

## Background

Sociocultural norms and practices shape people's ownership rights and access to assets such as land, water, and household property (livestock, income). Different members of the family have different access and responsibilities. Men are often engaged in ploughing fields, whereas women are engaged in collecting and fetching water, fodder, and fuelwood. Apart from sharing almost half of the farm work, women also have household duties. Hence it is necessary to look into men's and women's roles, responsibilities, knowledge, needs, contributions, and rules and regulations governing the natural resources. Several questions were asked regarding the access to and control over assets so that natural resources could be properly managed on an equitable basis. PARDYP carried out studies in the Jhikhu Khola watershed to address these issues.

## What are Feasible Local Rules and Practices for Ensuring Equitable Access to Natural Resources?

Some of the rules and practices used by the inhabitants of the watershed were documented through case studies.

### Case study: Gaukhureshwar Community Forest

Equitable distribution of resources among different populations and between men and women is essential for the balanced development of a community. Traditionally, different rules and regulations were practised for equitable distribution. One practice in the Jhikhu Khola watershed is 'gola pratha' (lucky draw). This traditional approach has been incorporated into the community forest regulations.

Gaukhureshwar Community Forest is a 21.5 ha mixed forest of *Schima wallichii*, *Castanopsis indica*, *Castanopsis tribuloides*, and *Rhododendron arboreum* located in Dhulikhel municipality, Kabhrepalanchowk district. The District Forest Office handed over the forest to the community in July 1992. The forest has users from eight major villages, with about 52 households in total, a population of 302, and an average population density of 16 persons per ha (as of 2004). Brahmins and Chettris are the dominant ethnic groups, providing 67% of the users.

Forest products are distributed on a household basis; each household has to pay NRs 240 annually, or NRs 20 per month. Each year the user committee issues membership cards to each household. The forest user group has an operational plan, which includes descriptions of rules and regulations, to ensure equal benefits and equitable distribution

of available forest products to all members, and for forest protection and management. The plan is submitted to the District Forest Office during the forest handover process. The forest user group manages and distributes forest products according to the agreed plan.

In Gaukhureswor, the community forest is opened twice a year for grass collection: two days in Bhadra (mid August - mid September) and two days in Asoj (mid September – mid October). During these days, all members of the user group are allowed to collect one bhari (~30-35 kg) of grass per day free of cost. Only one member from a household is allowed to collect grass. From Mansir to Falgun (mid November to mid February), fuelwood is collected by pruning and thinning, for which the forest is open four days a month. During this time one member can collect one bhari of fuelwood each day for free. All members can collect up to two extra bharis of fuelwood per day, but have to pay NRs 10 for the first bhari and NRs 40 for the second.

To ensure equitable distribution of fuelwood, the user committee has set up a rule of gola pratha (lucky draw). In this system, all wood from pruning is collected in one place and divided into equal bundles (bhari). To ensure reasonable distribution, each bundle is numbered and the number is put in a container. Each member picks a number from the container and receives the corresponding bundle.

From Mangsir to Jestha (mid November to mid May), members are allowed to collect as much dry litter for animal bedding as they can free of cost. Dry litter encourages forest fires, so unlimited collection is allowed on the assumption that its removal will help to reduce fire hazards. No one is allowed to collect timber from the forest, but if a household encounters natural disasters or calamities, a member can buy timber from the forest at a price 40% lower than the local rate. The maximum limit is set at five cubic feet per member. Non timber forest products (NTFPs) like lokta are the main source of income from this forest and are not distributed to the users but collected and sold communally.

One paid guard is appointed for security against illegal use. So far, the members have followed the rules and regulations, and very few members have been penalised. However, if someone cuts a tree illegally, collects fuelwood, damages small plants, or starts a forest fire, they have to pay a penalty decided by the committee based on the scale of damage. If someone cuts grass illegally, they have to pay NRs. 15, 20, and 40 for the first, second, and third offences, respectively. At the fourth offence the forest guard seizes the equipment and materials used for collecting grass. Similarly, if someone's livestock enters into the community forest, they will be charged depending on the animal: NRs 5, 10, and 20 for a goat; NRs 10, 20, and 40 for a cow; and NRs 20, 30, and 60 for a buffalo for the first, second, and third offences, respectively. The users' committee decides the penalty for the fourth offence. The annual income is spent on the guard's salary and establishment and maintenance of a nursery.

Users claim that because of the good understanding, cooperation among the members, and better management, the quality of the forest and availability of forest products has improved over the past 10 years.

### **Case Study: Juke Irrigation Canals, Jhikhu Khola watershed**

Juke canal is a farmer-managed irrigation system that extracts water close to Tamaghat bridge on the right hand side of the Jhikhu Khola. The system benefits 250 households in 13 villages. It serves command areas of about 45 ha of Panchkhal VDC with an average elevation of about 850m. The development of the Juke irrigation system is believed to have been associated with a traditional water mill that existed until 1983. The total length of the canal is 9.3 km, of which the primary canal is 2.7 km, the secondary 3.5 km, and the tertiary 3.1 km. The whole canal is simple earthen type, but 50m was cemented about 20m downstream of the main intake with the support of the SINKLAMA project in 1983.

The command area is divided into two parts: the head-end and tail-end. The cropping intensity of the Juke command area is about 250%. Around 92% of the farmers cultivate three crops per annum; four crops per annum has also been seen at suitable sites. In irrigated khet land, rice-potato-maize is the most common cropping pattern. Many new vegetables like chilli, bitter gourd, and brinjal have been introduced in the last 5 to 10 years. Farmers have also practiced intercropping mustard, sesame, pulses, and beans with wheat or other vegetables for home consumption.

With the intensification of cropping, the demand for irrigation water is increasing. Because of scarcity of water at the source and seepage, the Juke canal cannot supply water simultaneously to all command areas. Users of the head-end irrigate their land before the users from the tail-end. Having water allows farmers from the head-end to cultivate a higher number of crops compared to the tail-end. Regular cleaning of the canal is essential for irrigating the land in the lower strata. Therefore, to irrigate the land, users from the tail-end have to clean the canal regularly, although they only enjoy the irrigation facilities for a limited time. This has been the practice in the past.

To compensate for this disparity, the water user group charges different service fees for the users of the upper and lower end. The principle is that users who have more and easier irrigation facilities will pay more service fees. This rule was formulated by the users themselves in 2004 and has worked smoothly. The service fee for the upper area is set at NRs. 30 per ropani per year, whereas it is only NRs. 20 for the lower area. All the maintenance and cleaning is carried out by the fund raised from the service fees.

Irrigation always starts from the head because of the perception that water from the head will gradually seep downward. If somebody downstream is irrigating, upstream users generally do not divert water. However if someone needs water urgently, with mutual understanding they can share water at the same time. For the winter crop, the majority of tail-end users irrigate their land at night.

## **Access to Institutions and Information**

### **Social assets**

The Livelihood Survey 2005 found that 64% of respondents believe that various non-government and government organisations were working actively in the study area. However, 33% did not believe it and 4% didn't know. Further, 41% of respondents believe that they benefited from these organisations, whereas 57% didn't believe it and about 2% did not know.

### **Participation in formal organisations**

The Livelihood Survey 2005 found that 53% of respondent households had at least one family member participating in a formal organisation<sup>1</sup> such as a women's organisation or credit cooperative. There was no formal political participation among the surveyed households, although 27% of women were participating in women's organisations, followed by 18% in credit co-operatives. Self-help groups, marketing co-operatives, farmers' organisations, and religious and tribal organisations all existed in the study area. Some households were involved in more than one institution.

### **Political participation**

Political participation means using the right of voting in any election. Some 67% of respondents were participating in voting processes. The people in the area were politically active and aware of their political rights. Men and women voted in equal numbers, and participation in national and local level elections was above 50%.

### **Information**

People in the study area gathered information by means of Television, radio, newspapers, social gatherings, and informal meetings. Some 85% of households used these means daily, 14% only occasionally, and 1% never. Of the surveyed households, 49% had a television set and 83% a radio, and these were the main sources of information.

## **Access to Natural Resources**

### **Women responsible for fetching water and fodder**

Piped water is the main source of drinking water – 61% of the surveyed households used piped water, of which 41% used public and 20% private water taps. Springs are the second largest source of drinking water (36%) followed by other sources such as dug wells (3%). Two-thirds of the households spent 5 minutes or less for one trip to fetch water, 16% spent 5 to 15 minutes, and 18% more than 15 minutes. The maximum time reported per trip was 90 minutes and the least was 1 minute. In generally, fetching water has been the job of women. Men fetched 32% of total water and women 68%, and 29% of men and 61% of women were involved in the work (Livelihood Survey 2005).

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<sup>1</sup> Formal organisation means an organisation formed with a working committee and constitution.

## Adoption of on-farm options: grass

There has been a substantial decreasing trend in the availability of grass and shrubs in the Jhikhu Khola watershed over the last three decades. Due to limited access to community forests and small landholding sizes, forage availability is becoming of critical importance for sustaining the agricultural systems in the watershed. In order to address community fodder needs, PARDYP tested and distributed a number of promising fodder and grass/legume species that can be grown inside community forest and land and on private lands belonging to communities or farmers living within or outside the watershed. The species included sunhemp (*Crotalaria juncea*), tephrosia (*Tephrosia candida*), molasses (*Melinis minutiflora*), napier (*Pennisetum purpureum*), flemingia (*Flemingia microphylla*), stylo (*Stylosanthes guianensis*), vetiver (*Vetiveria lawsoni*), dinanath (*Pennisetum pedecellatum*), signal grass (*Brachiaria decumbens*), gini grass (*Panicum maximum*), joint vetch, tithonia (*Tithonia diversifolia*), guatemala (*Tripsacum laxum*), broom grass (*Thysanolaena maxima*), wynn cassia (*Chanaecrista rotundifolia*), kudzu (*Peuraria phaseoloides*), mott napier (*Pennisetum purpureum*), and hemata (*Stylosanthes hamata*). Distribution of potential fodder and grass and legume species to farmers within the watershed was initiated in 2000. A total of 477 kg seeds of different species and 14,570 seedlings or slips were distributed to about 500 farmers, either individually or in groups. PARDYP also built the farmers' capacities by awareness raising through workshops, meetings, study tours to demonstration sites, and training on methods of planting and raising the identified species, and also provided technical backstopping for their needs.

A survey was conducted in May 2004 on the access, status, and adoption of the species distributed; 51 households (about 10% of the total) were randomly selected for the survey. The sampled households represented the south and north aspects of the watershed, valley bottoms, and middle hills of four village development committees (Baluwa, Patalekheta, Hokse, and Panchkhal), and almost all the caste/ethnic groups in the watershed – Brahmin, Chhetri, Tamang, Danuwar, and Newar.

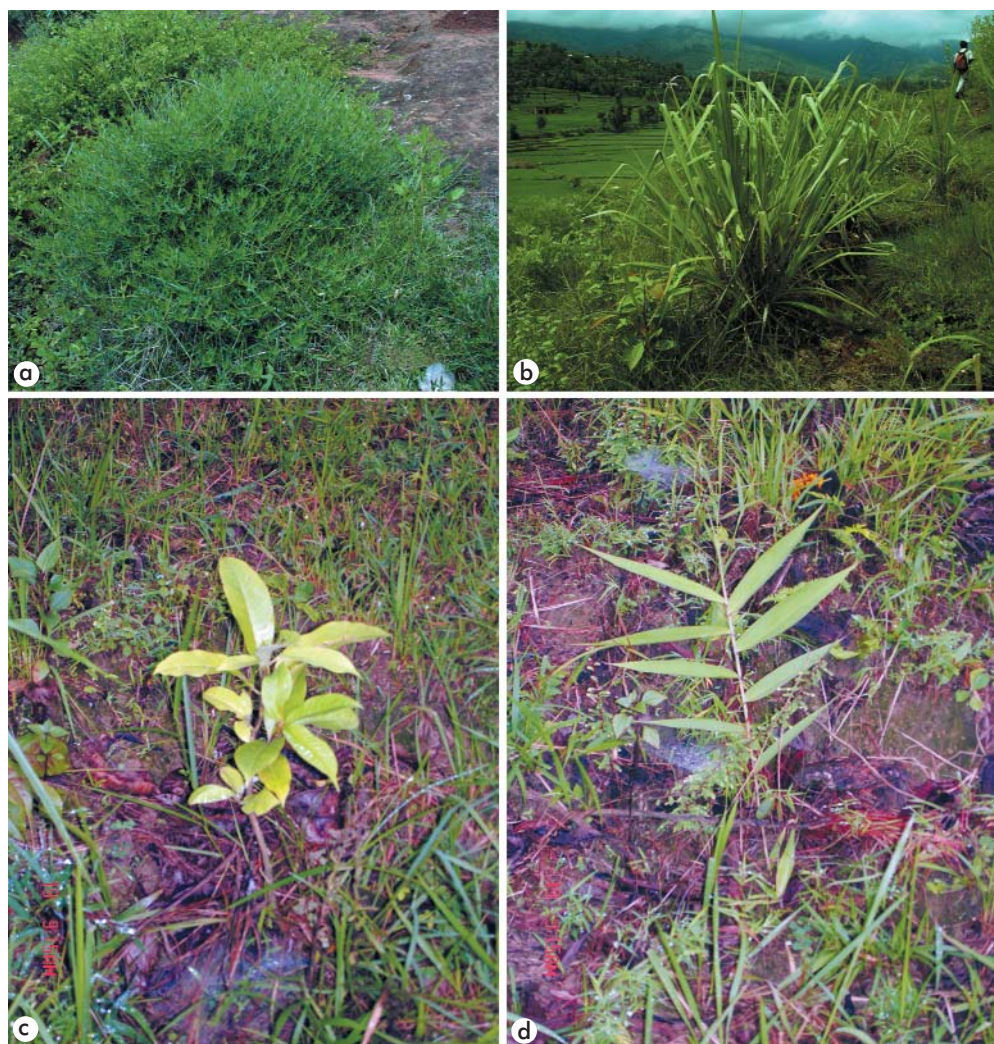
Depending on their needs and interests, the farmers took 1 to 12 species for planting in their private lands. At the time of the survey, about 90% of farmers had sown between one and nine species in their fields (Table 15, Figure 46).

About 94% of the farmers took seeds of sun hemp (*Crotalaria juncea*) and tephrosia (*Tephrosia candida*); and about 77% and 63%, respectively, were growing these species. The two species performed well in terms of survival rates and condition of the plants. Although 30 out of 51 farmers had taken cuttings or seedlings of Napier-NB21 (*Pennisetum purpureum*), only 19 farmers were growing it though the growth was excellent.

**Table 15: Grass species planted**

No of species	0	1	2	3	4	5	6	8	9
Number of farmers adopting	5	4	13	15	7	4	1	1	1





**Figure 46. Adoption of different fodder species**

a) Stylo (*Stylosanthes guianensis*); b) Guatemala grass (*Tripsacum laxum*);  
c) Champ (*Michelia champaca*); d) Amriso (*Thysanolaena maxima*)

Molasses (*Melinis minutiflora*) was distributed to 65% of the sample farmers, of whom 58% were growing it. A few farmers grew molasses mixed with stylo (*Stylosanthes guianensis*). One farmer in Hokse was impressed with molasses and grew it on almost all the riser bunds of his rainfed land; the total row length was more than 1 km.

The survey indicated that 73% of the farmers planted grasses for fodder; 13% for seeds; 7% for stabilisation of the terraces; and 2% for slide control, testing, and beekeeping. Sunhemp and tephrosia can be used as live fences, as stakes for tomato, and as firewood after drying. Molasses is an evergreen grass and stylo makes terrace risers very strong. One farmer planted tithonia for beekeeping purposes. Napier was the preferred grass species, followed by molasses (Figure 47). A few said feeding napier to cattle

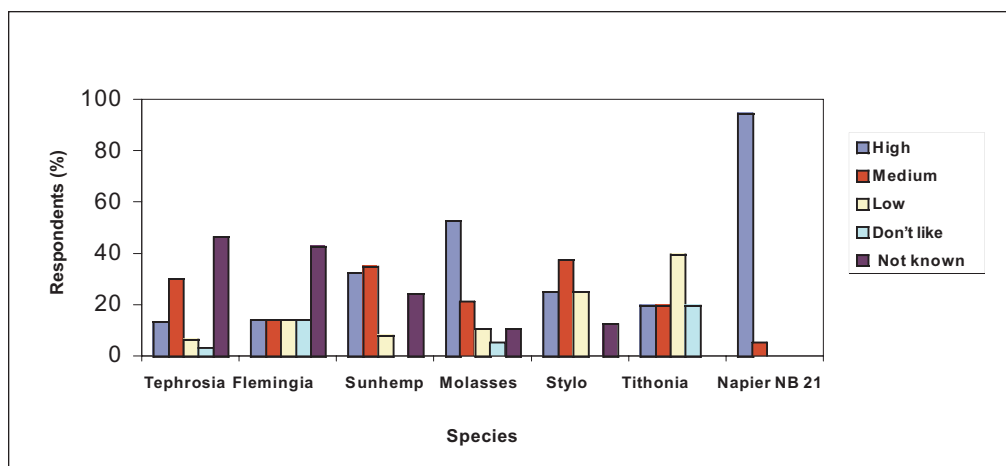


Figure 47: Species preference (ranking)

increased milk production. Napier was introduced a long time ago in the watershed (15-20 years) and is now widespread. Most livestock did not like the smell of molasses in the beginning but eventually started liking it. Stylo, sunhemp, and tephrosia were given second preference.

The grasses were mainly grown along bunds, mostly in single rows. A few species were planted in blocks. Biomass production of some of the grass species was recorded (Table 16).

Among the distributed species, the best performing were sunhemp, tephrosia, napier, and tithonia; molasses, stylo, and guatemala were medium; and dinanath, digital grass, gini grass, joint vetch, and flemingia were low performing species in terms of survival rates and healthiness.

The farmers preferred species with multiple uses. A few farmers said that stylo and molasses increased milk production in cattle and buffalo and were very good rainy

Table 16: Biomass estimation from different hedgerow species

Species	Biomass yield in kg per 100 m		Biomass yield in kg per sq.m
	Range	Average	
Tephrosia	400 to 1,200	840	4.6
Flemingia	400 to 600	500	10
Sunhemp	185 to 2,050	825	5 to 20
Molasses	60 to 1,500	475	1.5 to 16
Stylo	na	86	2.2 to 16
Napier NB 21	684 to 7,700	3,100	na
Tithonia			16 to 34
na = not available			

season forage. Tephrosia and sunhemp were good for winter. However, one farmer explained that due to the shading effect of sunhemp, growth of barley was poor, but later when cut to half its height production became very good.

Due to availability of fodder near their homes, most women were spending less time on fodder collection, and could utilise this saved time for other household work such as cooking, feeding livestock, and looking after their children.

People were collecting seeds and slips for further expansion, and some of them were distributing to their neighbours. The adoption rate was slow, but could increase if projects like PARDYP provide continuous technical support.

## Decision-making for Different Activities

There were significant gender differences in decision-making processes. About 40% of women played a role in selling and buying food items in small quantities, and decisions related to livestock, jewellery, and kitchen items (Table 17).

**Table 17: Decision structure by sex**

	Male	Female
Agricultural equipment	72	28
Food items: small	60	40
large	71	29
Education	72	28
Land	61	39
Livestock	59	41
Jewellery	53	47
Kitchen	60	40
Other	67	33

In almost all households (99%) at least one member had been out of the village in the past year; 11% of the households had made visits to the NGO office, 52% to a government office; 71% to their relatives; 88% to their parents' households; 93% to the market; and 67% to medical facilities. Around 2% had made visits to other destinations including church, abroad, and school (Table 18). The purpose of individual visits is also shown in Table 18. Only 2.4% of people had visited NGOs, 12.8% had visited government offices,

25.2% markets, 19.6% medical facilities, 39% parents' houses, 28.9% relatives, and less than 1% others. More men visited the NGOs, GOs, market, and relatives than women, but men and women visited medical facilities equally. Women visited parents' houses more than men.

**Table 18: Places visited out of the village**

Visited out of village	By household		By individuals (%)		
	No of HHs	%	Male	Female	Total
NGO Office	18	11	1.4	1.0	2.4
Government office	88	52	11.8	1.0	12.8
Relatives outside village	120	71	16.0	12.9	28.9
Parent's home	148	88	16.6	22.4	39
Market	157	93	16.7	8.5	25.2
Medical facility	113	67	9.8	9.8	19.6
Other (abroad, school)	3	2	0.5	0.4	0.9



## **Lessons Learned and Recommendations**

### **Local rules and practices**

- Indigenous methods such as gola pratha (lucky draw) rooted in community practices are sustainable natural management tools, and need to be explored to promote equitable distribution of benefits.
- Equitable contribution (service fee) and distribution of benefits is a key strategy for sustainable management of community activities.

### **Adoption of on-farm options**

- Activities that can be easily sustained and that fulfil people's daily needs are generally adopted.
- Napier is the most preferred grass species because of its growth and acceptance by livestock.

