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## Anhang

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Table 3.1. The studied landslides and slopes and their characteristics

Tab. 3.1. Die untersuchten Erdrutsche und Böschungen mit ihren Eigenschaften

mon = monsoon, dry = dry season, sl = slide, disp = disposal

Study plot	Transect No.	Vegetation type of anchor	Altitude a.s.l.	Aspect 0-400°	Slope %	Type	Occurred	Stabilization measures
1	1- 3	mesohygrophilous forest	1120	375	65	slide	mon 80	technical/fence/ Alnus
2	4- 6	mesohygrophilous forest	1180	375	68	slide	mon 77	technical
3	7	xerophilous forest	1450	225	80	cut/sl	mon 80+81	technical/ Alnus + Eupatorium
4	8	shrubland	1690	150	70	disp	dry 76/77	technical/fence/ Alnus
5	9	shrubland	1690	200	70	disp	dry 76/77	-
6	10	mesohygrophilous forest	1810	250	80	cut/sl	mon 81+82	technical
7	11	Pinus patula-afforestation	1970	300	85	slide	mon 81+82	-
8	12-13	hygrophilous forest	1990	350	90	slide	mon 79	-
9	14	shrubland/hygrophilous forest	1990	75	90	cut/sl	dry 77/78	-
10	15	shrubland/hygrophilous forest	2010	400	75	disp/sl	dry 77/78 mon 80	technical/fence/ Alnus
11	16-18	shrubland/hygrophilous forest	2040	250	85	disp	dry 77/78	technical/ Alnus
12	19	shrubland/hygrophilous forest	2040	200	75	slide	ca. 1955	-
13	20	shrubland/hygrophilous forest	2090	250	80	cut/sl	dry 77/78 mon 78	technical/ Alnus + point turfing
14	21	hygrophilous forest	2120	25	65	slide	mon 78	-
15	22	hygrophilous forest	2170	325	95	cut/sl	mon 78-80	technical/ Alnus + var. seeds
16	23	pasture land	2570	250	75	disp	dry 77/78	-
17	24	pasture land	2620	100	90	cut	dry 78/79	fence/ point turfing
18	25	pasture land	2560	125	78	cut	dry 78/79	technical
19	26-27	pasture land	2500	150	90	disp/sl	dry 78/79	-
20	28	pasture land	2500	150	85	disp	dry 78/79	Alnus
21	29	pasture land	2530	150	95	cut	dry 78/79	technical/ Alnus
22	30-31	mesohygrophilous forest	2550	275	73	slide	mon 82	technical/ Alnus
23	32	mesohygrophilous forest	2440	275	90	disp	dry 78/79	Alnus
24	33	mesohygrophilous forest	2350	200	70	slide	mon 82	technical/ Alnus
25	34	shrubland	2100	50	80	cut	mon 78/79	technical/ Alnus + point turfing
26	35	shrubland	2100	125	73	cut/sl	dry 78/79 mon 79	technical/ Alnus
27	36-37	shrubland	1975	175	50	slide	ca. 1970	technical/fence/ Alnus
28	38	shrubland	1950	210	70	slide	mon 83	technical/fence/ Alnus
29	39	shrubland	1890	250	85	disp	dry 82/83	-
30	40	shrubland	2050	290	95	cut	dry 78/79	point turfing
31	41	shrubland	2020	300	75	disp	dry 78/79	-
32	42	shrubland	1800	175	70	disp	dry 78/79 dry 82/83	Eupatorium + Alnus
33	43	shrubland	1750	200	112	cut	dry 78/79	technical/ var. seeds
34	44	mesohygrophilous forest	1730	200	80	disp	dry 78/79	Alnus + Eupatorium
35	45	mesohygrophilous forest	1730	300	80	disp	dry 78/79	Engelhardtia

Table 4.1. Plant composition and frequency, group 1, last survey

Tab. 4.1. Zusammensetzung und Frequenz der Pflanzenarten auf den Untersuchungsflächen der Gruppe I letzte Aufnahme (Oktober 1985)

$\circ$  = slide section,  $\Delta$  = transition section,  $\square$  = anchor section

$\circ$  = slide section,  $\triangle$  = tree

1 = plant frequency up to 2.5%, 2 = 5%, 3 = 7.5%, 4 = 10%, 5 = 20%

6 = 30%, 7 = 50%, 8 = 70%, 9 = 100

Species only found in one or two sections

**Anchor:** *Castanopsis tribuloides*, *Quercus glauca*, *Maoutia puya*, *Eriocaulon nepalense*, *Berberis* sp., *Indigofera atropurpurea*, *Labiatae* 2, *Taxithelium* sp., *Chlorophytum nepalense*, *Dioscorea bulbifera*, *Saxifl.* sp., *Clematis* sp., *Labiatae* 1, *Stephania* sp., *Comella paludosa*, *Cyperus globosus*, *Eragrostis papposa*, *Oxalis corniculata*, *Laggera alata*, *Sonchus asper*, *Premna* sp., *Calaminthe umbrosa*, *Crotalaria humifusa*, *Desmodium microphyllum*, *Sida rhombifolia*, *Eriosema chinensis*, *Scutellaria repens*, *Borreria latifolia*

Transition: *Viola serpens*, *Cynoglossum* sp., *Scutellaria repens*, *Borreria latifolia*,  
*Labiatae* 2

**Slide:** *Astremeris* sp., *Hedysarum scandens*, *Pavetta tomentosa*, *Gerbera* sp.,  
*Polygonum capitatum*, *Moutia puya*, *Crotalaria albida*, *Taxithelium* sp?,  
*Indigofera atropurpurea*, *Quercus glauca*, *Dioscorea bulbifera*, *Eragrostis*  
*atrovirens*, *Rubus ellipticus*, *Isodon striatus*, *Sporobolus fertilis*,  
*Equisetum diffusum*, *Anaphalis trilobularis*, *Chionella stellata*, *Lycopodium*  
*clavatum*, *Litsea polyantha*, *Digitaria violascens*, *Cyperus sanguinolentus*,  
*Anaphalis contorta*, *Ficus cumini*, *Oreocnide fruticosa*, *Zornia gibbosaa*,  
*Oxypora paniculata*, *Roscoea purpurea*, *Fraxinus floribundus*, *Chrysopogon*  
*acutifolius*, *Onchium siliculosum*, *Eragrostis paposa*, *Sonchus asper*,  
*Calanthe umbrosa*, *Desmodium microphyllum*, *Cynoglossum* sp., *Sida*  
*oblongifolia*.

Table 4.2. Plant composition and frequency, group 2, last survey (Oct. 1985)

Tab. 4.2. Zusammensetzung und Frequenz der Pflanzenarten auf den Untersuchungsflächen der Gruppe 2, letzte Aufnahme (Okt. 1985) (Legende siehe Tab. 4.1)

**Anchor:** *Pinus patula* (Sp.no 257), *Eurya cerasifolia* (Sp.no 129), *Eriobotrya dubia*, *Lepisorus bicolor*, *Berberis maxima*, *Vitis lanata*, *Viburnum corruscum*, *Quercus lanata*, *Desmodium confertum*, *Viburnum sinense*, *Castanopsis tribuloides*, *Sphalerotrichis chinensis*, *Leucostegia immersa*, *Saitis menospoides*, *Oncidaceae sp.*, *Begonia sp.*, *Rhus succedanea*, *Strobilanthes sp.*, *Lucasia plurimissa*, *Rhodobruchs giganteum*, *Melothria heterophylla*, *Neilia thomsonii*, *Crypsinus ebeninus*, *Flacourtiaceae sp.*, *Shuteria involucrata*, *Pavetta tonnentosa*, *Polythichium squarrosum*, *Microstegium nudum*, *Carex atropurpurea*, *Arisaema costatum*, *Smilacina crataeginoides*.

**Transition:** *Polygala triphylla*, *Eulalia* sp., *Melastoma normale*, *Hedyotis scandens*, *Pavetta tormentosa*, *Erianthus rufipilus*, *Shuteria vestitia*, *Zingiberaceae* sp., *Prunella vulgaris*

**Slope:** *Polygala triphylla*, *Leucas mollissima*, *Elsholtzia blanda*, *Eulalia* sp., *Melothria hederifolia*, *Shuteria involucrata*, *Taraxacum* sp., *Shuteria ferruginea*, *Pinus contorta*, *Glechidion velutinum*, *Chrysopogon aciculatus*, *Plantago major*, *Myriactis nepalensis*, *Dryopteris chrysocoma*, *Scutellaria discolor*, *Fraxinus floribundus*, *Marchantia* sp., *Cryptocarya* sp., *Hydrocotyle nepalensis*, *Digitaria* sp., *Buddleja asiatica*, *Lycopodium clavatum*, *Viola serpens*, *Lippocarya chinensis*, *Laggera alata*, *Eragrostis unioloides*, *Agave americana*, *Pennisetum clandestinum*, *Zornia gibbosa*, *Musa macrophyllo*, *Erianthus rufipilus*, *Prunus cerasoides*, *Cynodon dactylon*, *Desmodium heterocarpon*, *Impatiens racemosa*, *Cassia minosoides*, *Borreria stricta*, *Equisetum diffusum*, *Urtica* sp., *Opisineurus compositus*, *Zornia prismatocarpa*, *Crotalaria sessiliflora*, *Biophytum sensitivum*, *Prunella vulgaris*, *Tetrastigma serrulatum*

Tab. 4.3. Zusammensetzung und Frequenz der Pflanzenarten auf den Untersuchungsfeldern der Gruppe 3, letzte Aufnahme (Okt. 1985). (Von 1000 Quadratmeter)

**Species only found in one or two sections**

**Anchor:** *Geranium nepalense*, *Eliotsholtzia flava*, *Populus* sp. (Sp.no 274), *Polystichum squarrosum*, *Symploca* sp., *Carex nigribulosa*, *Calycopis* sp., *Pratia numularia*, *Melothria heterophylla*, *Agapetes serpens*, *Microstegium vimineum*, *Smilax menispermoidea*, *Rubus acuminatus*, *Fimbristylis dichotoma*, *Labiatea* 1, *Smilax lancifolia*, *Osbeckia nepalensis*, *Hedera nepalensis*, *Rhus javanica*, *Sporobolus fertilis*, *Zanthoxylum acanthopodium*, *Lucoceptrum canum*, *Dendrogaudium confertum*, *Cyperus rotundus*, *Eriobotrya dubia*, *Eulalia sp.*, *Polygonum lachnogous*, *Bulbostylis capillaris*, *Valeriana hardwickii*, *Granitiotomus versicolor*, *Polygonum molle*.

Transition: *Thelypteris* sp., *Symplocos* sp., *Microstegium vimineum*, *Sambucus adnata* (Sp.no 304), *Quercus fenestra*, *Arisaema costatum*, *Dichroa febrifuga*, *Ficus nemoralis*, *Fern* sp., *Polygonum nepalensis*, *Cheilanthes farinosa*, *Eurya acuminata*.

**Kyllinga brevirostris, Polygonum molle**

**Slide:** Carex atrata (*Sp.no. 47*), Fimbristylis dichotoma, Sporobolus fertilis, Desmodium confertum, Bothriochloa intermedia, Melasma arvense, Eriophorum comosum, Boenninghausenia albiflora, Borreria latifolia, Buddleja asiatica, Eriogon floribundum, Scrophulariaceae?; Athrium atkinsonii, Flemingia strobilifera, Cheilanthes farrinosa, Dicyspora paniculata, Engelhardtia spicata, Euya acuminata, Eulalia sp., Eragrostis atrovirens, Campanula colorata, Cydonia detylom, Eriobryum dubia, Ledenanthus pendulinarius, Hazus japonicus (*Sp.no. 215*), Pteris wallachiana, Hypericum confidolium, Polygonum spaeophyllum, Crassocarpus crepidioides, Orchidaceae sp., Eulalia sp., Shuteria arcuiginea, Athyrium sp., Carex filiformis

Table 4.4. Plant composition and frequency, group 4, last survey, (Oct. 1985)  
 (for legend see Table 4.1)

Tab. 4.4. Zusammensetzung und Frequenz der Pflanzenarten auf den Untersuchungsflächen der Gruppe 4, letzte Aufnahme (Okt. 1985) (Legende siehe Tab. 4.1)

Species only found in one or two sections.

**Anchor:** *Smithia ciliata*, Scrophulariaceae?, *Dryopteris lepidopoda*, *Athyrium atkinsonii*, *Lycopodium clavatum*, *Arundinaria aristata*, *Chlorophyllum nepalense*, *Shuteria ferruginea*, *Didymocarpus sp.*, *Anemone rivularis* (Spec.no 12), *Berberis maxima*, *Orchideae sp.*, *Digitaria cruciata*, *Begonia sp.*, *Zingiberaceae sp.*, *Melothria heterocalyx*, *Ulmusrum erubescens*, *Panopulus hispidulus*, *Phenax mollifolia*, *Phryma succedanea*

Transition: *Smithia ciliata*, *Taraxacum* sp., *Pyracantha crenulata*, *Viola hookeri*, *Eulalia mollis*, *Paspalum scrobiculatum*, *Phyllanthus flueggeiformis*, *Arundinella nepalensis*, *Anaphalis busua*, *Shuteria ferruginea*, *Centella asiatica*, *Epilobium wallachianum*, Leguminosae?, Orchidaceae sp., *Begonia* sp., *Rubus ellipticus* (Sper no 298), *Ficus succretans*

Slide: *Juncus prismatocarpus*, *Hypericum japonicum*, *Polygonum capitatum*, *Equisetum diffusum*, *Cynodon dactylon*, *Boenninghausenia albiflora*, *Berberis aristata*, *Cyperus globosus*, *Murdannia nudiflorum*, *Sporobolus piliferus*, *Pennisetum clandestinum*, *Erianthus rufipilus*, *Cyperus sanguinolentus*, *Anaphalis margaritacea*, *Prunella vulgaris*, *Dennstaedtia appendiculata*, *Scirpus sedatus*, *Epilobium wallichianum*, *Lemnaceae?*, *Fimbristylis dichotoma*, *Pteris wallichiana*, *Rubus ellipticus*

3 = covering 25 to 50% of the area      Q = *Quercus semecarpifolia*-forest  
 4 = covering 50 to 75% of the area      S = *Eupatorium*-shrubland  
 5 = covering 75 to 100% of the area      SCH = *Schima wallichii*-forest

ANSWER

Species found with abundance of + or 1 in at least one

- Tree layer:

  - Area 4: *Wendlandia coriacea*, *Rhus wallichii*, *Prunus persica*, *Phyllanthus emblica*, *Oxalis arborea*, *Smilax aspera*, *Gurania glauca*, *Hedysarum scandens*
  - Area 5: *Lithocarpus edulis*
  - Area 12a: *Fraxinus griffithii*, *Robus paniculatus*
  - Area 12b: *Vitis rotundifolia*, *Mobilia charatella*, *Polygonum molle*, *Melothria heterophylla*, *Clematis vitalba*
  - Area 12c: *Thlaspi serotinum*, *Delphinium nelsonii*, *Prunus repens*, *Ilex diffusa*
  - Area 12d: *Thlaspi sp.*, *Buxus ferruginea*

### Shrub layers



**Area 4 : Sibigatia ascendens, Didymopanax**  
**Area 5 : Schefflera venulosa, Cynipsos ebœninae, Clematis sp., Anthromeris himalaicaensis,**  
**Ostrya arborea, Scrophulariaceae?, Euphorbiaceae?, fera sp., Labiate 1,**  
**Osmunda cinnamomea**

**Area 5 :** *Dendropanax* sp., *Vitis parviflora*  
**Area 6 :** *Filiculaceae* sp., *Dioscorea batibifera*, *Cenopogia longifolia*, small shrub,  
Palms, *Acacia* sp.

Area 7 : *Polygonum sphaerocarpum*, *Digitaria crassula*  
 Area 8 : *Franus cerasoides*, *Ficus membranalis*  
 Area 9 : *Fimbristylis pilosa*, *Molinia*

Area 7: *Agave attenuata*, *Nastus japonicus*, *Bethencourtia intermedia*, *Crocodilus dactylon*  
 Area 10: *Sporobolus piliferus*, *Luzula sasa* sp.  
 Area 11: *Convolvulus stricta*  
 Area 12a: *Pimeliella diversifolia*, *Thlaspium alpestre*

Area 32b: *Sympetrum infuscatum*, *Argia munda*, *Cyathura ciliatum*  
Area 32b: *Symploca* sp., *Didymocarpus* sp., *Pratia numularia*, *Polygonum argutum*  
Area 12c: *Achranthes bidentata*, *Boenninghausenia albiflora*, *Dichroa febrifuga*,  
*Flaeckmania oblonga*, *Micromeria sinensis*, *Peltaria sagittifolia*

**Area 12d:** *Ilex digyna*, *Elaeotria fruticosa*, *Codonopsis viridis*, *Drepanopteris bipinnata*, *Tetrasporia sericeola*, *Schophularia intermedia*.

**Tabela 12:** Potentilla fragrans, Labiateae?, Juncus elegans, Cyperaceae, Chrysocoma, Desmodium elegans, Campanula colorata, Agrostis pilosula, Carex strata, Arundinaria aristata

Moss, Lanes:

Area 4 : Leucobryum spp., other moss spp.

Table 4.6. Change of plant frequency during the postmonsoon records (1983, 1984, 1985), group 1  
 Tab. 4.6. Entwicklung der Frequenzen der Pflanzenarten nach dem Monsun (1983, 1984, 1985) auf den Untersuchungsfeldern.

Season: 1 = 1983, 4 = 1984, 7 = 1985; section symbols as Table 4.1; for relevé group compare Fig. 4.34

Table 4.7. The most represented species in the three sections of the four groups

Tab. 4.7. Die häufigsten Pflanzenarten in den drei Sektionen der vier Gruppen

Group	Anchor	Transition	Slide
Group 1 Low altitude	<i>Engelhardtia spicata</i> <i>Schima wallichii</i> <i>Pinus roxburghii</i> <i>Indigofera dosna</i> <i>Hypericum cordifolium</i> <i>Imperata cylindrica</i> <i>Oplismenus compositus</i> <i>Cheilanthes farinosa</i> <i>Dicranopteris linearis</i> <i>Pteridium aquilinum</i>	<i>Schima wallichii</i> <i>Osbeckia nepalensis</i> <i>Phyllanthus parvifolius</i> <i>Lyonia ovalifolia</i> <i>Eupatorium adenophorum</i> <i>Pogonatherum spp.</i> <i>Imperata cylindrica</i> <i>Brachiaria villosa</i> <i>Hackeochloa granularis</i> <i>Bidens bipinnata</i> <i>Borreria stricta</i> <i>Biophytum sensitivum</i> <i>Euphorbia hirta</i> <i>Triumfetta pilosa</i> <i>Nephrolepis cordifolium</i> <i>Polygonatum seminudum</i>	<i>Alnus nepalensis</i> (cult.) <i>Osbeckia nepalensis</i> <i>Eupatorium adenophorum</i> <i>Desmodium concinnum</i> <i>Schizachyrium brevifolium</i> <i>Pogonatherum spp.</i> <i>Vandellia sp.</i> <i>Gonostegia hirta</i> <i>Polygonatum junghuhnianum</i> <i>Jamesoniella sp.</i> <i>Ceratodon purpureus</i>
Group 2 lower middle altitude generally southern aspect	<i>Schima wallichii</i> <i>Lyonia ovalifolia</i> <i>Rhododendron arboreum</i> <i>Eurya acuminata</i> <i>Gaultheria fragrantissima</i> <i>Arundinella nepalensis</i> <i>Pogonatherum spp.</i> <i>Carex cruciata</i> <i>Roscoea purpurea</i> <i>Strobilanthes atropurpureus</i> <i>Dicranopteris linearis</i>	<i>Alnus nepalensis</i> <i>Schima wallichii</i> <i>Berberis aristata/asiatica</i> <i>Osbeckia nepalensis</i> <i>Osbeckia stellata</i> <i>Eupatorium adenophorum</i> <i>Arundinella nepalensis</i> <i>Capillipedium assimile</i> <i>Pogonatherum spp.</i> <i>Imperata cylindrica</i> <i>Bulbostylis capillaris</i> <i>Anaphalis contorta</i> <i>Gonostegia hirta</i> <i>Selaginella sp.</i> <i>Polygonatum seminudum</i>	<i>Brachiaria villosa</i> <i>Sporobolus piliferus</i> <i>Arthraxon lancifolius</i> <i>Eragrostis atrovirens</i> <i>Paspalum scrobiculatum</i> <i>Fimbristylis dichotoma</i> <i>Vandellia nummularia</i> <i>Polygonum nepalensis</i> <i>Hypericum japonicum</i> <i>Gentiana capitata</i> <i>Polygonatum junghuhnianum</i> <i>Ceratodon purpureus</i> <i>Campylopus sp.</i>
Group 3 higher middle altitude generally northern aspect	<i>Daphniphyllum himalayense</i> <i>Alnus nepalensis</i> <i>Eurya cerasifolia</i> <i>Eurya japonica</i> <i>Myrsine semiserrata</i> <i>Randia tetrasperma</i> <i>Neillia thrysiflora</i> <i>Viburnum stellatum</i> <i>Arundinella nepalensis</i> <i>Carex cruciata</i> <i>Strobilanthes sp.</i> <i>Ellisophyllum pinnatum</i> <i>Roscoea purpurea</i> <i>Lycopodium clavatum</i> <i>Selaginella sp.</i> <i>Pteridium aquilinum</i> <i>Athyrium sp.</i> <i>Ptychanthus striatus</i> <i>Rhodobryum giganteum</i> <i>Gollania sp.</i>	<i>Alnus nepalensis</i> <i>Gaultheria fragrantissima</i> <i>Phyllanthus parvifolius</i> <i>Eupatorium adenophorum</i> <i>Eulalia mollis</i> <i>Agrostis pilosula</i> <i>Microstegium spp.</i> <i>Pogonatherum spp.</i> <i>Artemisia sp.</i> <i>Ellisiophyllum pinnatum</i> <i>Isodon coetsa</i> <i>Myriactis nepalensis</i> <i>Galium spp.</i> <i>Carex daltonii/longipes</i> <i>Selaginella sp.</i> <i>Dicranella sp.</i> <i>Marchantia sp.</i>	<i>Alnus nepalensis</i> <i>Eupatorium adenophorum</i> <i>Chambainia cuspidata</i> <i>Centella asiatica</i> <i>Drymaria diandra</i> <i>Anaphalis contorta</i> <i>Dennstaedtia appendiculata</i> <i>Polygonatum junghuhnianum</i> <i>Polygonatum seminudum</i> <i>Dicranella sp.</i>
Group 4 high altitude	<i>Quercus semecarpifolia</i> <i>Rhododendron arboreum</i> <i>Edgeworthia gardneri</i> <i>Berberis wallichiana</i> <i>Arundinella hookeri</i> <i>Oryzopsis lateralis</i> <i>Carex cruciata</i> <i>Commelinia paludosa</i> <i>Cyanotis vaga</i> <i>Roscoea purpurea</i> <i>Anaphalis triplinervis</i> <i>Anemone rivularis</i> <i>Chambainia cuspidata</i> <i>Fragaria sp.</i> <i>Valeriana hardwickii</i> <i>Viola serpens</i> <i>Selaginella sp.</i> <i>Ectropothecinus sp.</i>	<i>Rubus nepalensis</i> <i>Agrostis pilosula</i> <i>Arundinella hookeri</i> <i>Arthraxon lancifolius</i> <i>Eragrostis papposa</i> <i>Tripogon filiformis</i> <i>Carex atrata</i> <i>Bulbostylis capillaris</i> <i>Anaphalis contorta</i> <i>Elsholtzia pilosa</i> <i>Gonostegia hirta</i> <i>Hemiphagma heterophyllum</i> <i>Impatiens racemosa/serrata</i> <i>Potentilla fulgens</i> <i>Polygonatum microstomum</i> <i>Campylopus sp.</i>	<i>Arthraxon lancifolius</i> <i>Anaphalis contorta</i> <i>Impatiens racemosa/serrata</i> <i>Polygonatum junghuhnianum</i> <i>Polygonatum seminudum</i> <i>Dicranella sp.</i>

Table 4.8. Plant frequency at the end of the dry season 1985 on selected plots of group 1 and 2 (for legend see Table 4.1)

Tab. 4.8. Frequenz der Pflanzenarten am Ende der Trockenzeit 1985 auf ausgewählten Untersuchungsflächen der Gruppen 1 und 2 (Legende s. Tab. 4.1)

TRANSECT NO	4	4	4	4	4	4
SECTION NO	4	8	6	0	0	4
SECTION SYMBOL	OOOO	ΔΔΔ	□□			
NO SPECIES						
171 HYPERICUM JAPONICUM	+ 1	4				
281 PTERIDIUM AQUILINUM		5	3			
6 ALNUS NEPALENSIS	6	6				
170 HYPERICUM CORDIFOLIUM		2	2			
237 OPLISMENUS COMPOSITUS/BURMANII		1	1			
264 POLYGONUM CAPITATUM		5				
148 GENTIANA PEDICELLATA		5				
232 NEPHROLEPIS CORDIFOLIA		7				
321 SCHIMA WALlichii		2				
293 RHUS JAVANICA		2				
217 MELASTOMA NORMALE		3				
52 CASTANOPSIS INDICA		3				
115 ERAGROSTIS ATROVIRENS	+ +	+				
11 ANAPHALIS TRIPLINERVIS	+ +					
124 EULALIA SP.		2				
22 ARUNDINELLA NEPALENSIS	1 1	7				
194 KYLLINGA BREVIFOLIA	1 5	+ 3				
177 IMPERATA CYLINDRICA	+ 5	7 9				
219 MICROMERIA BIFLORA	1 3	2				
248 PASPALUM SCROBICULATUM	1 1	2				
9 ANAPHALIS CONTORTA		7 7				
145 GAULTHERIA FRAGRANTISSIMA		1 7				
48 CAREX CRUCIATA		3				
284 PYRUS PASHIA		5				
241 OSBECKIA STELLATA		2 2				
243 OXALIS CORNICULATA		1 2				
30 BERBERIS ARISTATA/ASIATICA			7			
359 VERNONIA CINEREA	1 5	2 5				
240 OSBECKIA NEPALENSIS	1 3 6	7				
111 ENGELHARDTIA SPICATA	1	8	9			
156 GONOSTEGIA HIRTA	+ 2 +		5			
210 LYONIA OVALIFOLIA	2		5	9		
90 DICRANOPTERIS LINEARIS			8		7	
229 MYRSINE CAPITELLATA			5		7	
56 LABIATAE ?					5	
360 VIBURNUM CORIACEUM					5	
292 RHODODENDRON ARBOREUM					5	
120 ERIOBOTHRYA DUBIA					7	
262 POGONATHERUM CRINITUM/PANICEUM	3 9 2	2 5	7			
126 EUPATORIUM ADENOPHORUM	6 5 8 3	3 5 7	9			
273 POGONATUM JUNGHUHNIANUM	+ 5 2		4			
253 PHYLLANTHUS PARVIFOLIUS	6 +		6			
349 THELYPTERIS MULTILINEATA	1					
302 SACCIOLEPTIS INDICA	1					
300 PTYCHANthus SP.	1					
298 RUBUS ELLIPTICUS	1					
128 EURYA ACCUMINATA	1					
102 DRYOPTERIS CHRYSOCOMA	1					
77 CYPERUS ARISTATUS	1					
57 CHEILANTHES FARINOSA	1					
18 ARTHRAXON QUARTINIANUS	1					

Species found scarcely (freq. 1%) in only one slide section:

Cyanotis vaga, Oxyspora paniculata, Lycopodium clavatum, Litsea polyantha, Desmodium confertum, Desmodium concinnum, Capillipedium assimile, Maesa macrophylla, Saccharum spontaneum, Prunus pashia, Flemingia strobilifera, Conyza stricta

Table 4.9. Plant frequency at the end of the dry season 1985 on selected plots of group 3 and 4 (for legend see Table 4.1)

Tab. 4.9. Frequenz der Pflanzenarten am Ende der Trockenzeit 1985 auf ausgewählten Untersuchungsflächen der Gruppen 3 und 4 (Legende s. Tab. 4.1)

TRANSECT NO	2	2	2	2	2	2	2	3	2	2	2	3	3	2	2	3	
SECTION NO	1	1	1	1	1	3	3	7	3	1	1	3	3	3	1	1	3
SECTION SYMBOL	○○○○○○○○○○									△△△△△△□□□□							
NO SPECIES																	
198 LEDANTHUS PEDUNCULARIS	5	1															
169 HYDROCOTYLE NEPALENSIS		3	3	5	3	3											
205 LITSEA CUBEBA		1	1														
260 PLANTAGO MAJOR		3	2														
83 DENNSTAEDTIA APPENDICULATA		3	1	1													
21 ARUNDINELLA HOOKERI			1	5													
74 CYANOTIS VAGA		1		1													
281 PTERIDIUM AQUILINUM			2	1													
263 POLYGALA TRIPHyllA	9				7												
6 ALNUS NEPALENSIS	5	7	3		5	4											
9 ANAPHALIS CONTORTA		7	8	7	4		7										
141 FRAGRARIA SP.		2	2	2	3			5									
47 CAREX ATRATA	8	1	2	5	6	1		5	5	3							
116 ERAGROSTIS PAPPOSA	3	3	5	5	7			5	7	6							
227 MYRIACTIS NEPALENSIS	5	1	3				5	2									
273 POGONATUM JUNGHUHNIANUM		2	1	4				4									
210 LYONIA OVALIFOLIA		3	5					7									
243 OXALIS CORNICULATA			7				4	2									
276 POTENTILLA FULGENS		2	1					2	2								
156 GONOSTEGIA HIRTA			1	2				5									
43 CALAMINTHE UMBROSUM	5	3	1	4				5		7							
164 HEMIPHRAGMA HETEROPHYLLUM		1	5	7	5	6		5	7	2							
182 ISACHNE ALBENS		1					7			9							
194 KYLLINGA BREVIFOLIA						5				4							
48 CAREX CRUCIATA		1	2	+		5		5		4							
304 SAMBUCUS ADNATA					4			7		2							
364 VIOLA SERPENS			2						5	4	5	4					
361 VIBURNUM ERUBESCENS							4					9					
294 RHUS SUCCEDANEA								4									
149 GERANIUM NEPALENSIS								2		4							
82 DAPHNIPHYLLUM HIMALAYENSE											8						
87 DESMODIUM MICROPHYLLUM												7					
104 EDGEWORTHIA GARDNERI												9					
292 RHODODENDRON ARBOREUM													7				
288 QUERCUS SEMECARPIFOLIA													9				
55 CHAMBAINIA CUSPIDATA	3	8	7	8	7	6	+	4	9	4	8	7	9	7	9	5	
337 STELLARIA PATENS		3	2	3	3	+	1			2	5		4				
126 EUPATORIUM ADENOPHORUM		5	5	1	1	1				7	3	5		7			
144 GALIUM SP.			3	6	1	6				6	7		6	4			
298 RUBUS ELLIPTICUS		5	2				4			4							
4 AGROSTIS PILOSULA		1		+	5					2		2		2		4	
319 SENECIO DENSIFLORUM					5					6		6		4			
267 POLYGONUM UNCINATUM		4	5		6			6		5	5	6	5	5			
173 HYPERICUM URALUM		6	1		2			8	2	4							
107 ELLISIOPHYLLUM PINNATUM		5	5	5				8			5	8					
221 MICROSTEGIUM NUDUM	5	7	8	1	6			9		6	7	4	8	4			
340 STROBILANTHES SP.			2	5						4				7			
50 CAREX NUBIGENA		6		2													
8 ANAPHALIS BUSUA		1		4						2							
5 AJUGA LOBATA		5	5		5								4				
23 ASTILBE RIVULARIS		2									2						
342 SWERTIA SP.				1	1					2			4				
249 MARCHANTIA SP.		5				5							4				
299 RUBUS NEPALENSIS/FOCKEANUS		8	7			9							5				

Species found only in one section:

Anchor: *Tetrastigma serrulatum*, *Phyllanthus flueggeiformis*, *Pratia nummularia*, *Elsholtzia flava*

Transition: *Boenninghausenia albiflora*, *Dryopteris lepidopoda*, *Rubia charaeifolia*, *Centella asiatica*, *Arundinella nepalensis*

Slide: *Sonchus asper*, *Impatiens racemosa*, *Conyza japonica*, *Scirpus sedatus*, *Mazus japonicus*, *Sporobolus piliferus*, *Conyza stricta*, *Carex daltonii*, *Bulbostylis capillaris*, *Anaphalis triplinervis*, *Leucosceptrum canum*, *Zanthoxylum acanthopodium*, *Cyperus rotundus*

Table 4.10. Plant frequency in early monsoon 1985: Group 1 (for legend see Table 4.1)

Tab. 4.10. Frequenz der Pflanzenarten am Anfang des Monsuns 1985 auf den Untersuchungsflächen der Gruppe 1 (Legende s. Tab. 4.1)

TRANSECT NO	1	1	5	2	1	2	3	4	4	4	5	6	7	1	2	7	7	1	2	4	4	5	7											
SECTION NO		2	4	2	2	3	3	1	2	3	4	1	1	3	5	4	2	4	1	1	1	5	3	1										
SECTION SYMBOL		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	□	□	□	□										
NO SPECIES																																		
6 ALNUS NEPALENSIS	7	8	5	8	7	7							5																					
84 DESMODIUM CONCINNUM	2	5	2				1	+																										
79 CYPERUS ROTUNDUS	2		2				+																											
273 POGONATUM JUNGHUNNIANUM		7	3	2	1	2	5	1	3																									
304 JAMESONIELLA SP.		5	8		1	2		5	2	3																								
214 CERATODON PURPUREUS		3		2	2			+	+																1									
336 SPOROBOLUS PILIFERUS			2	2			+	+																										
94 DIGITARIA ASCENDENS			+		+	1																			1									
134 FICUS CUNIA				+	2			1																										
222 MICROSTEGIUM VIMINEUM							3	1	2	1															3									
171 HYPERICUM JAPONICUM								2	3	4	3																							
217 MELASTOMA NORMALE								1	+	5	2	+																						
298 RUBUS ELLIPTICUS								1	5	1																								
119 ERIGERON FLORIBUNDUS							3	1	2	2	1		4																					
313 SCHIZACHYRUM BREVIFOLIUM							5	3	6	2	1	6	5	3	4																			
240 OSBECKIA NEPALENSIS	5	3	6	6	4	5	5	5	5	5	4	6	3	4	4	5	3	2	3	3	2	5	6	5										
33 BIDENS BIPINNATA							+	1	+	1		1				5		5	3															
312 SCHIMA WALLICHII			2	3	+		1	+			9				7		7																	
352 ORCHIDACEAE							+																		1	3								
354 TRIUMFETTA PILOSA							1								4	5									3	5								
49 CAREX DALTONII/LONGIPES							+																											
48 CAREX ATRATA		2						+	1																3	4								
284 QUERCUS GLAUCA									1	2																3								
132 DRYOPTERIS MARGINATA									+	+																								
242 OSYRIS ARBOREA									+																4	6								
281 PTERIDIUM AQUILINUM										2					4	5								3	2	5	3							
116 ERAGROSTIS PAPPOSA											+														2	2								
181 INULA CAPPA												1													3	1		3						
233 BORRERIA STRICTA													4														6							
35 BIOPHYTUM SENSITIVUM													2															7						
127 EUPHORBIA HIRTA													1	6														3	3					
96 DIGITARIA SP.													4															5	3					
258 PINUS ROXBURGHII													5	5		9	3										7	9						
325 SHUTERIA VESTITIA																												2	4	3				
126 EUPATORIUM ADENOPHORUM	4	7	6	5	7	8	8	5	8	7	8	8	5	6	8	7	5	5	5	8	2	5	6	5	5	6	5	5	6					
262 POGONATHERUM CRINITUM/PANICEUM	9	9	9	8	9	8	9	8	8	7	9	5	9	9	6	9	9	8	9	9	7	9	9	8	9	7	9	9	7					
57 CHEILANTHES FARINOSA	5	4	3	3	6			4	1	1	1		4			5	6	5	5	6	7													
17 ARTHRAKON LANCIFOLIUS	2	5	1	3		1	+	1	2	2			6			3	3												6	7				
38 BRACHIARRIA VILLOSA		3	2	2				+	4	3	5		4	7	3	1													7	5				
177 IMPERATA CYLINDRICA		6	5	1	6		6	3	6	5	1																8	6	3	5				
170 HYPERICUM CORDIFOLIUM	4	3	1	4		5	2	4					8														4	5	4	6				
99 DIOSCOREA GLABRA	4		2	1		3	1	2	3				4														2	5	5	7				
232 NEPHROLEPIS CORDIFOLIA	8	3	4	+ 4	5	5	5	6					6														8	8	8	8				
253 PHYLLANTHUS PARVIFOLIUS	8	5	1	2	6	7	5	6					4														5	2	6	7				
210 LYONIA QUALEIFOLIA	5	8	5	+	2	5	2						4														5	5	6	7				
138 FIMBRISTYLIS DICHOTOMA		3	3	5	2			6	6	7	7																		5					
146 GENIOSPORUM COLORATUM		6	2				1	1	2																				2	4	3			
293 RHUS JAVANICA		2	3				2	1		1			1																2		5			
156 GONOSTEGIA HIRTA		4	5	6	2	5	5	6	5	3	3	+	6			2												5	2	3				
180 INDIGOFEERA DOSNA			3					2	3				5															2	2	3	3			
248 PASPALUM SCROBICULATUM		2	1	+		2	1	5	4	5																		3	1	3				
305 POGONATUM SEMINUDUM			1	6	5	3	2	3					4			2	1											4	3					
194 KYLLINGA BREVIFOLIA		1	1	2		2	1	2	1				5			2												2	3					
302 SACCIOLEPIS INDICA			1	2	1	1	2	2	2																				5	3				
219 MICROMERIA BIFLORA									1	1	1	1																		1	5			
40 BULBOSTYLLIS CAPILLARIS										1																					3			
225 MURDANNIA NUDIFLORUM	5		+	1	5	5		+	4	4			4	4														5	3					
46 CAPILLIPEDUM ASSIMILE	5	1								8			8																5	5				
359 VERNONIA CINEREA		2	2				3	6																				2	2	2				
98 DIOSCOREA BULBIFERA		5	1	1			1						7															5	2					
22 ARUNDINELIA NEPALENSIS	4	5	6																										3	5				
111 ENGLERHARDIA SPICATA		5	6																										6					
300 PTYCHANthus SP.																													2	2	5			
154 GLOCHIDION VELUTINUM		5		2																									2	3	3			
85 DESMODIUM CONFERTUM		5			2	2	1																					3	1					
324 SHUTERIA INVOLUCRATA		4																																
52 CASTANOPSIS INDICA																																		
345 SYZYgium CUMINI																																		
28 BARLERIA CRISTATA																																		
367 WOODFORDIA FRUTICOSA																																		
331 SMITHIA CILIATA																																		
90 DICRANOPTERIS LINEARIS		2																																
349 THELYPTERIS MULTILINEATA		4																																
275 LITSEA SP?		2																																
316 SCUTELLARIA DISCOLOR				</td																														

**Species only found in one or two sections:**

**Anchor:** *Bidens pilosa*, *Polygonum* sp?, *Maoutia puya*, *Triumfetta rhomboidea*, *Premna* sp., *Labiatae* 2, *Maoutia puya*, *Castanopsis tribuloides*, *Clematis buchanania*, *Smilax* sp., *Oxalis corniculata*, *Selaginella* sp., *Litsea polyantha*, *Gonatanthus pumilus*, *Anisema erubescens*, *Castanopsis tribuloides*, *Zingiberaceae*, *Cynoglossum* sp., *Laggera alata*, *Justicia procumbens*, *Hypoxis aurea*, *Cyanotis vaga*, *Vandellia ummularifolia*, *Sida rhombifolia*, *Scutellaria repens*, *Hakeochloa granularis*

Transition: Gerbera sp., Labiate 2, Scutellaria repens

Slide: Pavetta tomentosa, Gerbera sp., Bidens pilosa, Polygonum uncinatum, Labiateae 1, Impatiens racemosa, Philonotis turneriana, Oxalis corniculata, Dryopteris chrysocoma, Indigofera atropurpurea, Polygonum capitatum, Oxyspora paniculata, Anaphalis triplinervis, Impatiens racemosa, Philonotis turneriana, Drymaria diandra, Oreocnide fruticosa, Arthromeris sp., Hedyotis scandens, Clematis sp., Berberis aristata, Indigofera atropurpurea, Litsea polyantha, Anaphalis triplinervis, Hemarthria compressa, Eulalia sp., Digitaria violascens, Drymaria diandra, Cynoglossum sp., Sphenomeris chinensis, Sida rhombifolia

Table 4.11. Soils, parent materials and landforms of Lamosangu-Kharidhunga area (after ESPINOSA 1975)

Tab. 4.11. Böden, Muttergestein und Relief im Gebiet von Lamosangu-Kharidhunga (nach ESPINOSA 1975)

Parent materials	Soil series	Main landform characteristics
Metamorphosed sandstone in situ	Guchchhe, Lapse	Steep to very steep hills. Severe soil/rock creep in places
Soil material derived from metamorphosed sandstone in situ	Lapse	nearly level bench terraces on or near hill summits
Phyllite in situ	Deorali, Golme Danda	Steeply dissected ridges with some undulating summits
Soil material derived from phyllite in situ	Golme Danda, Kharka, Parebha, Sunkhani	Nearly level bench terraces in steep mountainous areas
Alluvium/colluvium derived from metamorphosed sandstone and phyllite	Bhalukhop, Birta Besi Birta Pakhar, Timbure	Nearly level bench terraces on moderately steep to steep colluvial slopes
Rock/soil creep material: metamorphosed sandstone and phyllite	Kaping	Very steep, dissected hills
Soil material derived from metamorphosed sandstone and phyllite in situ	Dhuseni, Kathaiké, Mesipo, Pedku, Ratankot	Nearly level bench terraces in steep hilly areas
Augen gneiss (feldspatic schist) in situ	Sarai Danda	Steep to very steep, dissected mountains. Severe soil/rock creep in places
Colluvium derived from augen gneiss (feldspatic schist)	Girke Danda	Nearly level bench terraces on steep, dissected colluvial slopes
Soil material derived from augen gneiss (feldspatic schist) in situ	Chanaute, Chitre, Pakha Deb, Sarai Danda Sarangthali, Tauthali	Nearly level bench terraces in steep to very steep mountainous areas
Soil material derived from carbonaceous slate in situ	Burana	Ditto
Soil material derived from metamorphosed limestone in situ	Onchi	Ditto
Magnesite with talc lenses in situ	Kharidhunga	Steep to very steep, dissected mountainous areas
Alluvium/colluvium derived from chlorite schist; talc and iron oros	Khari, Mane	Nearly level bench terraces in rolling basin, probably of a syneliorium type

Note: Golme Danda, Lapse and Sarai Danda series occur on both bench terraces and non-terraced slopes.

Table 4.12. Soil classification of Lamosangu-Kharidhunga area (after ESPINOSA 1975)

Tab. 4.12. Klassifikation der Böden im Gebiet von Lamosangu-Kharidhunga (nach ESPINOSA 1975)

USDA SOIL CLASSIFICATION, 7th APPROXIMATION				Soil series	Legend of the FAO/UNESCO Soil Map of the World
Order	Suborder	Great Group	Subgroup		
Entisols	Aquents Orthents	Haplaquents Udorthents	Typic Haplaquents Typic Udorthents	Timbure Girkha Danda	Dystric Gleysols Dystric Regosols
Inceptisols	Aquepts Ochrepts Umbrepts	Haplaquepts Dystrochrepts Eutrochrepts Haplumbrepts	Typic Haplaquepts Fluventic Haplaquepts Typic Dystrochrepts Aquic Dystrochrepts Fluventic Dystrochrepts Lithic Dystrochrepts Rhodic Dystrochrepts Dystric Eutrochrepts Typic Haplumbrepts Cumulic Haplumbrepts	Birta Besi Birta Pakhar Dhuseni, Lapse, Khari, Kathaik Balukhop, Kharka Chitre, Mesipo, Pedku Kaping, Pakha Deb Deorali 1 Onchi Guchhhe, Sarangthali Burana, Chanaute Mane, Ratankot	Dystric Gleysols Dystric Gleysols Dystric Cambisols Dystric Cambisols Dystric Gleysols Dystric Cambisols Dystric Cambisols Dystric Cambisols Eutric Cambisols Humic Cambisols Humic Cambisols
Alfisols	Udalfs	Hapludalfs	Typic Hapludalfs Mollic Hapludalfs	Golme Danda 2 Parebha 2 Sunkhani 2 Thautali 2 Sarai Danda Kharidhunga	Orthic Acrisols Orthic Acrisols Humic Acrisols Humic Acrisols

1 Integrade between Dystrochrepts and Rhodustalfs2 May be ultic Hapludalf if base saturation is less than 60% at 125 cm below the top of the argillic horizon, or in a layer above hard rock if shallower.

Table 4.13. Soil survey of study area

Tab. 4.13. Ergebnisse aus den Bodenuntersuchungen im Untersuchungsgebiet

- A1 anchor/position in transect  
 T2 transition/position in transect  
 S1 slide/position in transect

1) 1 = 0.0356 mg P<sub>2</sub>O<sub>5</sub>/100 g dry soil2) 1 = 1.0 mg K<sub>2</sub>O/100 g dry soil

\* for CEC-value see Table 4.14

Plot No	Transect No	Section	Altitude a.s.l. 0-400° (estimated)	Aspect	Texture/Humus	pH (Hellige)	pH (H <sub>2</sub> O)	P <sub>2</sub> O <sub>5</sub> 1) 2)	K <sub>2</sub> O	Texture/Humus(measured)	CEC	Soil Serie	ESPINOSA	Vegetation Type		
1	2	A 1	1130 m	375	sandy loam with little humus	5.0	6.0	4.0	6.3			Kaping series:	dystric Cambisol	overexploited broadleaf forest		
1	2	S 1	1130 m	375	sandy loam with little humus	5.0	6.0	4.0	1.5	10.6	36.6	49.7	3.1		dystric Regosol	
1	2	T 2	1130 m	375	sand poor in humus		6.1	1.5	3.4				dystric Regosol			
1	3	S 1	1130 m	375	sand poor in humus	5.0	6.2	0.6	0.9			Kaping series:	dystric Cambisol	overexploited forest/shrubland		
2	4	A 1	1180 m	375	loamy sand with little humus	5.0	6.1	2.1	2.7				dystric Cambisol	overexploited forest/shrubland		
2	4	A 2	1180 m	375	loamy sand with little humus	5.8	2.6	2.1					dystric Regosol			
2	4	S 1	1180 m	375	sand poor in humus	6.1	1.2	0.5					dystric Regosol			
2	4	S 2	1180 m	375	loamy sand poor in humus	5.0	6.3	1.5	1.1			Lapse series:	dystric Cambisol	Pinus roxburghii forest		
3	7	A 1	1450 m	225	sandy loam poor in humus	5.0	6.0	0.2	2.5				dystric Cambisol	Pinus roxburghii forest		
3	7	A 2	1450 m	225	sandy loam poor in humus	5.0	5.9	0.6	2.0				dystric Regosol			
3	7	S 1	1450 m	225	loamy sand poor in humus	5.0	5.8	0.2	1.2	11.6	36.6	51.5	0.7		dystric Regosol	
4	8	S 1	1690 m	150	sand poor in humus	5.0	5.7	0.1	0.5			Golme danda ss:	orthic Acrisol	uncultivated terrace		
4	8	A 2	1690 m	150	sandy loam with little humus	5.0	5.6	0.6	0.5				dystric Regosol	broadleaf forest		
5	8	S 1	1680 m	200	loamy sand poor in humus	5.0	6.4	5.2	2.4			Golme danda ss:	orthic Acrisol	afforested with Pinus patula		
6	10	A 2	1800 m	250	loamy sand poor in humus	5.0	5.4	0.9	2.2				dystric Regosol	afforested with Pinus patula		
6	10	S 1	1800 m	250	sand poor in humus	5.0	5.7	0.3	0.3			Guchchhe ss:	humic Cambisol	overexploited broadleaf forest		
6	10	T 1	1800 m	250	loamy sand poor in humus		5.6	0.2	0.6				humic Cambisol	overexploited broadleaf forest		
7	11	A 1	1980 m	300	loamy sand with humus	4.5	5.6	0.5	0.8	12.0	34.6	48.0	5.4		dystric Regosol	
7	11	A 2	1980 m	300	sandy loam with humus		5.4	1.6	0.9				humic Cambisol	overexploited broadleaf forest		
7	11	S 1	1980 m	300	sand poor in humus	4.8	5.5	0.1	0.4	6.8	31.8	60.7	0.7		dystric Regosol	
8	12	A 1	1990 m	350	loamy sand with humus		5.2	2.0	1.8			Guchchhe ss:	humic Cambisol	overexploited broadleaf forest		
8	12	A 2	1990 m	350	sandy loam with little humus	4.5	5.5	1.6	1.7				humic Cambisol	overexploited broadleaf forest		
8	12	S 1	1990 m	350	sand poor in humus	4.5	5.4	0.2	0.2				Lithosol	shrubland		
9	14	A 1	1990 m	75	loamy sand poor in humus		5.5	0.1	0.4				dystric Regosol	shrubland		
9	14	S 1	1990 m	75	loamy sand poor in humus	5.0	5.6	0.1	1.3				Lithosol	grassland		
10	15	A 1	2010 m	400	loamy sand with little humus		7.0	0.5	2.3			Golme danda ss:	orthic Acrisol	overexploited broadleaf forest		
10	15	A 2	2010 m	400	loamy sand poor in humus	4.5	7.2	0.1	0.4				orthic Acrisol	grassland		
10	15	S 1	2010 m	400	sand poor in humus	5.0	7.6	0.3	1.1				dystric Regosol	shrubland		
11	16	A 2	2040 m	250	sandy loam with humus	6.0	6.7	0.9	0.6			Golme danda ss:	calcaric Regosol	overexploited broadleaf forest		
11	17	A 1	2040 m	250	sandy loam poor in humus		7.5	0.4	3.0	10.0	29.6	58.6	1.8		calcaric Regosol	grassland
11	18	S 1	2040 m	250	sand poor in humus	5.0	7.8	0.3	0.3	2.0	23.2	74.3	0.5		orthic Acrisol	shrubland
12	19	S 1	2030 m	200	sandy loam poor in humus	7.5	7.7	0.2	1.0			Golme danda ss:	dystric Regosol	overexploited broadleaf forest		
13	20	S 1	2100 m	250	sandy loam with little humus	5.0	5.7	0.2	0.4			Burana series:	humic Cambisol	broadleaf forest		
14	21	A 1	2130 m	25	sandy loam poor in humus		6.1	0.5	0.9				humic Cambisol	overexploited broadleaf forest		
14	21	A 2	2130 m	25	sandy loam with humus	5.0	5.5	0.6	2.1				dystric Regosol	shrubland		
14	21	S 1	2130 m	25	loamy sand with humus	5.0	6.6	0.2	0.6				orthic Acrisol	overexploited broadleaf forest		
15	22	S 2	2130 m	25	sandy loam with little humus	4.8	6.5	0.7	0.6				dystric Regosol	shrubland		
15	22	A 1	2180 m	325	sandy loam with little humus		5.5	0.3	0.4			Burana series:	humic Cambisol	overexploited broadleaf forest		
15	22	R 2	2180 m	325	sandy loam poor in humus	5.0	5.0	1.1	4.4				Lithosol	shrubland		
15	22	A 1	2180 m	325	sandy loam with humus	4.0	4.5	0.8	0.7			Burana series:	humic Cambisol	overexploited broadleaf forest		
16	23	A 1	2570 m	250	loamy sand with little humus	4.5	5.4	0.6	0.5			Sarai danda ss:	humic Acrisol	shrubland		
16	23	S 1	2570 m	250	sand poor in humus	5.0	4.5	0.6	0.9				dystric Regosol	overexploited broadleaf forest		
17	24	A 1	2620 m	100	sandy loam with little humus	4.5	4.9	0.2	0.6			Sarai danda ss:	humic Cambisol	overexploited broadleaf forest		
17	24	A 2	2620 m	100	sandy loam with humus		4.6	0.7	1.3				humic Cambisol	grassland		
17	24	S 1	2620 m	100	sandy loam poor in humus	5.0	5.3	0.0	0.2			Lithosol	shrubland			
18	25	A 1	2560 m	125	sandy loam with little humus	5.0	5.3	0.4	1.1			Chitre series:	dystric Cambisol	uncultivated terrace		
18	25	A 2	2560 m	125	sandy loam with humus		5.0	5.6	0.6	0.8			orthic Acrisol	shrubland		
18	25	S 1	2560 m	125	sandy loam poor in humus	4.8	5.3	0.1	0.2				dystric Cambisol	overexploited broadleaf forest		
19	27	A 1	2500 m	150	sandy loam with humus	4.3	4.9	0.6	0.9			Chitre series:	dystric Cambisol	shrubland		
19	27	S 2	2500 m	150	sandy loam with little humus	5.0	4.5	0.1	0.4				orthic Acrisol	overexploited broadleaf forest		
20	28	S 1	2500 m	150	sand poor in humus	5.0	5.6	0.1	0.4				dystric Regosol	shrubland		
21	29	A 2	2530 m	150	loam with humus	4.7	5.1	0.2	0.2	24.4	45.0	22.2	8.4		dystric Regosol	
21	29	S 1	2530 m	150	loamy sand poor in humus	5.0	5.6	0.0	0.4	12.4	13.8	73.3	0.5		Lithosol	
22	30	A 1	2590 m	275	sandy loam with little humus		5.0	0.3	1.1			Sarai danda ss:	humic Acrisol	overexploited Quercus semecarp.forest		
22	30	A 2	2590 m	275	loam rich in humus	4.5	5.9	1.3	0.5	20.3	31.7	36.2	11.8		humic Acrisol	
22	30	S 1	2590 m	275	sandy loam with humus	4.5	5.0	0.2	0.6	10.4	30.0	52.3	7.3		Regosol	
22	30	S 2	2590 m	275	loamy sand poor in humus	5.0	5.5	0.3	0.2			Sarai danda ss:	humic Acrisol	overexploited Quercus semecarp.forest		
23	32	A 2	2450 m	275	sandy loam with little humus	4.5	5.2	0.9	1.5				orthic Acrisol	shrubland		
23	32	S 1	2450 m	275	loamy sand with little humus	5.5	5.0	0.2	0.6			Sarai danda ss:	humic Acrisol	overexploited broadleaf forest		
24	33	A 1	2350 m	200	sandy loam with little humus		5.3	2.0	1.3				humic Acrisol	shrubland		
24	33	A 2	2350 m	200	sandy loam with little humus	4.5	5.2	1.5	2.7			Sarai danda ss:	humic Acrisol	overexploited broadleaf forest		
24	33	S 1	2350 m	200	sandy loam with humus	5.0	5.6	1.3	1.9				Regosol	shrubland		
25	34	A 1	2100 m	50	loam poor in humus		5.4	0.1	1.1			Golme danda ss:	orthic Acrisol	overexploited broadleaf forest		
25	34	A 2	2100 m	50	sandy loam poor in humus	4.5	5.5	0.5	1.3				orthic Acrisol	shrubland		
25	34	S 1	2100 m	50	sand with little humus	4.7	5.2	2.3	0.2				dystric Regosol	overexploited broadleaf forest		
26	35	A 1	2090 m	125	loamy sand poor in humus		4.9	0.3	2.0			Golme danda ss:	orthic Acrisol	overexploited broadleaf forest		
26	35	A 2	2090 m	125	loam rich in humus	4.5	4.6	0.4	0.8	25.2	45.0	19.5	10.3		orthic Acrisol	
26	35	S 1	2090 m	125	sand poor in humus	5.5	5.5	0.1	0.2				dystric Regosol	overexploited broadleaf forest		
26	35	S 2	2090 m	125	sandy loam poor in humus	5.0	5.3	0.2	0.2	12.8	30.0	55.6	1.6		Lithosol	
27	36	S 3	2000 m	175	sand poor in humus		6.1	0.3	0.4			Golme danda ss:	orthic Acrisol	cultivated terrace		
27	37	A 1	2000 m	175	loamy sand with little humus	4.5	5.2	0.3	1.1				orthic Acrisol	cultivated terrace		
27	37	A 2	2000 m	175	loamy sand poor in humus		5.4	0.2	2.2			Guchchhe ss:	humic Cambisol	overexploited broadleaf forest		
27	37	S 1	2000 m	175	loamy sand poor in humus	5.6	5.6	0.1	0.6				dystric Regosol	shrubland		
27	37	S 2	2000 m	175	loamy sand poor in humus	5.0	5.4	0.2	0.9			Sarai danda ss:	humic Acrisol	overexploited broadleaf forest		
28	38	A 1	1950 m	210	loamy sand with little humus	4.5	5.5	0.8	2.0	10.4	21.4	63.2	5.0		dystric Regosol	
28	38	A 2	1950 m	210	sand with little humus	5.3	5.5	0.5	1.4	9.0	23.4	64.8	2.8		orthic Acrisol	
28	38	S 1	1950 m	210	sand poor in humus	5.0	6.1	0.3	0.4			Guchchhe ss:	humic Cambisol	overexploited broadleaf forest		
29	39	A 1	1890 m	250	loamy sand poor in humus	4.5	5.5	0.5	2.4				dystric Regosol	shrubland		
29	39	S 1	1890 m	250	loamy sand with little humus	5.0	5.4	0.4	0.9			Guchchhe ss:	humic Cambisol	overexploited broadleaf forest		
29	39	S 2	1890 m	250	sand poor in humus		5.6	0.1	0.3				dystric Regosol	shrubland		
30	40	A 2	2050 m	290	loamy sand with little humus	5.0	5.4	0.5	0.7			Sarai danda ss:	humic Acrisol	overexploited broadleaf forest		
30	40	AB	2050 m	290	loamy sand with little humus	5.0	5.4	0.9	2.2				humic Acrisol	shrubland		
30	40	S 1	2050 m	290	loamy sand poor in humus	5.0	5.5	0.0	0.2			Guchchhe ss:	humic Cambisol	overexploited broadleaf forest		
31	41	A 2	2020 m	300	loamy sand poor in humus	4.5	5.5	0.2	1.1				dystric Regosol	shrubland		
31	41	S 1	2020 m	300												

Parent materials	Soil series	Main landform characteristics
Metamorphosed sandstone in situ	Guchchhe, Lapse	Steep to very steep hills. Severe soil/rock creep in places
Soil material derived from metamorphosed sandstone in situ	Lapse	nearly level bench terraces on or near hill summits
Phyllite in situ	Deorali, Golme Danda	Steeply dissected ridges with some undulating summits
Soil material derived from phyllite in situ	Golme Danda, Kharka, Parebha, Sunkhani	Nearly level bench terraces in steep mountainous areas
Alluvium/colluvium derived from metamorphosed sandstone and phyllite	Bhalukhop, Birta Besi Birta Pakhar, Timbure	Nearly level bench terraces on moderately steep to steep colluvial slopes
Rock/soil creep material: metamorphosed sandstone and phyllite	Kaping	Very steep, dissected hills
Soil material derived from metamorphosed sandstone and phyllite in situ	Dhuseni, Kathaikai, Mesipo, Pedku, Ratankot	Nearly level bench terraces in steep hilly areas
Augen gneiss (feldspathic schist) in situ	Sarai Danda	Steep to very steep, dissected mountains. Severe soil/rock creep in places
Colluvium derived from augen gneiss (feldspathic schist)	Girke Danda	Nearly level bench terraces on steep, dissected colluvial slopes
Soil material derived from augen gneiss (feldspathic schist) in situ	Chanaute, Chitre, Pakha Deb, Sarai Danda Sarangthali, Tauthali	Nearly level bench terraces in steep to very steep mountainous areas
Soil material derived from carbonaceous slate in situ	Burana	Ditto
Soil material derived from metamorphosed limestone in situ	Onchi	Ditto
Magnesite with talc lenses in situ	Kharidhunga	Steep to very steep, dissected mountainous areas
Alluvium/colluvium derived from chlorite schist; talc and iron oros	Khari, Mane	Nearly level bench terraces in rolling basin, probably of a syneliorium type

Note: Golme Danda, Lapse and Sarai Danda series occur on both bench terraces and non-terraced slopes.

Table 4.15. Monthly rainfall, runoff and soil loss at Dandapakhar (1984/ 1985) and Bonch (1985)

Tab. 4.15. Monatlicher Niederschlag, Abfluss und Boden-Abtrag in Dandapakhar (1984/1985) und in Bonch (1985)

Testplots Dandapakhar

1984 / Month Experiment		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Rainfall	Amount (mm) Erosivity $E_2 (10^{-2} \text{ Joules.m.cm.h}^{-1})$	20 -	31 -	9 -	126 ?	274 189.8	555 378.0	958 461.4	529 281.7	436 138.8	53 21.8	0 -	8 -	2999 1471.5
Plot 1 (bare)	Runoff ( $\text{m}^3 \cdot \text{h}^{-1}$ ) Runoff (% rainfall) Soilloss ( $\text{t} \cdot \text{ha}^{-1}$ )	- -	- -	- -	7 ?	21.7 10.3	24.6 3.2	24.1 1.8	19.5 0.8	6.8 0.1	- -	- -	- -	5598 18.7 16.2
Plot 2 (over-grown)	Runoff ( $\text{m}^3 \cdot \text{h}^{-1}$ ) Runoff (% rainfall) Soilloss ( $\text{t} \cdot \text{ha}^{-1}$ )	- -	- -	- -	7 ?	24.9 2.7	25.7 0.4	22.9 0.2	14.0 0	5.9 0	- -	- -	- -	5303 17.7 3.3

1985 / Month Experiment		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Rainfall	Amount (mm) Erosivity $E_2 (10^{-2} \text{ Joules.m.cm.h}^{-1})$	17 -	13 -	2 -	30 -	120 78.8	425 300.2	1048 430.6	839 532.1	440 187.2	252 92.3	11 -	54 -	3251 1621.2
Plot 1 (bare)	Runoff ( $\text{m}^3 \cdot \text{h}^{-1}$ ) Runoff (% rainfall) Soilloss ( $\text{t} \cdot \text{ha}^{-1}$ )	- -	- -	- -	- -	3.9 1.3	16.9 2.4	5.6 1.4	7.8 0.3	8.6 0	4.0 0	- -	- -	2454 7.8 5.4
Plot 2 (over-grown)	Runoff ( $\text{m}^3 \cdot \text{h}^{-1}$ ) Runoff (% rainfall) Soilloss ( $\text{t} \cdot \text{ha}^{-1}$ )	- -	- -	- -	- -	0 0.1	2.1 0.1	0.9 0.2	0.2 0	1.3 0	0.4 0	- -	- -	277 0.9 0.4

Testplots Bonch

1985 / Month Experiment		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Rainfall	Amount (mm) Erosivity $E_2 (10^{-2} \text{ Joules.m.cm.h}^{-1})$	15 -	25 -	7 -	93 50.8	246 94.5	420 178.6	910 375.2	1000 767.9	605 338.8	268 107.1	8 -	64 -	3661 1912.9
Plot 1 (bare)	Runoff ( $\text{m}^3 \cdot \text{h}^{-1}$ ) Runoff (% rainfall) Soilloss ( $\text{t} \cdot \text{ha}^{-1}$ )	- -	- -	- -	22.4 13.7	23.7 15.5	17.1 7.2	18.6 7.8	36.2 11.5	26.4 9.0	21.9 1.9	- -	- -	9001 25.1 66.6
Plot 2 (over-grown)	Runoff ( $\text{m}^3 \cdot \text{h}^{-1}$ ) Runoff (% rainfall) Soilloss ( $\text{t} \cdot \text{ha}^{-1}$ )	- -	- -	- -	21.1 2.7	13.9 0.9	10.1 0.1	6.0 0	6.6 0	3.8 0	3.2 0	- -	- -	2466 6.9 3.7