trees.

MVSS group monitors forest damage, surveys the damage, and reports it to the VPC - as well as makes plans to try and prevent further damage to the forest (leadership). Also, those that grow their own oak trees (entrepreneurship).

The estimated time this subgroup works a substantial amount of time in activities not related with appropriation of the system is not known.

The proportion of this subgroup that currently appropriates similar units from other systems is not known, specifically, as part of the multiple-property-rights confusion.

There are no low cost alternatives of the supply unit available, for timber, the chir pine is not an effective alternative.

Potential Actions and Levels of Control:

There would be noticeable impact on the balance of the quantity of units withdrawn and the number of units available in this resource that would occur in a drastic reduction of this subgroups' appropriation activities. The balance of units would probably be restored if appropriation activities were to drastically reduce - but the reduction would have to be long term (at least 10 years), so that the forest had time to fully grow and recover.

Keeping in mind the physically available levels of withdrawal that are possible from this resource, the extent to which rules concerning different aspects of withdrawal constrain appropriation: the only reported restrictions on technology (that can be inferred) are the cost of mining in Parwara - and the hefty fines faced by miners if any damage is done to the area (which would be done through mining technology); the time limits are intended to give the forest time to recover from use, and this limitation does limit the amount of different activities (and the level of that activity) that can be done by users - since, esp., every user has the same time frame; the limits on quantity are intended to ensure equitable distribution of resources, which does limit the activities that users can do - as their physical resources are now limited (and become more limited the more users that come to Parwara); marginal units or units obtained by increasing levels of appropriation, fit the conditions of diminishing Marginal Returns - the severely decreasing supply is making appropriation and production very expensive. Many individual households grow their own oak trees, but this is expensive and many cannot participate. The higher levels of government are stepping in to take away the rights/abilities of the VPC, but cannot manage the forest properly themselves - so excessive/illicit use is easier to accomplish under the watch of the Forest Dept. than the VPC.

Technology:

The appropriative power of the technology used does not threaten the balance between units withdrawn and units available (even if no new users are added) [inferred].

Strategies Adopted:

The rate of unit withdrawal, near the end of the period, the average household (as part of a sample surveyed by the authors) collected about 131.33 quintals of forest tree materials per year, and owned about five units of cattle; estimates for unit withdrawals at the beginning of the period are unknown.

At the beginning and end of the time period, appropriation resource grass was used for cattle grazing, cut for making mulch and manure (grass); and the trees were used for fodder, construction timber, and fuel wood.

During the time period, members have not invested resources (i.e., their own labor) in maintaining or improving the structure of the appropriation resource.

Presumably, with multiple-property-rights, some do have access to alternative supply sources - but the article don't say; also, some have taken it upon themselves to create an alternative supply source of oak trees.

According to interviews with the VPC (by the authors), most members do follow the rules - but that has not stopped illicit use, nor has it halted degradation of the forest.

Subgroup Results:

The estimate percentage that this subgroup appropriates of its total appropriated units, at the end of the time period was 91-100% (highly confident).

By the end, the appropriates from this resource system have been increasing.

The absolute quantity of appropriation units obtained by this subgroup has increased.

Operational Rules Report:

Concerning collective-choice, relating to the resource system, the jurisdiction structure (governance structure), in relation to the type of resource appropriated by this subgroup, can broadly be described as: *National Collective-Choice: a level of government that may exercise jurisdiction over appropriation*, but doesn't usually exercise much authority over the system - other than instituting the JFM program in the early 2000's; *Regional Collective-Choice: a mechanism that may or may not devise operational rules*, all rule changes proposed by the VPC must be approved by the Sub-Divisional Magistrate, and technical rule changes must be approved by the Forest Dept.; *Local Collective-Choice: a level of government or organization of appropriators at the location*, the VPC no longer has the power the craft rules - and very little power to enforce them. Most enforcement goes through the Forest Guard, who reports the Revenue Dept. and the Patwari - who have more authority to enforce rules, and more importantly, sanctions.

Boundary Rules: rules defining the requirements that must be met before individuals are eligible to harvest/withdraw units from the appropriation resource. (Also, state the level of creation/enforcement of the rule and whether or not the rule assigns substantially unequal privileges to some subgroups over others).

A rule exists that states, that one must be a citizen of Parwara to use the resource, but not necessarily a resident. This rule is enforced at the local and rules-in-use levels.

A rule exists that states; payment of a fixed fee of entry during times of collective harvesting is required, every time the resource is accessed.

A rule exists that states; payment of a seasonal fee is required.

A rule exists, permitting the purchase of access rights to the resource in an auction.

A rule exists, permitting ownership or leasing of land in the location of the resource. This rule is enforced at the state rules-in-use level.

A rule exists, within one generation of potential resource appropriators; entry rights can be given, leased, or returned to others on a temporary basis, but not permanently severed. This rule is enforced at the national constitutional rules level.

A rule exists, when a transfer on a temporary or permanent basis is allowed, a local collective choice arena containing some non-appropriators determines to whom such rights can be transferred.

Authority and Scope Rules: (Also, state the level of creation/enforcement of the rule and whether or not the rule assigns substantially unequal privileges to some subgroups over others).

There is a rule, requiring withdrawal up to a fixed number of units during a period, based on membership/non-membership in an organization. Enforced at the local and rules-in-use levels.

There is a rule, requiring withdrawal only during specific seasons of specific units, based on membership/non-membership in an organization.

There is a rule, requiring withdrawal at specific locations, based on membership/non-membership in an organization.

Payoff Rules: that all appropriators can retain whether they can physically keep hold of and no external rewards, taxes, or sanctions are imposed/not imposed in this case.

Incarceration is not imposed as a penalty on appropriators for breaking rules related to the appropriators for breaking rules related to the appropriations of the resource. Fines are sometimes imposed for breaking rules, but are ineffective in stopping any rule breaking; and rights can never be severed due to rule breaking activities. Aid can be obtained to develop and/or repair number production, distribution, or appropriation of resource, but the Forest Dept. and national government entities. Specific assignment of unequal rewards and/or punishments is not reported, but the suggestion is made by hesitation of the VPC to report non-payment of fines to the Patwari.

Overall Questions About Rules Configuration: The general framework of the rules-in-use has governed the activities of this subgroup for 75 to 80 years.

Social, Economic, and Political Settings:

There has been increasing economic activity all over India, which has led to increasing development in areas around Parwara (namely, Nainital City).

The political sector has been relatively stable, since the enactment of the van panchayats, but - recently - the JFM program has caused some tension between residents and state level government entities.

The national government has enacted several resource policies to help manage and preserve the forests in India; these policies include the Van Panchayat Act, Indian Forest Act, several Forest Conservation Projects undertaken by the Forest Dept., and the Joint-Forest Management program.

Market incentives that have, over time, increased the use of the appropriation resources include, construction in nearby Nainital City, and increasing development (globally) overall.