ANNEXES

Annex 1: Database Structure

Geographic Information System for District Level Planning in Gorkha District, Western Development Region of Nepal

Annex 1.1 *Temperature Regime Based on Analysis*

The temperature regime data, which are based on the raster GIS analysis (unit size 100 x 100m), are stored in a polygon coverage.

ICIMOD/MENRIS 1994 Coverage name: temp Attribute table: temp.pat			Storage capacity: 0.2 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
TEMP_	11	N	-	internal no. of polygons/temp (used by system)
TEMP_ID	11	N	-	no. given by user
T_CODE	11	N	-	temperature regime 1: arctic 2: alpine 3: cool temperate 4: warm temperate 5: subtropical

Annex 1.2 *Moisture Regime Based on Analysis*

The moisture regime data, which are based on the raster GIS analysis (unit size 100 x 100m), are stored in a polygon coverage.

ICIMOD/MENRIS 1994 Coverage name: moist Attribute table: moist.pat			Storage capacity: 0.2 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
MOIST_	11	N	-	internal no. of polygons/moist (used by system)
MOIST_ID	11	N	-	no. given by user
M_CODE	11	N	-	moisture regime 1: subhumid 2: humid 3: perhumid 4: arctic 5: no data

Annex 1.3 *Temperature and Moisture Regime Based on Analysis*

The overlay of the coverages 'temp' and 'moist' is compiled in the coverage 'tempmois'.

ICIMOD/MENRIS 1994 Coverage name: tempmois Attribute table: tempmois.pat			Storage capacity: 1.0 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
TEMPMOIS_	11	N	-	internal no. of polygons/tempmois (used by system)
TEMPMOIS_ID	11	N	-	no. given by user
T_CODE	11	N	-	temperature regime 1: arctic 2: alpine 3: cool temperate 4: warm temperate 5: subtropical
M_CODE	11	N	-	moisture regime 1: subhumid 2: humid 3: perhumid 4: arctic 5: no data
TM_CODE	11	N	-	agroclimatic zone 1: subtropical/subhumid 2: subtropical/humid 3: warm temperate/subhumid 4: warm temperate/humid 5: cool temperate/subhumid 6: cool temperate/humid 9: alpine/humid 10: alpine/perhumid 11: alpine/no data 12: arctic

Annex 1.4 *Mean Annual Temperature Based on Analysis*

The mean annual temperature data are based on the raster GIS analysis (unit size 100 x 100m) and are stored in a polygon coverage.

ICIMOD/MENRIS 1994 Coverage name: temp2_ Attribute table: temp2_.pat			Storage capacity: 0.3 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
TEMP2__	11	N	-	internal no. of polygons/temp2_ (used by system)
TEMP2__ID	11	N	-	no. given by user
GRID_CODE	11	N	-	mean annual temperature 1: < -3°C 2: -3 - 0°C 3: 0 - 3°C 4: 3 - 6°C 5: 6 - 9°C 6: 9 - 12°C 7: 12 - 15°C 8: 15 - 18°C 9: 18 - 21°C 10: 21 - 24°C 11: > 24°C

Annex 1.5 *Land Capability*

The land capability data are stored in a polygon coverage. They are based on the land capability maps of the LRMP, published in 1984 at a scale of 1:50,000: 71D8, 71D10, 71D11, 71D12, 71D14, 71D15, 71D16, 71H2, 71H3, 72A5, 72A9, 72A13. These single sheets are combined into one land capability map and clipped with the Gorkha District boundary (coverage: goutline). The land capability database includes information about the temperature and moisture regimes and provides an irrigation classification (Annex 11).

ICIMOD/MENRIS 1994 Coverage name: landcap Attribute table: landcap.pat			Storage capacity: 0.9 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
LANDCAP_	11	N	-	internal no. of polygons/landcap (used by system)
LANDCAP_ID	11	N	-	no. given by user
CLASSES	10	C	-	LRMP land capability legend (see Annex 11)
CAP	11	N	-	land capability classes (see Annex 11)
T_CODE	11	N	-	temperature regime 1: arctic 2: alpine 3: cool temperate 4: warm temperate 5: subtropical
M_CODE	11	N	-	moisture regime 1: subhumid 2: humid 3: perhumid 4: arctic
TM_CODE	11	N	-	temperature and moisture regimes 1: subtropical/subhumid 3: warm temperate/subhumid 4: warm temperate/humid 5: cool temperate/subhumid 6: cool temperate/humid 7: cool temperate/perhumid 8: alpine/subhumid 9: alpine/humid 10: alpine/perhumid 12: arctic
IR_CODE	11	N	-	irrigation suitability classes 1: suitable 2: moderately suitable 3: tentative

Annex 1.6 *Contour Lines*

The contour line data are stored in a line coverage. The contour lines were digitised at 500-foot intervals from the Indian Survey Topographical Maps, published in the 1960s at a scale of 1:63,360: 71D8, 71D10, 71D11, 71D12, 71D14, 71D15, 71D16, 71H2, 71H3, 72A5, 72A9, 72A13. These single sheets are combined into one contour map and clipped with the Gorkha District boundary (coverage: goutline).

ICIMOD/MENRIS 1994 Coverage name: contour Attribute table: contour.aat			Storage capacity: 2.3 MByte	
Item name	Width	Type	Dec.	Explanation
LENGTH	13	N	6	length of contour-lines in metres
CONTOUR_	11	N	-	internal no. of arc/contour (used by system)
CONTOUR_ID	11	N	-	contour lines in feet above sea-level (500 feet interval)

Annex 1.7 *Drainage System (rivers)*

The data on drainage systems are stored in a line coverage. They are based on the 'Central Service Map - Gorkha District', published in 1989 at a scale of 1:125,000.

ICIMOD/MENRIS 1994 Coverage name: river Attribute table: river.aat			Storage capacity: 265 KByte	
Item name	Width	Type	Dec.	Explanation
LENGTH	13	N	6	length of river in metres
RIVER_	11	N	-	internal no. of line/river (used by system)
RIVER_ID	11	N	-	no. given by user 1: Budhigandaki River 2: Trisuli River 3: Marsyangdi River 4: Daroundi *Khola* 5: Chepe *Khola* 6: Shyar *Khola* 10: other rivers
NAME	20	C	-	name of river

Annex 1.8 *Road and Trail Network*

The road and trail network data are stored in a line coverage. They are based on the 'Central Service Map - Gorkha District', published in 1989 at a scale of 1:125,000.

ICIMOD/MENRIS 1994 Coverage name: road Attribute table: road.aat			Storage capacity: 34 KByte	
Item name	Width	Type	Dec.	Explanation
LENGTH	13	N	6	length of road in metres
ROAD	11	N	-	internal no. of line/road (used by system)
ROAD_ID	11	N	-	no. of road type 2: bitumen road 5: local trail 7: main trail

Annex 1.9 *Bridges*

The data on bridges are stored in a point coverage. They are based on the 'Central Service Map - Gorkha District' of the Suspension Bridge Division (HMG), published in 1989 at a scale of 1:125,000.

ICIMOD/MENRIS 1994 Coverage name: bridge Attribute table: bridge.pat			Storage capacity: 10 KByte	
Item name	Width	Type	Dec.	Explanation
BRIDGE_	11	N	-	internal no. of point/bridge (used by system)
BRIDGE_ID	11	N	-	no. of point given by user
REG_NO	9	C	-	serial no. of central bridge register

Annex 1.10 *Land Utilisation in 1979*

The land utilisation data are stored in a polygon coverage. They are based on the land use maps of the LRMP, published in 1984 at a scale of 1:50,000: 71D8, 71D10, 71D11, 71D12, 71D14, 71D15, 71D16, 71H2, 71A5, 71A9, 71A13. These single sheets are combined into one land utilisation map and clipped with the Gorkha District boundary (coverage: goutline). The land-use database includes information about the main land-use classes, agricultural cropping patterns, forest types and forest density, etc.

ICIMOD/MENRIS 1994
Coverage name: landuse
Attribute table: landuse.pat
Storage capacity: 1.3 Mbyte (page 1)

Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
LANDUSE_	11	N	-	internal no. of polygon/landuse (used by system)
LANDUSE_ID	11	N	-	no. of polygon given by user
AREA_GROSS	13	N	6	gross cultivated area in hectares
AREA_NCI	13	N	6	area of non-cultivated inclusions in hectares
AREA_NET	13	N	6	net cultivated area in hectares
AREA_BUND	13	N	6	area of risers and bunds in hectares
AREA_CROP	13	N	6	area covered with crops in hectares
CLASSES	11	C	-	LRMP land use legend (see Annex 7)
LUT	11	N	-	aggregation of LRMP-defined land-use classes 1: sloping terraces 2: valley floors 3: grazing land 4: rocks, sand & boulders 5: snow & ice 6: foots lopes & *tars* 7: forest 12: level terraces 14: shrubland
CROPS	11	N	-	cultivation type of agricultural land sloping terraces 1: C1; low intensity cultivated 2: C2; medium intensity cultivated 3: C3; intensity cultivated level terraces 4: T1; low intensity cultivated 5: T2; medium intensity cultivated 6: T3; intensity cultivated 7: V; valley floors 8: F; foot slopes & *tars*
PADDY	11	N	-	agricultural land cover with paddy
PADDY_UP	11	N	-	agricultural land cover with upland paddy
MAIZE	11	N	-	agricultural land cover with maize
WHEAT	11	N	-	agricultural land cover with wheat
MILLET	11	N	-	agricultural land cover with millet
POTATO	11	N	-	agricultural land cover with potatoes
PULSES	11	N	-	agricultural land cover with pulses
OILSEED	11	N	-	agricultural land cover with oil seeds

Annex 1.10: continued

ICIMOD/MENRIS 1994
Coverage name: landuse
Attribute table: landuse.pat
(page 2)

Item name	Width	Type	Dec.	Explanation
MIXED	11	N	-	agricultural land cover with mixed crops
SUGAR	11	N	-	agricultural land cover with sugarcane
LUT3	11	N	-	pasture zones according to altitude 1: subtropical (< 1,000masl) 2: warm temperate (1,000 - 2,000masl) 3: temperate (2,000 - 2,600masl) 4: cool temperate (2,600-3,000masl) 5: subalpine (3,000 - 4,000masl) 6: alpine (> 4,000masl)
LUT7	11	N	-	forest types 1: mixed forest 2: hardwood forest 3: coniferous forest 4: protected forest 5: shrubland
LUT7_2	11	N	-	forest density & maturity classes 3: no density data 4: 10-40%; small timber 5: 40-70%; small timber 6: >70%; small timber 7: 10-40%; mature 8: 40-70%; mature 9: shrubland

Annex 1.11 *Aspect Based on Analysis*

The aspect data are based on analysis using DEM and raster GIS. The data are stored in a polygon coverage.

ICIMOD/MENRIS 1994 Coverage name: aspect Attribute table: aspect.pat			Storage capacity: 3.8 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
ASPECT_	11	N	-	internal no. of polygons/aspect (used by system)
ASPECT_ID	11	N	-	no. given by user
GRID_CODE	11	N	-	aspect code 1: level ground 2: north 337.5 - 22.5° 3: northeast 22.5 - 67.5° 4: east 67.5 - 112.5° 5: southeast 112.5 - 157.5° 6: south 157.5 - 202.5° 7: southwest 202.5 - 247.5° 8: west 247.5 - 292.5° 9: northwest 292.5 - 337.5°

Annex 1.12 *Land Systems*

The land system data are stored in a polygon coverage. They are based on the land system of the LRMP, published in 1984 at a scale of 1:50,000: 71D8, 71D11, 71D12, 71D15, 71D16, 71H3, 72A5, 72A9, 72A13; and three map sheets from northern Gorkha at a scale of 1:125,000 : 71D10, 71D14, 71H2. These single sheets are combined into one land system map and clipped with the Gorkha District boundary (coverage: gridline). The land-system database includes information about the landform, land units, dominant soils, slopes and textures, seasonal variations in the water table, and drainage (Annexes 8 - 10).

ICIMOD/MENRIS 1994 Coverage name: landsys Attribute table: landsys.pat			Storage capacity: 0.8 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
LANDSYS_	11	N	-	internal no. of polygons/landsys (used by system)
LANDSYS_ID	11	N	-	no. given by user, based on LRMP land-system legend (see Annexes 8 - 10) 99: glacier 500: riverbed/lake
CODE	11	N	-	LRMP land-system legend (see Annexes 8 - 10)

Annex 1.13 *Land Utilisation and Land Systems*

The overlay of the coverages 'landuti' and 'landsys' is compiled in the coverage 'utisys'. The database of this coverage was used to identify the location of agricultural land and forest area in relation to categories of land systems.

ICIMOD/MENRIS 1994 Coverage name: utisys Attribute table: utisys.pat			Storage capacity: 3.5 Mbyte	(page 1)
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
UTISYS_	11	N	-	internal no. of polygons/utisys (used by system)
UTISYS_ID	11	N	-	no. of polygon given by user
CLASSES	11	C	-	LRMP land utilisation legend (see Annex 7)

Annex 1.13: continued

ICIMOD/MENRIS 1994 Coverage name: utisys Attribute table: utisys.pat				(page 2)
Item name	Width	Type	Dec.	Explanation
LUT	11	N	-	aggregation of LRMP-defined land use classes 1: sloping terraces 2: valley floors 3: grazing land 4: rocks, sand, & boulders 5: snow & ice 6: foot slopes & *tars* 7: forest 12: level terraces 14: shrubland (shrubland = LRMP defined)
LUT1	11	N	-	agricultural land related to land systems 1: no data available Middle Mountain Region 9: alluvial plains and fans 10: ancient lakes and river terraces 11: moderately to steeply sloping terrain 12: steeply to very steeply sloping terrain High Mountain Region 13: alluvial plains and fans 14: past glaciated mountainous terrain below limit of arable agriculture 15: past glaciated mountainous terrain above limit of arable agriculture High Himalayan Region 16: alluvial, colluvial, and morainal depositional surfaces 17: steeply to very steeply sloping terrain
LUT7	11	N	-	forest area related to land systems (see LUT1)
LSCODE	11	N	-	LRMP land systems and land units (see Annexes 8 - 10)
LRMP_SYS	11	N	-	LRMP land systems (see Annexes 9 - 10)

Annex 1.14 *VDC Database*

The VDC data are stored in a polygon coverage. It is based on the VDC boundary maps published by the HMG/Topographical Survey Branch in 2046 B.S. (1986) at a scale of 1:50,000 or 1:25,000 for each VDC. These single sheets did not have proper reference points; thus the line features were delineated manually on the topographical sheets of the Indian Survey and only then were they digitised.

ICIMOD/MENRIS 1994
Coverage name: vdc_gdp Storage capacity: 0.2 Mbyte (page 1)
Attribute table: vdc_gdp.pat

Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
VDC_GDP_	11	N	-	internal no. of polygons/vdc_gdp (used by system)
VDC_GDP_ID	11	N	-	no. given by user
VDCNO	5	N	-	no. of VDC used on maps
NAME	20	C	-	name of VDC
VDCAREA	13	N	6	total area in hectares
AREA_AGRI	13	N	6	agriculture area in hectares
AREA_GROSS	13	N	6	gross cultivated area in hectares
AREA_NCI	13	N	6	non-cultivated inclusions in hectares
AREA_NET	13	N	6	net cultivated area in hectares
AREA_BUND	13	N	6	area of bunds & risers in hectares
AREA_CROP	13	N	6	cropped area in hectares
AREA_GRAZ	13	N	6	area of grazing land in hectares
TOT_HH	4	N	-	total no. of households 1991
TOT_POP	6	N	-	total no. of population 1991
TOT_MALE	6	N	-	total no. of males 1991
T0T_FEMALE	6	N	0	total no. of females 1991
POP_DENS	7	N	1	population density relative to total area
POP_DENS2	7	N	1	population density relative to agri. area
AGE16	6	N	-	no. of children under 16 years
BOY16	6	N	-	no. of boys under 16 years
GIRL16	6	N	-	no. of girls under 16 years
SGO	6	N	-	no. of school-going children
SGO_PER	6	N	1	% of children going to school
GSGO	6	N	-	no. of school-going girls
GSGO_PER	6	N	1	% of girls going to school
PSBOY	6	N	-	no. of primary school boys
PSGIRL	6	N	-	no. of primary school girls
SSBOY	6	N	-	no. of secondary school boys
SSGIRL	6	N	-	no. of secondary school girls
HSSBOY	6	N	-	higher secondary school boys
HSSGIRL	6	N	-	higher secondary school girls

Annex 1.14: continued

ICIMOD/MENRIS 1994 Coverage name: vdc_gdp Attribute table: vdc_gdp.pat				(page 2)
Item name	Width	Type	Dec.	Explanation
PSDIST	5	N	1	distance factor to primary school
SSDIST	5	N	1	to secondary school
HSSDIST	5	N	1	to higher secondary school
H_DIST	5	N	1	to health post
M_DIST	5	N	1	to monsoon water
W_DIST	5	N	1	to winter water
ROAD_DIST	5	N	1	to road-head
MARDIST	5	N	1	to market
WOODDIST	5	N	1	to firewood source
ASCDIST	5	N	1	to agricultural service centre
VETDIST	5	N	1	to veterinary service centre
POSTDIST	5	N	1	to post office
SIXLESS1	4	N	-	food sufficiency < 6 months (number of households, HH)
SIXL1PER	6	N	1	food sufficiency < 6 months (% of HH)
NINE1	4	N	-	for 9 months (HH)
YEAR1	4	N	-	for whole year (HH)
SALE1	4	N	-	surplus for sale (HH)
YEAR3	4	N	-	employment out of ward in a year (number of households, HH)
YEAR3PER	6	N	1	whole year (% of HH)
SIX3	4	N	1	up to 6 months (HH)
THREE3	4	N	-	up to 3 months (HH)
THREELESS3	4	N	-	< 3 months (HH)
WOODTOTAL	5	N	-	required firewood/house/year
BURY_PER	3	N	-	buried by landslides: persons
BURY_CAT	3	N	-	cattle
BURY_HOU	3	N	-	houses

Annex 1.15 *Database of Livestock and Feed Situation*

The data on livestock and the feed situation in Gorkha District are stored in a polygon coverage. They are based on the VDC boundary maps published by the HMG/Topographical Survey Branch in 2046 B.S. (1986) at a scale of 1:50,000 or 1:25,000 for each VDC.

ICIMOD/MENRIS 1994
Coverage name: vdc_feed Storage capacity: 0.2 Mbyte page 1
Attribute table: vdc_feed.pat

Item name	Width	Type	Dec.	Explanation
AREA	18	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
VDC_FEED_	11	N	-	internal no. of polygons/vdc_feed (used by system)
VDC_FEED_ID	11	N	-	no. given by user
VDCNO	5	N	-	no. of VDC used on maps
NAME	20	C	-	name of VDC
VDCAREA	13	N	6	total area in hectares
TOT_HH	4	N	-	total no. of households 1991
TOT_POP	6	N	-	total no. of population 1991
TOT_MALE	6	N	-	total no. of males 1991
T0T_FEMALE	6	N	0	total no. of females 1991
POP_DENS	7	N	1	population density relative to total area
POP_DENS2	7	N	1	population density relative to agri. area
COWOX	5	N	-	number of cows/oxen
BUFF	5	N	-	number of buffaloes
YAK	5	N	-	number of yaks and *chauris*
SHEEP	5	N	-	number of sheep
PIG	5	N	-	number of pigs
HENDUCK	5	N	-	number of hens/ducks
LU	8	N	1	no. of livestock units
COOL	11	N	-	location of VDC in terms of temperature zone 1: VDC located in cool zone 2: VDC located in both zones 3: VDC located in warm zone
LU_MODEL	8	N	2	no. of livestock units as calculated with grazing model
LU_COOL	8	N	2	no. of livestock units in cool zone
LU_WARM	8	N	2	no. of livestock units in warm zone
LUDENS	8	N	2	livestock density relative to total area
LUDENS_M	8	N	2	livestock density under the grazing model
FODETOT	8	N	1	annual feed requirements of all livestock in metric tonnes dry matter (mt DM) (first set of indicators)
FODETOT2	8	N	1	annual feed requirements of all livestock (mt DM) (second set of indicators)
FODEFOSU	8	N	1	feed supply in relation to feed requirements (first set of indicators)
FODEFOS2	8	N	1	feed supply in relation to feed requirements (first set of indicators and in access to pastures)

Annex 1.15: continued

ICIMOD/MENRIS 1994
Coverage name: vdc_feed (page 2)
Attribute table: vdc_feed.pat

Item name	Width	Type	Dec.	Explanation
FODEFOS3	8	N	1	feed supply in relation to feed requirements (second set of indicators)
FODEFOS4	8	N	1	feed supply in relation to feed requirements (second set of indicators and in access to pastures)
LU_CARRY	8	N	2	livestock carrying capacity relative to total area excluding wasteland
LU_CARRYB	8	N	2	livestock carrying capacity relative to total area excluding wasteland under livestock distribution model)
LU_CARRY2	8	N	2	livestock carrying capacity relative to total area excluding wasteland and 60% of pastures
LU_CARRY2B	8	N	2	livestock carrying capacity relative to total area excluding wasteland and 60% of pastures under livestock distribution model)
FODEHA	8	N	1	annual feed requirements of all livestock related to the VDC area excluding wasteland (mt DM/ha) (first set of indicators)
FODEHA2	8	N	1	annual feed requirements of all livestock related to the VDC area excluding wasteland and 60% of pasture land (mt DM/ha) (first set of indicators)
FODEHA3	8	N	1	annual feed requirements of all livestock relative to the VDC area excluding wasteland (mt DM/ha) (second set of indicators)
FODEHA4	8	N	1	annual feed requirements of all livestock related to the VDC area excluding wasteland and 60% of pastures (mt DM/ha) (second set of indicators)
FOSUTOT	8	N	1	annual amount of feed supply (mt DM)
FOSUTOT2	8	N	1	annual amount of feed supply excluding 60% pasture land (mt DM)
FOSUTOTC	8	N	1	annual amount of feed supply in cool zone (mt DM)
FOSUTOTW	8	N	1	annual amount of feed supply in warm zone (mt DM)
FOSUFOR	8	N	1	annual amount of feed supply from forest resources (mt DM)
FOSUFORC	8	N	1	annual amount of feed supply from forest resources in cool zone (mt DM)
FOSUFORW	8	N	1	annual amount of feed supply from forest resources in warm zone (mt DM)
FOSUGRA	8	N	1	annual amount of feed supply from pastures (mt DM)

Annex 1.15: continued

ICIMOD/MENRIS 1994
Coverage name: vdc_feed (page 3)
Attribute table: vdc_feed.pat

Item name	Width	Type	Dec.	Explanation
FOSUGRAC	8	N	1	annual amount of feed supply from pastures in cool zone (mt DM)
FOSUGRAW	8	N	1	annual amount of feed supply from pastures in warm zone (mt DM)
FOSUAGR	8	N	1	annual amount of feed supply from agricultural land (mt DM)
FOSUAGRC	8	N	1	annual amount of feed supply from agricultural land in cool zone (mt DM)
FOSUAGRW	8	N	1	annual amount of feed supply from agricultural land in warm zone (mt DM)
FOSUNCI	8	N	1	annual amount of feed supply from non-cultivated area within agricultural land (mt DM)
FOSUBUND	8	N	1	annual amount of feed supply from risers and bunds (mt DM)
FOSUTREE	8	N	1	annual amount of feed supply from fodder trees (mt DM)
FOSUSHR	8	N	1	annual amount of feed supply from shrubland (mt DM)
FOSUSHRC	8	N	1	annual amount of feed supply from shrubland in cool zone (mt DM)
FOSUSHRW	8	N	1	annual amount of feed supply from shrubland in warm zone (mt DM)

Annex 1.16 *Accessibility of Road Infrastructure*

The data on the walking distance to road infrastructure are based on the raster GIS analysis (unit size 200 x 200m) and are stored in a polygon coverage.

ICIMOD/MENRIS 1994 Coverage name: acc1_ Attribute table: acc1_.pat			Storage capacity: 0.6 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
ACC1__	11	N	-	internal no. of polygons/acc1_ (used by system)
ACC1__ID	11	N	-	no. given by user
GRID_CODE	11	N	-	walking distance to roads in hours

Annex 1.17 *Accessibility of Road Infrastructure Including Proposed Road to Arkhet*

The data on walking distance to road infrastructure, including the proposed road to Arkhet, are based on the raster GIS analysis (unit size 200 x 200m) and are stored in a polygon coverage.

ICIMOD/MENRIS 1994 Coverage name: acc2_ Attribute table: acc2_.pat			Storage capacity: 0.6 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
ACC2__	11	N	-	internal no. of polygons/acc2_ (used by system)
ACC2__ID	11	N	-	no. given by user
GRID_CODE	11	N	-	walking distance to roads in hours

Annex 1.18 *Accessibility of Bazaar*(s)

The data on walking distance to *bazaar*(s) are based on the raster GIS analysis (unit size 200 x 200m) and are stored in a polygon coverage.

ICIMOD/MENRIS 1994 Coverage name: acc3_ Attribute table: acc3_.pat			Storage capacity: 0.4 MByte	
Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
ACC3__	11	N	-	internal no. of polygons/acc3_ (used by system)
ACC3__ID	11	N	-	no. given by user
GRID_CODE	11	N	-	walking distance to *bazaar*(s) in hours

Annex 1.19 *Horticultural Development Areas*

The data on potential horticultural development areas in Gorkha are based on the raster GIS analysis (unit size 100 x 100m) and are stored in a polygon coverage.

ICIMOD/MENRIS 1994
Coverage name: horti_ Storage capacity: 7.7 Mbyte (page 1)
Attribute table: horti_.pat

Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
HORTI_	11	N	-	internal no. of polygons/horti_ (used by system)
HORTI_ID	11	N	-	no. given by user
LUT	11	N	-	agricultural land-use classes sloping terraces 1: C1 low-intensity cultivated 2: C2 medium-intensity cultivated 3: C3 intensly cultivated level terraces 4: T1 low-intensity cultivated 5: T2 medium-intensity cultivated 6: T3 intensly cultivated 7: V valley floors 8: F foot slopes & tars
TEMP	11	N	-	mean annual temperature 1: < -3° 2: -3 - 0° 3: 0 - 3° 4: 3 - 6° 5: 6 - 9° 6: 9 - 12° 7: 12 - 15° 8: 15 - 18° 9: 18 - 21° 10: 21 - 24° 11: > 24°
LANDUNIT	11	N	-	LRMP land-system legend (see Annexes 8 - 10)
ASPECT	11	N	-	aspect code 1: level ground 2: north 337.5 - 22.5° 3: northeast 22.5 - 67.5° 4: east 67.5 - 112.5° 5: southeast 112.5 - 157.5° 6: south 157.5 - 202.5° 7: southwest 202.5 - 247.5° 8: west 247.5 - 292.5° 9: northwest 292.5 - 337.5°

Annex 1.19: continued

ICIMOD/MENRIS 1994
Coverage name: horti_
Attribute table: horti_.pat
(page 2)

Item name	Width	Type	Dec.	Explanation
TM_CODE	11	N	-	agroclimatic zone 1: subtropical/subhumid 2: subtropical/humid 3: warm temperate/subhumid 4: warm temperate/humid 5: cool temperate/subhumid 6: cool temperate/humid 9: alpine/humid 10: alpine/perhumid 11: alpine/no data 12: arctic
APPLE	11	N	-	suitable areas for apples 1: suitable; NW - E 2: suitable; SE - W & level ground 3: moderately suitable; NW - E 4: moderately suitable; SE - W & level
PEAR	11	N	-	suitable areas for pears
WALNUT	11	N	-	suitable areas for walnuts
PEACH	11	N	-	suitable areas for peaches
PLUM	11	N	-	suitable areas for plums
SUNTALA	11	N	-	suitable areas for *suntala*(s)
JUNAR	11	N	-	suitable areas for *junar*(s)
LIME	11	N	-	suitable areas for limes
MANGO	11	N	-	suitable areas for mangoes
BANANA	11	N	-	suitable areas for bananas

Annex 1.20 *Potential Potato-growing Areas*

The data on potential potato growing areas in Gorkha are based on the raster GIS analysis (unit size 150 x 150m) and are stored in a polygon coverage.

ICIMOD/MENRIS 1994
Coverage name: potato_ Storage capacity: 1.65 Mbyte (page 1)
Attribute table: potato_.pat

Item name	Width	Type	Dec.	Explanation
AREA	13	N	6	area in square metres
PERIMETER	13	N	6	perimeter in metres
POTATO_	11	N	-	internal no. of polygons/potato_ (used by system)
POTATO_ID	11	N	-	no. given by user
AREA_GROSS	13	N	6	gross cultivated area in hectares
AREA_NCI	13	N	6	non-cultivated inclusions in hectares
AREA_NET	13	N	6	net cultivated area in hectares
AREA_BUND	13	N	6	area of bunds & risers in hectares
AREA_CROP	13	N	6	cropped area in hectares
POT_CODE	11	N	-	potential potato-growing area and optimal growing period 1: September - April/May 2: October - March/April 3: November - February/March 4: December - February 5: February - December 6: March - November 7: April - October 8: May - September/October 9: June - September 10: other agricultural land
LU_CODE	11	N	-	agricultural land-use classes sloping terraces 1: C1 low-intensity cultivated 2: C2 medium-intensity cultivated 3: C3 intensly cultivated level terraces 4: T1 low-intensity cultivated 5: T2 medium-intensity cultivated 6: T3 intensly cultivated 7: V valley floors 8: F foot slopes & *tars*
LANDUNIT	11	N	-	LRMP land-system legend (see Annexes 8 - 10)

Annex 1.20: continued

ICIMOD/MENRIS 1994
Coverage name: potato_
Attribute table: potato_.pat
(page 2)

Item name	Width	Type	Dec.	Explanation
TM_CODE	11	N	-	agroclimatic zone 1: subtropical/subhumid 2: subtropical/humid 3: warm temperate/subhumid 4: warm temperate/humid 5: cool temperate/subhumid 6: cool temperate/humid 9: alpine/humid 10: alpine/perhumid 11: alpine/no data 12: arctic
M_CODE	11	N	-	moisture regime 1: subhumid 2: humid 3: perhumid 4: arctic 5: no data

Annex 2: Location, mean annual air temperature, annual precipitation, and moisture regime recorded at meteorological stations in western and central Nepal

No.	Location	Longitude	Latitude	Altitude masl	Mean annual air temperature		Temperature regime	Mean annual precipitation		No. of months			Moisture regime
					°C	years		mm	years	wet	moist	dry	
601	Jomsom	83°43′	28°47′	2,744	11.4	11	cool temperate	256	18	0	5	7	arid
604	Thakmarpha	83°42′	28°45′	2,566	11.1	11	cool temperate	386	16	1	4	7	arid
605	Baglung	83°36′	28°16′	984	21.2	4	subtropical	1,891	16	5	2	5	subhumid
606	Tatopani	83°39′	28°29′	1,243		-		1,504	15	4	3	5	subhumid
607	Lete	83°36′	28°38′	2,343		-		1,099	16	7	3	2	humid
608	Muktinath	83°53′	28°49′	3,500		-		380	11	3	3	6	semi-arid
609	Beni *Bazaar*	83°34′	28°21′	835		-		1,454	25	4	3	5	subhumid
610	Ghami (Mustang)	83°53′	29°03′	3,465		-		221	9	0	6	6	arid
612	Mustang (Lomangtang)	83°58	29°11′	3,705	5.9	8	alpine	177	9	2	2	8	semi-arid
614	Kushma	83°42′	28°13′	891		-		2,320	16	6	2	4	humid
619	Ghorapani	83°44′	28°24′	2,742		-		2,692	10	6	4	2	humid
801	Jagat (Setibas)	84°54′	28°20′	1,334		-		1,299	26	4	5	3	subhumid
802	Khudi *Bazaar*	84°22′	28°17′	823	19.9	18	warm temperate	3,306	20	6	5	1	humid
803	Pokhara (Hospital)	84°00′	28°14′	918	20.8	8	subtropical	3,849	8	6	3	3	humid
804	Pokhara (Airport)	84°00′	28°13′	827	20.7	25	subtropical	3,709	26	6	3	3	humid
805	Syangja	83°53′	28°06′	860	20.1	3	subtropical	2,926	12	6	2	4	humid
806	Larke Samdo	84°37′	28°40′	3,650		-		1,121	5	11	1	0	perhumid
807	Kunchha	84°21′	28°08′	855		-		2,508	29	6	2	4	humid
808	Bandipur	84°25′	27°56′	965		-		1,900	29	5	3	4	subhumid
809	Gorkha	84°37′	28°00′	1,097	20.2	23	subtropical	1,800	24	5	3	4	subhumid
810	Chapkot	83°49′	27°53′	460	22.7	4	subtropical	1,793	26	4	3	5	subhumid
811	Malepatan (Pokhara)	83°57′	28°13′	856	19.9	10	warm temperate	3,531	13	6	1	5	humid
813	Bhadaure Deurali	83°49′	28°16′	1,600		-		(4,293)	2	7	3	2	
814	Lumle	83°48′	28°18′	1,642	15.6	16	warm temperate	5,224	17	6	5	1	humid
815	Khaireni Tar	84°06′	28°02′	500	22.7	8	subtropical	2,249	12	5	2	5	subhumid
816	Chame	84°14′	28°33′	2,680	10.4	4	cool temperate	953	9	7	2	3	humid
817	Damauli	84°17′	27°58′	358	19.7	2	warm temperate	1,878	7	5	3	4	subhumid
818	Lamachaur	83°59′	28°16′	1,070		-		4,476	13	7	4	1	humid
820	Manang Bhot	84°01′	28°40′	3,420		-		471	11	3	6	3	semi-arid

Annex 2: continued

No.	Location	Longitude	Latitude	Altitude masl	Mean annual air temperature		Temperature regime	Mean annual precipitation		No. of months			Moisture regime
					°C	years		mm	years	wet	moist	dry	
821	Ghandruk	83°48′	28°23′	1,960		-		3,388	9	8	3	1	humid
822	Khuldi	83°50′	28°26′	2,440		-		(3,123)	1	8	2	2	
823	Gharedhunga	84°37′	28°12′	1,120		-		2,802	10	6	3	3	humid
824	Siklesh	84°06′	28°22′	1,820		-		3,761	9	12	0	0	perhumid
905	Daman	85°05′	27°36′	2,314	12.8	12	cool temperate	1,856	15	6	3	3	humid
1001	Timure	85°23′	28°17′	1,900	16.7	9	warm temperate	853	26	4	2	6	subhumid
1002	Arughat *Bazaar*	84°49′	28°03′	518		-		2,548	28	4	4	4	subhumid
1003	Trishuli (closed)	85°09′	27°55′	595	22.1	7	subtropical	1,769	7	5	1	6	subhumid
1004	Nuwakot	85°10′	27°55′	1,003	21.0	8	subtropical	1,884	24	4	2	6	subhumid
1005	Dhading	84°56′	27°52′	1,420		-		2,301	28	5	4	3	subhumid
1007	Kakani	85°15′	27°48′	2,064	14.8	15	cool temperate	2,751	17	6	2	4	humid
1015	Thankot	85°12′	27°41′	1,630		-		2,051	17	6	2	4	humid
1016	Sarmathang	85°36′	27°57′	2,625	10.9	3	cool temperate	4,005	14	6	5	1	humid
1017	Dubachaur	85°34	27°52′	1,550		-		2,391	15	6	1	5	humid
1018	Baunepati	85°34′	27°47′	845		-		1,815	15	4	3	5	subhumid
1022	Godavari	85°24′	27°35′	1,400	16.2	15	warm temperate	1,888	26	4	3	5	subhumid
1024	Dhulikhel	85°33′	27°37′	1,552		-		1,547	32	4	3	5	subhumid
1029	Khumaltar	85°20′	27°40′	1,350	17.3	16	warm temperate	1,281	17	4	2	6	subhumid
1030	Kathmandu Airport	85°22′	27°42′	1,336	17.9	17	warm temperate	1,423	18	4	2	6	subhumid
1036	Panchkhal	85°38′	27°41′	865	21.2	7	subtropical	1,201	12	4	2	6	subhumid
1038	Dhunibesi	85°11′	27°43′	1,085	20.9	10	subtropical	1,571	12	4	3	5	subhumid
1039	Panipokhari (Kathmandu)	85°21′	27°44′	1,335	18.0	10	warm temperate	1,549	12	4	3	5	subhumid
1043	Nagarkot	85°31′	27°42′	2,150	14.3	8	cool temperate	1,852	15	6	0	6	humid
1054	Thamachit	85°19′	28°10′	1,847		-		1,408	12	5	6	1	subhumid
1055	Dhunche	85°18′	28°06′	1,982		-		1,860	15	9	3	0	perhumid
1057	Pansayakhola	85°07′	28°01′	1,235	(14.1)	10		3,093	10	6	1	5	humid
1068	Tarke Ghyang	85°33′	28°00′	2,480		-		3,360	8	6	5	1	humid

( ) data not utilised for analysis
wet : precipitation > PET
moist : 0.5 PET < precipitation < PET
dry : precipitation < = 0.5 PET

Annex 3: Number of livestock units and the feed situation relative to VDCs (first set of indicators)

VDC No.	Name	Number of livestock units			Feed requirements		Feed supply	Carrying capacity		Feed situation
		(LU)	(LU_MODEL)	per ha (LUDENS_M)	mt DM/ year (FODETOT)	mt DM/ ha/yr (FODEHA)	mt DM/year (FOSUTOT)	(LU_CARRY)	(LU_CARRYB)	per cent (FODEFOSU)
VDCs of category 1 (cool zone)										
10	Bihi	811	1,121	.19	3,635	.63	3,242	.18	.23	89.2
13	Chekampar	304	1,625	.18	6,523	.70	12,945	.44	.80	198.4
15	Chumchet	1,024	1,301	.22	4,363	.72	5,082	.27	.33	116.5
37	Laprak	7,062	2,124	.40	6,979	1.32	6,095	.37		87.3
39	Lho	1,450	2,092	.44	6,895	1.46	5,972	.40	.52	86.6
50	Prok	803	1,382	.23	4,750	.78	5,438	.29	.41	114.5
52	Samagaun	1,436	2,773	.32	9,778	1.12	12,479	.45	.67	127.6
Sub-total					42,923		51,253			119.4
VDCs of category 2 (cool and warm zone)										
2	Aru Arbang	2,135	2,059	.83	6,126	2.47	4,257	.55		69.5
28	Gumda	1,596	1,921	.31	6,432	1.02	6,862	.35	.41	106.7
32	Kashigaun	773	965	.18	3,201	.61	4,963	.30	.36	155.0
34	Kerauja	1,936	3,712	.19	13,866	.70	23,274	.37	.55	167.8
35	Kharibot	4,611	4,474	.93	14,443	2.99	6,986	.46		48.4
38	Lapu	993	976	.30	3,033	.94	3,047	.30		100.5
42	Manbu	1,225	1,219	.23	3,826	.70	4,540	.27		118.7
53	Saurpani	2,897	2,761	.80	8,310	2.40	5,478	.51		65.9
55	Simjung	2,400	2,637	.42	8,430	1.35	7,189	.37	.40	85.3
56	Sirdibas	4,260	5,552	.31	20,195	1.11	23,943	.42	.52	118.6
57	Swara	2,159	2,109	.69	6,341	2.08	4,075	.43		64.3
66	Thumi	1,623	1,589	.50	5,018	1.56	5,036	.50		100.3
67	Uhiya	2,079	2,719	.24	9,365	.81	11,535	.32	.40	123.2
68	Barpak	1,589	1,852	.22	6,142	.73	8,179	.31	.35	133.2
69	Ghyachok	1,157	1,114	.50	3,370	1.50	1,939	.28		57.5
Sub-total					118,098		121,303			102.7

Annex 3: continued

VDC No.	Name	Number of livestock units			Feed requirements		Feed supply	Carrying capacity		Feed situation
		(LU)	(LU_MODEL)	per ha (LUDEN_M)	mt DM/year (FODETOT)	mt DM/ha/yr (FODEHA)	mt DM/year (FOSUTOT)	(LU_CARRY)	(LU_CARRYB)	per cent (FODEFOSU)
VDCs of category 3 (warm zone)										
1	Aampipal	3,331	3,098	1.69	9,359	5.09	4,184	.73		44.7
3	Aru Chanaute	1,874	1,782	2.23	5,362	6.70	1,637	.65		30.5
4	Aru Pokhari	2,901	2,753	1.15	8,182	3.43	4,615	.62		56.4
5	Asrang	2,673	2,522	1.40	7,578	4.20	3,398	.60		44.8
6	Baguwa	1,319	1,249	2.31	3,701	6.83	1,200	.71		32.4
7	Bakrang	1,589	1,508	.58	4,540	1.75	4,308	.53		94.9
8	Mirkot	2,200	1,991	.77	6,118	2.35	4,700	.58		76.8
9	Bhumlichok	2,152	2,030	.72	6,130	2.18	4,555	.52		74.3
11	Borlang	2,636	2,497	.87	7,473	2.59	4,356	.48		58.3
12	Bungkot	3,718	3,517	1.25	10,527	3.75	4,773	.54		45.3
14	Choprak	3,270	3,088	1.41	9,258	4.23	4,440	.65		48.0
16	Changli	3,068	2,933	.97	8,873	2.94	6,465	.68		72.9
17	Darbung	1,855	1,758	1.00	5,292	3.02	3,006	.55		56.8
18	Deurali	3,425	3,231	1.07	9,765	3.23	3,887	.41		39.8
19	Dhawa	2,158	2,039	1.29	6,092	3.86	2,634	.53		43.2
20	Dhuwakot	2,357	2,230	1.04	6,744	3.15	3,351	.50		49.7
21	Phinam	2,546	2,394	2.00	7,263	6.07	2,625	.70		36.1
22	Phujel	3,090	2,929	2.06	8,718	6.12	3,281	.73		37.6
23	Gaikhur	2,873	2,697	1.78	8,209	5.43	2,516	.53		30.7
24	Gakhu	1,667	1,578	1.16	4,752	3.48	2,591	.60		54.5
25	Gairung	2,315	2,202	1.07	6,601	3.19	4,355	.67		66.0
26	Ghyalchok	1,300	1,203	.41	3,642	1.25	4,398	.48		120.8
27	Gorakhkali	2,583	2,392	1.20	7,444	3.73	3,520	.56		47.3
29	Hanspur	3,807	3,633	1.98	10,788	5.89	5,034	.88		46.7
30	Harmi	1,726	1,621	1.33	4,897	4.02	3,263	.85		66.6
31	Jaubari	3,816	3,385	1.64	10,649	5.17	3,802	.59		35.7
33	Kerabari	1,561	1,418	.96	4,321	2.93	2,873	.62		66.5
36	Koplang	3,008	2,819	1.22	8,486	3.68	4,542	.63		53.5
40	Makaising	1,355	1,272	1.34	3,840	4.05	1,736	.58		45.2

Annex 3: continued

VDC No.	Name	Number of livestock units			Feed requirements		Feed supply	Carrying capacity		Feed situation
		(LU)	(LU_MODEL)	per ha (LUDENS_M)	mt DM/year (FODETOT)	mt DM/ha/yr (FODEHA)	mt DM/year (FOSUTOT)	(LU_CARRY)	(LU_CARRYB)	per cent (FODEFOSU)
41	Manakamana	2,952	2,830	.89	8,528	2.68	5,442	.55		63.8
43	Masel	2,297	2,272	1.69	6,626	4.92	3,316	.78		50.0
44	Muchok	1,356	1,189	.69	3,693	2.15	2,980	.55		80.7
45	Namjung	2,708	2,562	1.60	7,635	4.75	2,457	.49		32.2
46	Nareshwar	977	888	.65	2,726	1.99	2,937	.68		107.8
47	Palungtar	3,358	3,197	1.46	9,586	4.37	5,333	.77		55.6
48	Panchkhuwadeurali	1,482	1,375	1.64	4,154	4.95	1,489	.57		35.8
49	Pandrung	1,898	1,792	1.30	5,342	3.88	2,293	.53		42.9
51	Ranishwara	2,943	2,724	1.53	8,463	4.75	2,939	.53		34.7
54	Shreenathkot	2,895	2,693	1.34	8,067	4.02	3,544	.56		43.9
58	Taklung	3,181	3,031	1.23	9,181	3.72	5,132	.66		55.9
59	Takukot	2,098	1,986	1.36	5,983	4.08	2,935	.64		49.1
60	Takumajhlakuri	1,021	967	.86	2,881	2.56	2,431	.69		84.4
61	Tandrung	2,504	2,370	1.45	7,036	4.30	3,645	.71		51.8
62	Tanglichok	3,373	3,218	1.43	9,629	4.28	4,225	.60		43.9
63	Taple	2,423	2,286	1.34	6,845	4.00	3,454	.64		50.5
64	Taranagar	1,720	1,666	.87	5,030	2.63	3,791	.63		75.4
65	Thalajung	2,168	2,047	1.09	6,121	3.26	3,789	.64		61.9
Sub-total					332,128		168,180			52.2
Total					483,149		340,736			70.5

( ) item names used in VDC_FEED.PAT

Annex 4: Number of livestock units and the feed situation relative to VDCs (first set of indicators); considering limited access to pasture land

VDC No.	Name	Number of livestock units			Feed requirements		Feed supply	Carrying capacity		Feed situation
		(LU)	(LU_MODEL)	per ha (LUDENS_M)	mt DM/year (FODETOT)	mt DM/ha/yr (FODEHA2)	mt DM/year (FOSUTOT2)	(LU_CARRY2)	(LU_CARRY2B)	per cent (FODEFOS2)
VDCs of category 1 (cool zone)										
10	Bihi	811	1,121	.19	3,635	.71	1,923	.12	.15	52.9
13	Chekampar	304	1,625	.18	6,523	1.35	5,610	.37	.67	86.0
15	Chumchet	1,024	1,301	.22	4,363	.85	2,875	.18	.22	65.9
37	Laprak	7,062	2,124	.40	6,979	1.67	3,618	.28		51.8
39	Lho	1,450	2,092	.44	6,895	2.49	2,674	.31	.41	38.8
50	Prok	803	1,382	.23	4,750	1.11	2,403	.18	.26	50.6
52	Samagaun	1,436	2,773	.32	9,778	2.08	5,821	.40	.59	59.5
Sub-total				42,923		24,923			58.1	
VDCs of category 2 (cool and warm zone)										
2	Aru Arbang	2,135	2,059	.83	6,126	2.47	4,255	.55		69.4
28	Gumda	1,596	1,921	.31	6,432	1.20	4,345	.26	.30	67.6
32	Kashigaun	773	965	.18	3,201	.66	3,834	.25	.30	119.8
34	Kerauja	1,936	3,712	.19	13,866	1.00	11,767	.27	.40	84.9
35	Kharibot	4,611	4,474	.93	14,443	3.64	5,204	.42		36.0
38	Lapu	993	976	.30	3,033	.97	2,813	.29		92.8
42	Manbu	1,225	1,219	.23	3,826	.71	4,497	.26		117.5
53	Saurpani	2,897	2,761	.80	8,310	2.40	5,438	.50		65.4
55	Simjung	2,400	2,637	.42	8,430	1.62	5,114	.31	.34	60.7
56	Sirdibas	4,260	5,552	.31	20,195	1.78	10,558	.30	.37	52.3
57	Swara	2,159	2,109	.69	6,341	2.08	4,065	.42		64.1
66	Thumi	1,623	1,589	.50	5,018	1.60	4,719	.48		94.0
67	Uhiya	2,079	2,719	.24	9,365	1.01	6,736	.23	.28	71.9
68	Barpak	1,589	1,852	.22	6,142	.79	7,018	.29	.33	114.3
69	Ghyachok	1,157	1,114	.50	3,370	1.53	1,796	.26		53.3
Sub-total				118,098		82,160			69.6	

Annex 4: continued

VDC No.	Name	Number of livestock units			Feed requirements		Feed supply	Carrying capacity		Feed situation
		(LU)	(LU_MODEL)	per ha (LUDENS_M)	mt DM/year (FODETOT)	mt DM/ ha/yr (FODEHA2)	mt DM/year (FOSUTOT2)	(LU_CARRY2)	(LU_CARRY2B)	per cent (FODEFOS2)
VDCs of category 3 (warm zone)										
1	Aampipal	3,331	3,098	1.69	9,359	5.09	4,151	.72		44.4
3	Aru Chanaute	1,874	1,782	2.23	5,362	6.70	1,637	.65		30.5
4	Aru Pokhari	2,901	2,753	1.15	8,182	3.44	4,579	.61		56.0
5	Asrang	2,673	2,522	1.40	7,578	4.26	3,313	.59		43.7
6	Baguwa	1,319	1,249	2.31	3,701	6.83	1,197	.70		32.3
7	Bakrang	1,589	1,508	.58	4,540	1.75	4,291	.53		94.5
8	Mirkot	2,200	1,991	.77	6,118	2.35	4,669	.57		76.3
9	Bhumlichok	2,152	2,030	.72	6,130	2.26	4,254	.50		69.4
11	Borlang	2,636	2,497	.87	7,473	2.59	4,342	.48		58.1
12	Bungkot	3,718	3,517	1.25	10,527	3.75	4,758	.54		45.2
14	Choprak	3,270	3,088	1.41	9,258	4.23	4,426	.64		47.8
16	Changli	3,068	2,933	.97	8,873	2.94	6,393	.68		72.1
17	Darbung	1,855	1,758	1.00	5,292	3.04	2,956	.54		55.9
18	Deurali	3,425	3,231	1.07	9,765	3.23	3,879	.41		39.7
19	Dhawa	2,158	2,039	1.29	6,092	3.86	2,628	.53		43.1
20	Dhuwakot	2,357	2,230	1.04	6,744	3.15	3,333	.50		49.4
21	Phinam	2,546	2,394	2.00	7,263	6.07	2,606	.69		35.9
22	Phujel	3,090	2,929	2.06	8,718	6.25	3,179	.73		36.5
23	Gaikhur	2,873	2,697	1.78	8,209	5.43	2,512	.53		30.6
24	Gakhu	1,667	1,578	1.16	4,752	3.48	2,571	.60		54.1
25	Gairung	2,315	2,202	1.07	6,601	3.74	3,431	.62		52.0
26	Ghyalchok	1,300	1,203	.41	3,642	1.25	4,390	.48		120.5
27	Gorakhkali	2,583	2,392	1.20	7,444	3.73	3,503	.56		47.1
29	Hanspur	3,807	3,633	1.98	10,788	5.89	5,000	.87		46.3
30	Harmi	1,726	1,621	1.33	4,897	4.02	3,252	.85		66.4
31	Jaubari	3,816	3,385	1.64	10,649	5.17	3,786	.59		35.5
33	Kerabari	1,561	1,418	.96	4,321	2.93	2,843	.61		65.8
36	Koplang	3,008	2,819	1.22	8,486	3.68	4,542	.62		53.5
40	Makaising	1,355	1,272	1.34	3,840	4.05	1,731	.58		45.1

Annex 4: continued

VDC No.	Name	Number of livestock units			Feed requirements		Feed supply	Carrying capacity		Feed situation
		(LU)	(LU_MODEL)	per ha (LUDENS_M)	mt DM/year (FODETOT)	mt DM/ha/yr (FODEHA2)	mt DM/year (FOSUTOT)	(LU_CARRY2)	(LU_CARRYB2)	per cent (FODEFOS2)
41	Manakamana	2,952	2,830	.89	8,528	2.82	4,984	.52		58.4
43	Masel	2,297	2,272	1.69	6,626	4.92	3,284	.78		49.6
44	Muchok	1,356	1,189	.69	3,693	2.15	2,965	.55		80.3
45	Namjung	2,708	2,562	1.60	7,635	4.76	2,449	.49		32.1
46	Nareshwar	977	888	.65	2,726	1.99	2,905	.68		106.6
47	Palungtar	3,358	3,197	1.46	9,586	4.37	5,317	.77		55.5
48	Panchkhuwadeurali	1,482	1,375	1.64	4,154	5.09	1,419	.55		34.2
49	Pandrung	1,898	1,792	1.30	5,342	4.09	2,083	.51		39.0
51	Ranishwara	2,943	2,724	1.53	8,463	4.75	2,930	.52		34.6
54	Shreenathkot	2,895	2,693	1.34	8,067	4.02	3,524	.56		43.7
58	Taklung	3,181	3,031	1.23	9,181	4.20	4,275	.62		46.6
59	Takukot	2,098	1,986	1.36	5,983	4.10	2,910	.63		48.6
60	Takumajhlakuri	1,021	967	.86	2,881	2.56	2,425	.69		84.1
61	Tandrung	2,504	2,370	1.45	7,036	4.30	3,632	.71		51.6
62	Tanglichok	3,373	3,218	1.43	9,629	4.37	4,080	.59		42.4
63	Taple	2,423	2,286	1.34	6,845	4.00	3,440	.64		50.3
64	Taranagar	1,720	1,666	.87	5,030	2.63	3,769	.63		74.9
65	Thalajung	2,168	2,047	1.09	6,121	3.26	3,751	.64		61.3
Sub-total				332,128		164,277				51.0
Total				483,149		271,359				56.2

Annex 5: Number of livestock units and the feed situation relative to VDCs (second set of indicators)

VDC No.	Name	Number of livestock units	Feed requirements	Feed supply	Feed situation	mt DM/year (FOSUTOT)	per cent (FODEFOS3)
		(LU)	(LU_MODEL)	mt DM/year (FODETOT2)	mt DM/ha/yr (FODEHA3)		
VDCs of category 1 (cool zone)							
10	Bihi	811	1,121	3,635	.63	3,242	89.2
13	Chekampar	304	1,625	6,523	.70	12,945	198.4
15	Chumchet	1,024	1,301	4,363	.72	5,082	116.5
37	Laprak	7,062	2,124	5,235	.99	6,095	116.4
39	Lho	1,450	2,092	6,895	1.46	5,972	86.6
50	Prok	803	1,382	4,750	.78	5,438	114.5
52	Samagaun	1,436	2,773	9,778	1.12	12,479	127.6
Sub-total				41,178		51,253	124.5
VDCs of category 2 (cool and warm zone)							
2	Aru Arbang	2,135	2,059	4,031	1.62	4,257	105.6
28	Gumda	1,596	1,921	4,956	.79	6,862	138.5
32	Kashigaun	773	965	2,452	.47	4,963	202.4
34	Kerauja	1,936	3,712	12,219	.62	23,274	190.5
35	Kharibot	4,611	4,474	10,690	2.21	6,986	65.4
38	Lapu	993	976	2,110	.66	3,047	144.4
42	Manbu	1,225	1,219	2,735	.50	4,540	166.0
53	Saurpani	2,897	2,761	5,503	1.59	5,478	99.5
55	Simjung	2,400	2,637	6,145	.99	7,189	117.0
56	Sirdibas	4,260	5,552	20,195	1.11	23,943	118.6
57	Swara	2,159	2,109	4,174	1.37	4,075	97.6
66	Thumi	1,623	1,589	3,581	1.12	5,036	140.6
67	Uhiya	2,079	2,719	7,494	.65	11,535	153.9
68	Barpak	1,589	1,852	4,713	.56	8,179	173.5
69	Ghyachok	1,157	1,114	2,256	1.01	1,939	86.0
Sub-total				93,255		121,303	130,1
VDCs of category 3 (warm zone)							
1	Aampipal	3,331	3,098	6,290	3.42	4,184	66.5
3	Aru Chanaute	1,874	1,782	3,552	4.44	1,637	46.1
4	Aru Pokhari	2,901	2,753	5,382	2.25	4,615	85.7
5	Asrang	2,673	2,522	5,039	2.80	3,398	67.4
6	Baguwa	1,319	1,249	2,446	4.52	1,200	49.1
7	Bakrang	1,589	1,508	3,007	1.16	4,308	143.3
8	Mirkot	2,200	1,991	4,230	1.63	4,700	111.1
9	Bhumlichok	2,152	2,030	4,102	1.46	4,555	111.1
11	Borlang	2,636	2,497	4,954	1.72	4,356	87.9
12	Bungkot	3,718	3,517	6,970	2.49	4,773	68.5
14	Choprak	3,270	3,088	6,123	2.80	4,440	72.5
16	Changli	3,068	2,933	5,889	1.95	6,465	109.8
17	Darbung	1,855	1,758	3,520	2.01	3,006	85.4
18	Deurali	3,425	3,231	6,493	2.14	3,887	59.9
19	Dhawa	2,158	2,039	4,025	2.55	2,634	65.4
20	Dhuwakot	2,357	2,230	4,483	2.09	3,351	74.8
21	Phinam	2,546	2,394	4,865	4.07	2,625	54.0
22	Phujel	3,090	2,929	5,738	4.03	3,281	57.2
23	Gaikhur	2,873	2,697	5,517	3.65	2,516	45.6
24	Gakhu	1,667	1,578	3,142	2.30	2,591	82.4
25	Gairung	2,315	2,202	4,377	2.12	4,355	99.5
26	Ghyalchok	1,300	1,203	2,443	.84	4,398	180.0
27	Gorakhkali	2,583	2,392	5,176	2.60	3,520	68.0
29	Hanspur	3,807	3,633	7,057	3.85	5,034	71.3
30	Harmi	1,726	1,621	3,264	2.68	3,263	100.0
31	Jaubari	3,816	3,385	7,597	3.69	3,802	50.1
33	Kerabari	1,561	1,418	2,945	2.00	2,873	97.6
36	Koplang	3,008	2,819	5,647	2.45	4,542	80.4

VDC No.	Name	Number of livestock units	Feed requirements	Feed supply	Feed situation	mt DM/year (FOSUTOT)	per cent (FODEFOS3)
		(LU)	(LU_MODEL)	mt DM/year (FODETOT2)	mt DM/ha/yr (FODEHA3)		
40	Makaising	1,355	1,272	2,566	2.70	1,736	67.7
41	Manakamana	2,952	2,830	5,652	1.78	5,442	96.3
43	Masel	2,297	2,272	4,192	3.11	3,316	79.1
44	Muchok	1,356	1,189	2,593	1.51	2,980	114.9
45	Namjung	2,708	2,562	5,027	3.13	2,457	48.9
46	Nareshwar	977	888	1,876	1.37	2,937	156.6
47	Palungtar	3,358	3,197	6,324	2.88	5,333	84.3
48	Panchkhuwadeurali	1,482	1,375	2,788	3.32	1,489	53.4
49	Pandrung	1,898	1,792	3,528	2.56	2,293	65.0
51	Ranishwara	2,943	2,724	5,829	3.27	2,939	50.4
54	Shreenathkot	2,895	2,693	5,389	2.68	3,544	65.8
58	Taklung	3,181	3,031	6,137	2.49	5,132	83.6
59	Takukot	2,098	1,986	3,981	2.72	2,935	73.7
60	Takumajhlakuri	1,021	967	1,898	1.69	2,431	128.1
61	Tandrung	2,504	2,370	4,629	2.83	3,645	78.7
62	Tanglichok	3,373	3,218	6,339	2.82	4,225	66.6
63	Taple	2,423	2,286	4,542	2.65	3,454	76.1
64	Taranagar	1,720	1,666	3,321	1.74	3,791	114.2
65	Thalajung	2,168	2,047	4,047	2.15	3,789	93.6
Sub-total				214,931		168,180	78.2
Total				349,364		340,736	97.5

Annex 6: Number of livestock units and the feed situation relative to VDCs (second set of indicators); considering limited access to pasture land

VDC No.	Name	Number of livestock units (LU)	(LU_MODEL)	Feed requirements mt DM/year (FODETOT2)	mt DM/ha/yr (FODEHA4)	Feed supply mt DM/year (FOSUTOT2)	Feed situation per cent (FODEFOS4)
VDCs of category 1 (cool zone)							
10	Bihi	811	1,121	3,635	.71	1,923	52.9
13	Chekampar	304	1,625	6,523	1.35	5,610	86.0
15	Chumchet	1,024	1,301	4,363	.85	2,875	65.9
37	Laprak	7,062	2,124	5,235	1.26	3,618	69.1
39	Lho	1,450	2,092	6,895	2.49	2,674	38.8
50	Prok	803	1,382	4,750	1.11	2,403	50.6
52	Samagaun	1,436	2,773	9,778	2.08	5,821	59.5
Sub-total				41,178		24,923	60.5
VDCs of category 2 (cool and warm zone)							
2	Aru Arbang	2,135	2,059	4,031	1.62	4,255	105.5
28	Gumda	1,596	1,921	4,956	.92	4,345	87.7
32	Kashigaun	773	965	2,452	.51	3,834	156.3
34	Kerauja	1,936	3,712	12,219	.88	11,767	96.3
35	Kharibot	4,611	4,474	10,690	2.69	5,204	48.7
38	Lapu	993	976	2,110	.67	2,813	133.3
42	Manbu	1,225	1,219	2,735	.50	4,497	164.4
53	Saurpani	2,897	2,761	5,503	1.59	5,438	98.8
55	Simjung	2,400	2,637	6,145	1.18	5,114	83.2
56	Sirdibas	4,260	5,552	20,195	1.78	10,558	52.3
57	Sawara	2,159	2,109	4,174	1.37	4,065	97.4
66	Thumi	1,623	1,589	3,581	1.14	4,719	131.8
67	Uhiya	2,079	2,719	7,494	.81	6,736	89.9
68	Barpak	1,589	1,852	4,713	.60	7,018	148.9
69	Ghyachok	1,157	1,114	2,256	1.03	1,796	79.6
Sub-total				93,255		118,098	88.1
VDCs of category 3 (warm zone)							
1	Aampipal	3,331	3,098	6,290	3.42	4,151	66.0
3	Aru Chanaute	1,874	1,782	3,552	4.44	1,637	46.1
4	Aru Pokhari	2,901	2,753	5,382	2.26	4,579	85.1
5	Asrang	2,673	2,522	5,039	2.83	3,313	65.7
6	Baguwa	1,319	1,249	2,446	4.52	1,197	48.9
7	Bakrang	1,589	1,508	3,007	1.16	4,291	142.7
8	Mirkot	2,200	1,991	4,230	1.63	4,669	110.4
9	Bhumlichok	2,152	2,030	4,102	1.51	4,254	103.7
11	Borlang	2,636	2,497	4,954	1.72	4,342	87.6
12	Bungkot	3,718	3,517	6,970	2.49	4,758	68.3
14	Choprak	3,270	3,088	6,123	2.80	4,426	72.3
16	Changli	3,068	2,933	5,889	1.95	6,393	108.6
17	Darbung	1,855	1,758	3,520	2.02	2,956	84.0
18	Deurali	3,425	3,231	6,493	2.14	3,879	59.7
19	Dhawa	2,158	2,039	4,025	2.55	2,628	65.3
20	Dhuwakot	2,357	2,230	4,483	2.09	3,333	74.3
21	Phinam	2,546	2,394	4,865	4.07	2,606	53.6
22	Phujel	3,090	2,929	5,738	4.11	3,179	55.4
23	Gaikhur	2,873	2,697	5,517	3.65	2,512	45.5
24	Gakhu	1,667	1,578	3,142	2.30	2,571	81.8
25	Gairung	2,315	2,202	4,377	2.48	3,431	78.4
26	Ghyalchok	1,300	1,203	2,443	.84	4,390	179.7
27	Gorakhkali	2,583	2,392	5,176	2.60	3,503	67.7
29	Hanspur	3,807	3,633	7,057	3.85	5,000	70.9
30	Harmi	1,726	1,621	3,264	2.68	3,252	99.6
31	Jaubari	3,816	3,385	7,597	3.69	3,786	49.8
33	Kerabari	1,561	1,418	2,945	2.00	2,843	96.5
36	Koplang	3,008	2,819	5,647	2.45	4,527	80.2

VDC No.	Name	Number of livestock units		Feed requirements		Feed supply	Feed situation
		(LU)	(LU_MODEL)	mt DM/year (FODETOT2)	mt DM/ha/yr (FODEHA4)	mt DM/year (FOSUTOT2)	per cent (FODEFOS4)
40	Makaising	1,355	1,272	2,566	2.70	1,731	67.5
41	Manakamana	2,952	2,830	5,652	1.87	4,984	88.2
43	Masel	2,297	2,272	4,192	3.11	3,284	78.3
44	Muchok	1,356	1,189	2,593	1.51	2,965	114.4
45	Namjung	2,708	2,562	5,027	3.13	2,449	48.7
46	Nareshwar	977	888	1,876	1.37	2,905	154.8
47	Palungtar	3,358	3,197	6,324	2.88	5,317	84.1
48	Panchkhuwadeurali	1,482	1,375	2,788	3.41	1,419	50.9
49	Pandrung	1,898	1,792	3,528	2.70	2,083	59.1
51	Ranishwara	2,943	2,724	5,829	3.27	2,930	50.3
54	Shreenathkot	2,895	2,693	5,389	2.68	3,524	65.4
58	Taklung	3,181	3,031	6,137	2.81	4,275	69.7
59	Takukot	2,098	1,986	3,981	2.73	2,910	73.1
60	Takumajhlakuri	1,021	967	1,898	1.69	2,425	127.7
61	Tandrung	2,504	2,370	4,629	2.83	3,632	78.5
62	Tanglichok	3,373	3,218	6,339	2.87	4,080	64.4
63	Taple	2,423	2,286	4,542	2.65	3,440	75.8
64	Taranagar	1,720	1,666	3,321	1.74	3,769	113.5
65	Thalajung	2,168	2,047	4,047	2.15	3,751	92.7
Sub-total				214,931		164,277	76.4
Total				349,364		271,359	77.7

Annex 7

LAND-USE LEGEND

TERAI CULTIVATION

Wet Lands	W
Upper Wetlands	W
Dry Lands	D
Mixed Lands	X

HILLSLOPE CULTIVATION

Level Terraces		T
Sloping Terraces		C
Intense	75% - 100% cultivated	3
Medium	50% - 75% cultivated	2
Light	25% - 50% cultivated	1
Abandoned		A

GRAZING LANDS — G

	amsl	
Sub-Tropical Zone	< 1000m	1
Warm Temperate Zone	1000m - 2000m	2
Temperate Zone	2000m - 2600m	3
Cool Temperate Zone	2600m - 3000m	4
Sub-Alpine Zone	3000m - 4000m	5
Alpine Zone	> 4000m	6

VALLEY CULTIVATION

Valley Floors, including Tars, Footslopes and/or Alluvial Fans which are too small to map	V
Tars, Alluvial Fans and/or Lower Footslopes	F

NON AGRICULTURAL LANDS

Perpetual Snow and Ice	I
Rock	R
Sand/Gravel/Boulders	B
Lake	L
Urban	U

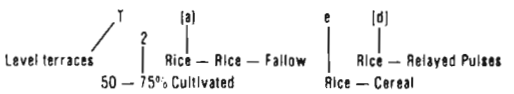
DOMINANT CROPPING PATTERNS

MONSOON SEASON	WINTER / DRY SEASON	
Rice	Fallow	a
Rice	Oilseed	b
Rice	Mixed Winter crop	c
Rice	Pulses	d
Rice	Cereal	e
Jute — Rice	Fallow	f
Jute — Rice	Winter crop	g
Rice Maize	Winter crop	h
Rice seedlings	Mustard	i
Maize or Millet	Fallow	j
Maize	Mustard	k
Maize	Cereal	l
Cereal	Fallow	n

MONSOON SEASON	WINTER / DRY SEASON	
Maize	Tobacco	o
Cereal — Fallow	Fallow — Fallow	q
Maize — Rice	Winter crop	r
Tobacco	Fallow	t
Maize — Rice	Fallow	u
Maize	Pulses	w
Maize	Potato	x
Maize + Potato	Winter crop	y
Potato	Fallow	z
Mixed		m
Pigeon Pea		p
Sugar Cane		s
Other		v

Upland rice-underlined ... e Double monsoon crop in brackets (•) Relayed winter crop in square brackets [•]

TYPE LEGEND SAMPLE



FORESTRY LEGEND

COVER TYPE

C — Coniferous — 75% or more of tree species are coniferous
H — Hardwood — 75% or more of tree species are hardwoods
M — All other combinations of tree species
S — Shrub: shrub vegetation which may include hardood regeneration

CROWN DENSITY

Expressed as a percentage of the area covered by tree crowns

1 < 10% (Non — forest type)
2 10 — 40%
3 40 — 70%
4 >70%

SPECIES TYPE

Tropical types

Sal — Shorea robusta
KS — Acacia catechu and Dalbergia sissoo
Pr — Pinus roxburghii (Chir Pine)
TMH — Tropical mixed hardwoods

Temperate and Alpine Types

DMB — Deciduous mixed broad leaved
Q — Quercus (Oak) all species
Bu — Betula utilis (Birch)
A — Abies spectabilis and Abies pindrow (Fir)
Pw — Pinus wallichiana (Blue Pine)
Td — Tsuga dumosa (Hemlock)

MATURITY CLASS

M — Mature to overmature — trees have reached at estimated rotation age or saw timber size
I — Immature or small timber size material
R — Reproduction — new regeneration to pole size

Species of interest which may form a minor or infrequent component within a major type will be shown by subscripts in lower case species abbreviation. Severe degradation is shown by the subscript d.

c — Conifers present in hardwood mix
ce — Cedrus deodara (Cedar)
ct — Cupressus torulosa (Cypress)
d — Degraded, caused by heavy lopping of trees for fodder and/or fuel
jw — Juniperus wallichiana (Juniper)
lg — Larix griffithiana (Larch)
pw — Pinus wallichiana (Blue Pine)
sp — Picea smithiana (Spruce)
td — Tsuga dumosa (Hemlock)

Major species are noted. When feasible more than one species group is given, if possible in order of predominance, e.g. APw for an Abies stand with Pinus wallichiana

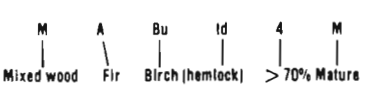
——— Land Use Boundary

——— Forest Boundary

CONDITION TYPES

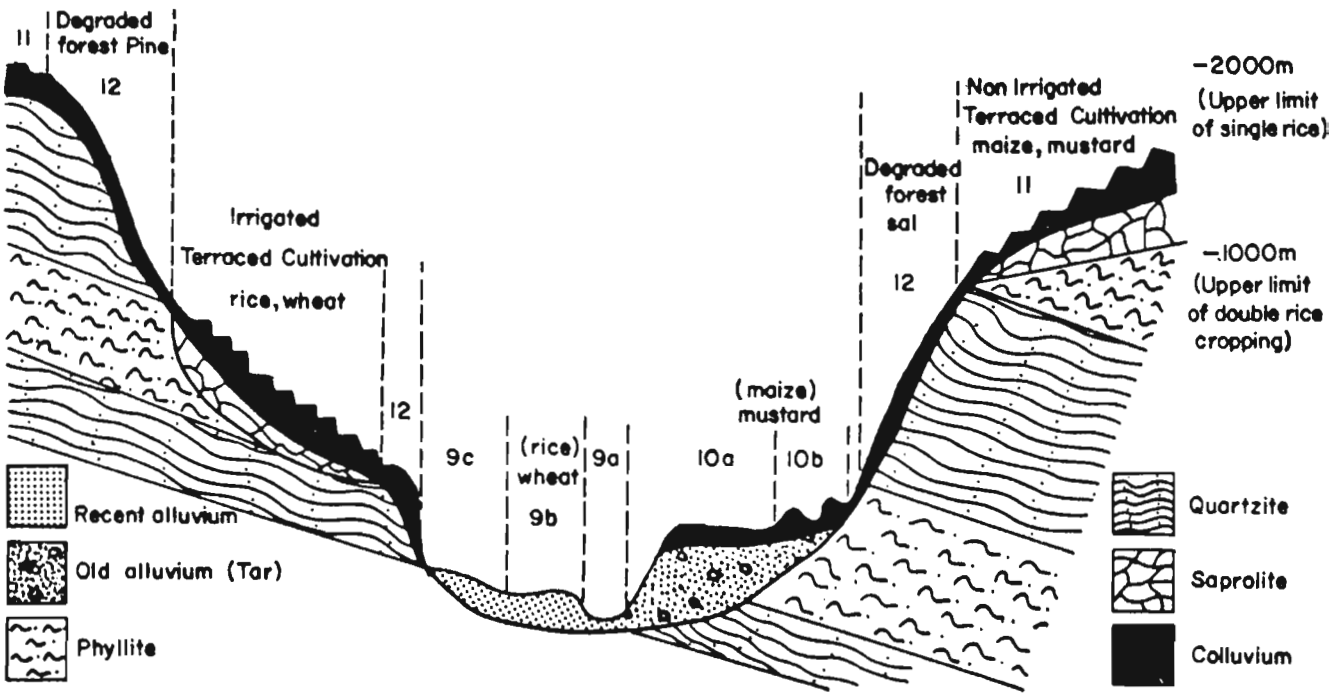
R — Rock or rock outcrop with scattered trees
— Slide and slips — arrow indicates downslope direction
Br — Burn — area of burn leaving little or no residual stand
Pl — Plantation
PF — Protection Forest — forests with management problems due to site fragility

TYPE LEGEND SAMPLE



Source: LRMP 1986d

Annex 8: Schematic Cross Section of Land Systems in the Middle Mountain Region

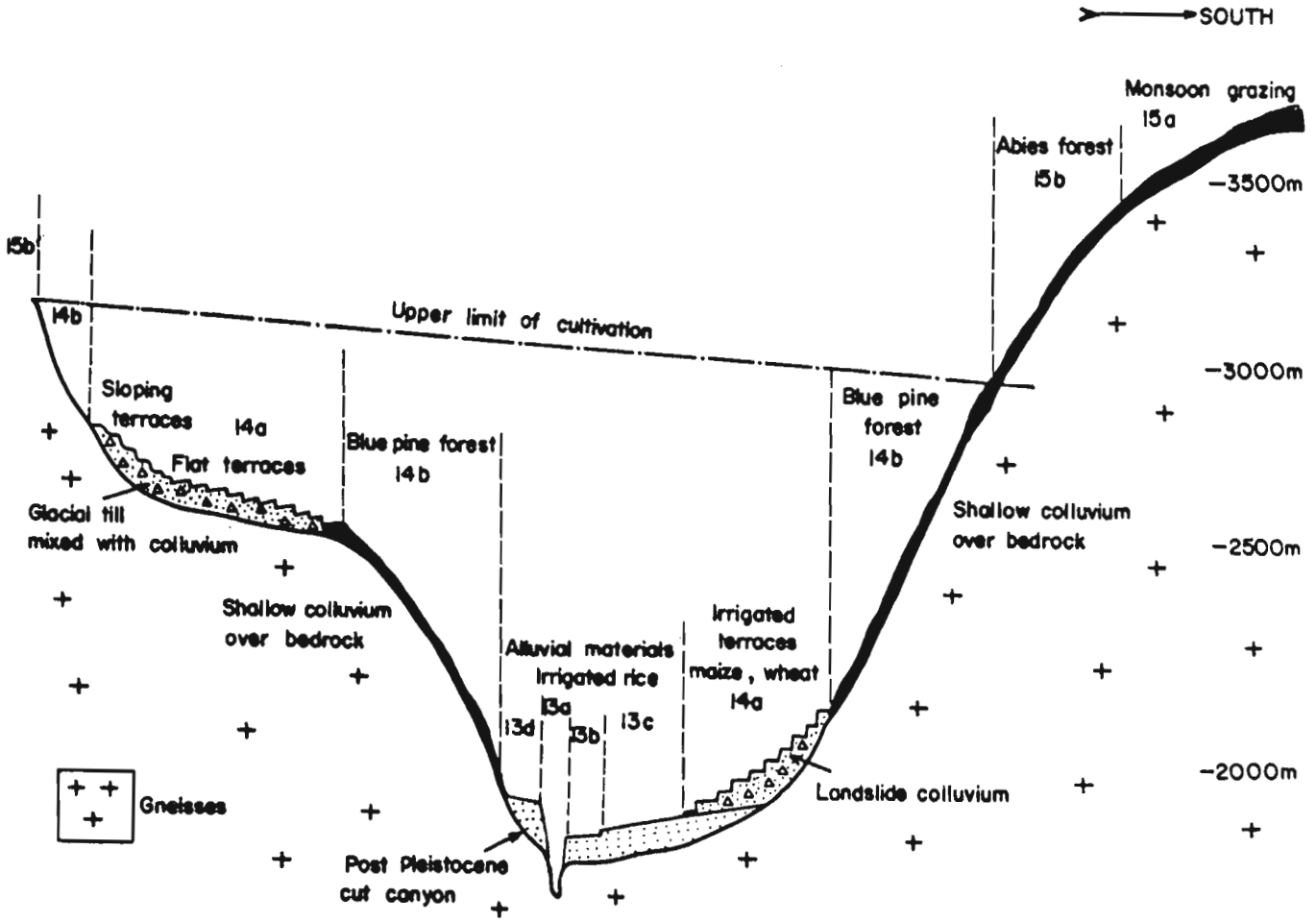


MIDDLE MOUNTAIN REGION Precambrian to Eocene phyllites, quartzites, schists, limestones and gneisses, generally deeply weathered, Subtropical to Warm Temperate.

Land System	Landform	Land Unit	Dominant Soils	Dominant Slopes	Dominant Texture	Seasonal Range of Depth to Water Table	Drainage
9	Alluvial Plains and Fans (depositional)	9a river channel	Psamments Ustorthents	<1°	Fragmental Sandy	0 - 2m	variable
		9b alluvial plains	Ustifluvents Fluvaquents Ustochrepts	<1°	Loamy/ Bouldery	0 - 2m	well
		9c alluvial fans	Ustochrepts Haplustalfs	1 - 5°	Loamy/ Bouldery	1 - 15m	well
10	Ancient Lake and River Terraces (Tars) (erosional)	10a non-dissected	Typic & Rhodic Haplustalfs Ustochrepts	0-5°	Loamy	> 2m	well
		10b dissected	"	0-5°	Loamy	> 2m	well
11	Moderately to Steeply Sloping Mountainous Terrain		Typic, Rhodic, Udic, Anthropic Subgroups of Ustochrepts Dystrochrepts Haplumbrepts	< 30°	Loamy Skeletal	> 50cm to bedrock	moderately well to well
12	Steeply to Very Steeply Sloping Mountainous Terrain		Lithic Subgroups of II and Ustorthents	> 30°	Loamy Skeletal	< 50cm to bedrock	well

Source: Carson 1990:19

Annex 9: Schematic Cross Section of Land Systems in the High Mountain Region

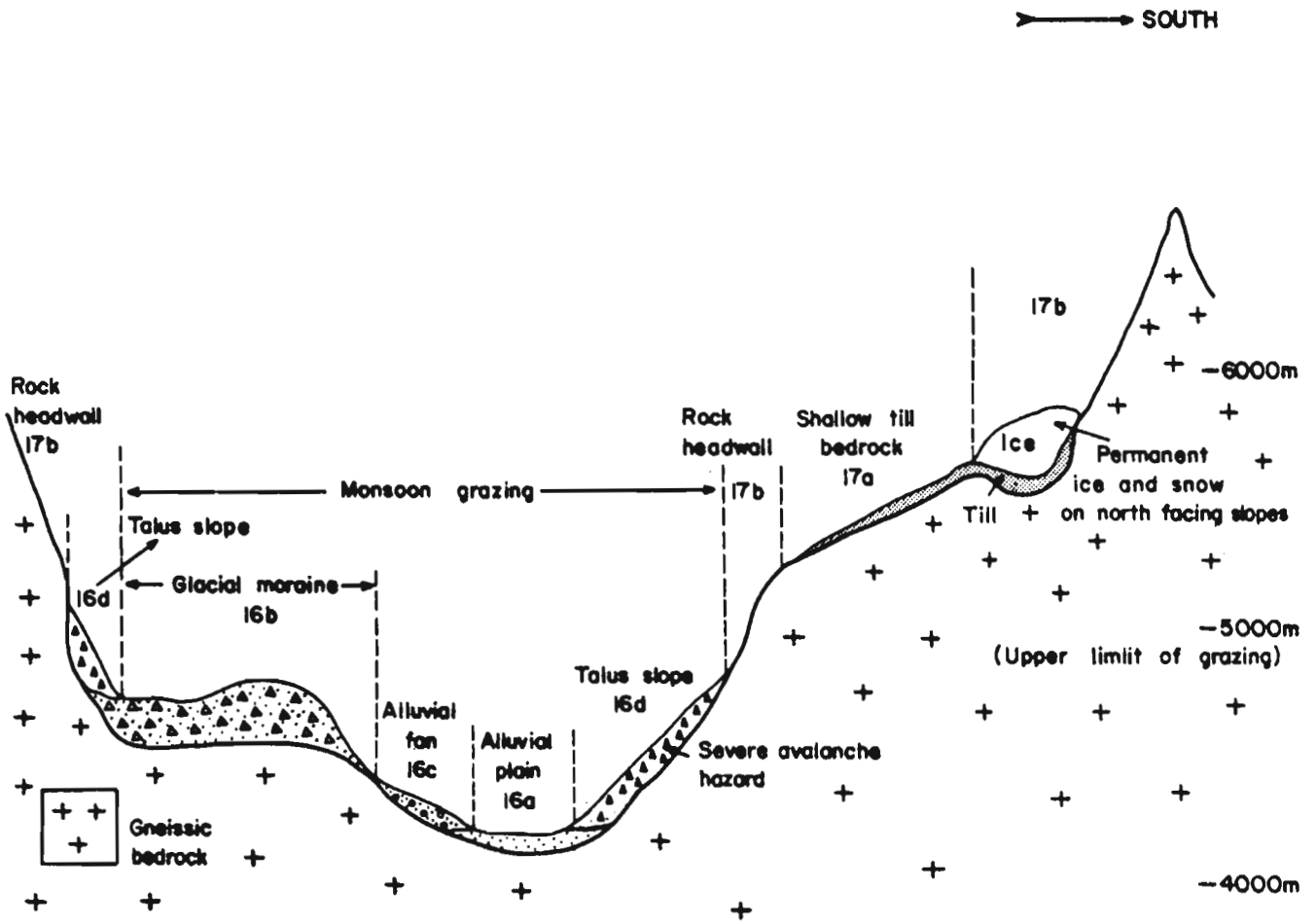


HIGH MOUNTAIN REGION Precambrian to Eocene gneisses, quartzites, schists, phyllites and limestones, generally not deeply weathered; Glaciated; Warm Temperate to Alpine.

13	Alluvial Plains Fans	13a active alluvial plain	Ustifluvents	<1°	Loamy	0 - 2m	variable
		13b recent alluvial plain	Eutrochrepts Dystrochrepts	<2°	Loamy/ Bouldery	0 - 2m	moderately well
		13c fans	"	1 - 10°	Loamy/ Bouldery	> 2m	well
		13d ancient alluvial terraces	"	<5°	Loamy/ Bouldery	> 2m	moderately well
14	Past Glaciated Mountainous Terrain below Upper Altitudinal Limit of Arable Agriculture	14a moderate to steep slopes	Anthropic and Typic Eutrochrepts Dystrochrepts Haplumbrepts	< 30°	Loamy Skeletal	> 50cm to bedrock	moderately well to well
		14b steep to very steep slopes	Lithic Subgroups of 14a and Ustorthents	> 30°	Loamy Skeletal	< 50cm to bedrock	well
15	Past Glaciated Mountainous Terrain above Upper Altitudinal Limit of Arable Agriculture	15a moderate to steep slopes	Typic and Lithic Haplumbrepts Cryumbrepts	< 40°	Loamy Skeletal	> 20cm to bedrock	moderately well
		15b very steep slopes	Lithic Subgroups of 15a and Cryorthents	> 40°	Loamy Skeletal	< 20cm to bedrock	moderately well

Source: Carson 199022

Annex 10: Schematic Cross Section of Land Systems in the High Himalayan Region



HIGH HIMALAYAN REGION Precambrian to Eocene gneisses, limestones, schists and granites; active glaciation; Subalpine to Arctic

16	Alluvial, Colluvial and Morainal Depositional Surfaces	16a glacio-alluvial plains	Cryumbrepts Cryorthents	< 20°	Loamy Skeletal	soil frozen > 4 months per year	poor
		16b morainal deposits	Cryumbrepts Cryorthents	< 40°	Loamy Skeletal	"	imperfect
		16c alluvial colluvial fans	Cryumbrepts Cryorthents	2 - 15°	Loamy Skeletal	"	moderately well
		16d colluvial slopes(talus)	Cryumbrepts Cryorthents	10-35°	Fragmental Loamy	"	well
17	Steeply to Very Steeply Sloping Mountainous Terrain	17a shallow till or colluvium over bedrock	Lithic Cryumbrepts Cryorthents	< 40°	Fragmental Loamy	< 50cm to bedrock	well
		17b rock headwalls	Rock	> 40°	—	bedrock at surface	rapid

Source: Carson 1990:27

Annex 11

LAND CAPABILITY LEGEND

CLASSES

Class I Lands are nearly level (slopes < 1°) and soils are deep. There are few limitations for arable agriculture or forestry

Class II Lands are gently sloping (slopes 1-5°) and soils are deep and well drained. Terracing or contouring is necessary to control erosion when used for arable agriculture, and maintenance of ground cover is required for forestry related useage

Class III Lands are moderately to strongly sloping (slopes 5-30°) and soils are 50 to 100cm deep and well drained. There are few limitations to traditional forest use provided adequate ground cover is maintained. Terracing is mandatory to control erosion when used for arable agriculture. Under the existing agricultural system a large portion of class III land is required for fodder production and grazing in order to maintain the productivity of the cultivated lands (see report).

Class IV Lands are either too steep to be terraced and cultivated (>30° slope), or lie above the altitudinal limit of arable agriculture. Soils are more than 20cm deep and well to imperfectly drained. These lands are suitable for fuelwood, fodder and timber production provided a good, permanent vegetative cover is maintained to minimize erosion.

Class V Soils are more than 20cm deep and slopes are less than 30° on lands which are alpine (above treeline), or are river terraces that are frequently flooded. These lands will not support tree growth but have few limitations when used for fodder collection or grazing.

Class VI This class includes areas with slopes of 40 to 50°, or gentler slopes with soils less than 20cm deep. These lands are considered fragile because of extreme erosion hazard and/or poor regeneration potential.

Class VII This class consists of rock and ice.

SUBCLASSES (Temperature regimes)

A	Sub-tropical	(< 1000m)	(> 20°C)
B	Warm temperate	(1000-2000m)	(15-20°C)
C	Cool temperate	(2000-3000m)	(10-15°C)
D	Alpine	(3000-4500m)	(3-10°C)
E	Arctic	(> 4500m)	(< 3°C)

SUBDIVISIONS (Moisture regimes)

s	semiarid
u	subhumid
h	humid
p	perhumid

IRRIGATION CLASSIFICATION LEGEND

The USBR Land Classification is used in part to identify the arable lands according to their suitability for irrigation agriculture. In mountainous areas only class I and II are given irrigation ratings.

Two classes for both diversified croplands and wetland ricelands represent lands with progressively less favourable physical characteristics. Two classes identify nonarable lands.

The subclasses used indicate deficiencies in soils, topography or drainage.

CLASSES

1	Diversified crops — arable (suitable)
2	Diversified crops — arable (moderately suitable)
1R	Wetland rice — arable (suitable)
2R	Wetland rice — arable (moderately suitable)
5	Nonarable — tentative
6	Nonarable

SUBCLASSES

s	Soil deficiency
t	Topography deficiency
d	Drainage deficiency

MAP SYMBOL EXPLANATION

IVBCu
- Dominant Subclasses, Warm temperate and cool temperate
- Dominant Subdivision, subhumid
- Dominant Capability Class IV

Denominator

Irrigation Suitability (USBR) Class 2 for Diversified Crops, arable with a topographic deficiency — 2T

Numerator

II A h
- Dominant Capability Class 2
- Dominant Subclass, Subtropical
- Dominant Subdivision, humdid

NOTES

1. Map unit designations show dominant capability only.
2. These maps are to be used in conjunction with the Land Capability Report.

Source: LRMP 1986b

Annex 12: Suitability categories for fruit crops

Fruit crops	Suitable areas: requirements			Moderately suitable areas: requirements		
	temperature °C	altitude approx. masl	land unit (LRMP)	temperature °C	altitude approx. masl	land unit (LRMP)
Tropical fruits						
mango	> 21	0 - 800	9b, 9c, 10a, 10b, 11	> 21	0 - 800	12
				18.5 - 21	800 - 1,300	9b, 9c, 10a, 10b, 11, 12
pineapple	> 21	0 - 800	9b, 9c, 10a, 10b, 11	> 21	0 - 800	12
				18.5 - 21	800 - 1,300	9b, 9c, 10a, 10b, 11, 12
banana	> 20	0 - 1,000	9b, 9c, 10a, 10b, 11	> 20	0 - 1,000	12
				17.5 - 20	1,000 - 1,500	9b, 9c, 10a, 10b, 11, 12
Citrus fruits						
suntala	18 - 21	800 - 1,400	9c, 10a, 10b, 11	18 - 21	800 - 1,400	9, 9b, 12
				21.0 - 21.5 16.5 - 18.0	700 - 800 1,400 - 1,700	9, 9b, 9c, 10a, 10b, 11, 12
junar	18 - 21	800 - 1,400	9c, 10a, 10b, 11	18 - 21	800 - 1,400	9, 9b, 12
				21.0 - 21.5 17.0 - 18.0	700 - 800 1,400 - 1,600	9, 9b, 9c, 10a, 10b, 11, 12
lime	18 - 21	800 - 1,400	9c, 10a, 10b, 11	18 - 21	800 - 1,400	9, 9b, 12
				21.0 - 23.5 17.0 - 18.0	300 - 800 1,400 - 1,600	9, 9b, 9c, 10a, 10b, 11, 12

Annex 12: continued

Fruit crops	Suitable areas: requirements			Moderately suitable areas: requirements		
	temperature °C	altitude approx. masl	land unit (LRMP)	temperature °C	altitude approx. masl	land unit (LRMP)
Warm temperate fruits						
peach	15 - 19	1,200 - 2,000	9c, 10a, 10b, 13c	15 - 19	1,200 - 2,000	9, 9b, 11, 12, 13b, 13d
				19.0 - 19.5 13.5 - 15.0	1,100 - 1,200 2,000 - 2,300	9, 9b, 9c, 10a, 10b, 11, 12* 13b, 13c, 13d
plum	15 - 19	1,200 - 2,000	9, 9b, 9c 10a, 10b, 11, 13c	15 - 19	1,200 - 2,000	12, 13b, 13d
				19.0 - 19.5 13.5 - 15.0	1,100 - 1,200 2,000 - 2,300	9, 9b, 9c, 10a, 10b, 11, 12 13b, 13c, 13d
Temperate fruits						
apple	11 - 16	1,800 - 2,800	9b, 9c, 10a, 10b, 11, 12,13c 14a, 14b	11 - 16	1,800 - 2,800	9, 13b, 13d 15a, 16c
				16.0 - 18.0 9.5 - 11.0	1,500 - 1,800 2,800 - 3,100	9, 9b, 9c, 10a, 10b, 11, 12 13b, 13c, 13d, 14a, 14b 15a, 16c
pear	12.5 - 18	1,400 - 2,500	9c, 10a, 10b, 11, 13c, 13d, 14a	12.5 - 18	1,400 - 2,500	9, 9b 12, 13b 14b, 15a
				18.0 - 18.5 11.0 - 12.5	1,300 - 1,400 2,500 - 2,800	9, 9b, 9c, 10a, 10b, 11, 12 13b, 13c, 13d, 14a, 14b 15a
walnut	11 - 16	1,800 - 2,800	9c, 10a, 10b, 13c	11 - 16	1,800 - 2,800	9, 9b, 11 13b, 13d 14a
				16.0 - 16.5 10.0 - 11.0	1,700 - 1,800 2,800 - 3,000	9, 9b, 9c, 10a, 10b, 11 13b, 13c, 13d, 14a

Annex 13: Area size of forest density classes in relation to agroclimatic zones

Forest density; maturity	Agroclimatic zone	Area (ha)	% of total per agroclimatic zone	% of forest per agroclimatic zone
shrubland (< 10%)	subtropical/subhumid	7806.3	11.1	25.0
	subtropical/humid	1565.2	12.8	33.0
	warm temperate/subhumid	4076.5	19.4	42.6
	warm temperate/humid	4810.5	21.6	42.8
	cool temperate/subhumid	809.1	10.2	12.9
	cool temperate/humid	1927.4	5.3	6.6
	cool temperate/perhumid	114.7	24.8	42.4
	alpine/humid	575.1	3.0	6.2
	alpine/perhumid	1628.8	3.5	14.8
	alpine/no data	645.8	9.4	67.3
	arctic	327.3	0.3	86.8
low (10-40%); small timber	subtropical/subhumid	11851.2	16.8	38.0
	subtropical/humid	2544.8	20.7	53.6
	warm temperate/subhumid	2816.4	13.4	29.4
	warm temperate/humid	4405.7	19.8	39.2
	cool temperate/subhumid	1260.0	15.9	20.1
	cool temperate/humid	6074.2	16.7	20.9
	alpine/humid	1558.4	8.1	16.7
	alpine/perhumid	606.6	1.3	5.5
	alpine/no data	0.1	0.0	0.0
	arctic	41.7	0.0	11.1
medium (40-70%); small timber	subtropical/subhumid	11287.6	16.0	36.2
	subtropical/humid	640.0	5.2	13.5
	warm temperate/subhumid	1285.8	6.1	13.4
	warm temperate/humid	1232.5	5.5	11.0
	cool temperate/subhumid	949.4	12.0	15.2
	cool temperate/humid	3376.6	9.3	11.6
	alpine/humid	780.8	4.1	8.4
	alpine/perhumid	354.9	0.8	3.2
	alpine/no data	4.0	0.1	0.4
high (> 70%); small timber	subtropical/subhumid	213.0	0.3	0.7
low (10-40%); mature trees	warm temperate/subhumid	23.3	0.1	0.2
	cool temperate/subhumid	759.1	9.6	12.1
	cool temperate/humid	1587.7	4.4	5.5
	alpine/humid	1186.9	6.2	12.7
	alpine/perhumid	455.9	1.0	4.1
	alpine/no data	5.7	0.1	0.6

Forest density; maturity	Agroclimatic zone	Area (ha)	% of total per agroclimatic zone	% of forest
mature trees	warm temperate/subhumid	680.0	3.2	7.1
	warm temperate/humid	660.5	3.0	5.9
	cool temperate/subhumid	1818.0	22.9	29.1
	cool temperate/humid	8372.9	23.1	28.8
	cool temperate/perhumid	0.7	0.1	0.2
	alpine/humid	2137.1	11.1	23.0
	alpine/perhumid	1147.9	2.5	10.4
	alpine/no data	4.1	0.1	0.4
no density data	subtropical/subhumid	0.8	0.0	0.0
	warm temperate/subhumid	695.8	3.3	7.3
	warm temperate/humid	132.6	0.6	1.2
	cool temperate/subhumid	662.3	8.3	10.6
	cool temperate/humid	7701.8	21.2	26.5
	cool temperate/perhumid	155.1	33.6	57.4
	alpine/subhumid	40.0	96.6	100.0
	alpine/humid	3071.5	15.9	33.0
	alpine/perhumid	6795.3	14.7	61.8
	alpine/no data	300.4	4.4	31.3
	arctic	7.9	0.0	2.1
	subtropical/humid	7516.1	61.3	
non-forest area	subtropical/subhumid	39368.2	55.8	
	warm temperate/subhumid	11440.3	54.4	
	warm temperate/humid	11009.6	49.5	
	cool temperate/subhumid	1680.9	21.2	
	cool temperate/humid	7242.8	20.0	
	cool temperate/perhumid	191.3	41.4	
	alpine/subhumid	1.4	3.4	
	alpine/humid	9948.7	51.7	
	alpine/perhumid	35095.3	76.2	
	alpine/no data	5939.7	86.1	
	arctic	121048.7	99.7	
total		364461.7		

Annex 14: Area size of forest density classes in relation to aspect

Forest density; maturity	Aspect	Area (ha)	% of total per aspect	% of forest per aspect
shrubland (< 10%)	level	816.9	5.7	19.9
	N	1,582.1	3.7	11.2
	NE	1,207.6	3.0	9.8
	E	1,825.8	4.6	17.0
	SE	3,824.3	8.4	28.9
	S	4,361.6	8.4	29.9
	SW	3,934.2	8.7	27.3
	W	4,012.1	9.6	25.5
	NW	2,725.9	6.6	18.7
low (10-40%); small timber	level	1,326.7	9.2	32.4
	N	3,591.4	8.3	25.3
	NE	3,122.5	7.7	25.3
	E	3,499.6	8.7	32.6
	SE	4,125.0	9.0	31.2
	S	4,494.6	8.6	30.8
	SW	3,552.5	7.8	24.7
	W	3,683.8	8.8	23.4
	NW	3,727.8	9.1	25.6
medium (40-70%); small timber	level	1,761.1	12.2	43.0
	N	2,129.7	4.9	15.0
	NE	1,569.8	3.9	12.7
	E	1,498.2	3.7	14.0
	SE	2,211.9	4.8	16.7
	S	2,064.9	4.0	14.1
	SW	3,062.0	6.7	21.3
	W	2,903.2	6.9	18.4
	NW	2,703.5	6.6	18.6
high (> 70%); small timber	level	10.9	.1	.3
	SE	4.0	.0	.0
	S	92.0	.2	.6
	SW	83.8	.2	.6
	W	22.3	.1	.1
low (10-40%); mature trees	level	18.2	.1	.4
	N	528.6	1.2	3.7
	NE	414.3	1.0	3.4
	E	356.3	.9	3.3
	SE	150.3	.3	1.1
	S	498.9	1.0	3.4
	SW	636.4	1.4	4.4
	W	747.3	1.8	4.7
	NW	651.5	1.6	4.5

Forest density; maturity	Aspect	Area (ha)	% of total per aspect	% of forest per aspect
medium (40-70%);	level	28.0	.2	.7
mature trees	N	2,531.4	5.9	17.8
	NE	2,516.6	6.2	20.4
	E	2,040.4	5.1	19.0
	SE	1,271.3	2.8	9.6
	S	1,026.8	2.0	7.0
	SW	1,388.2	3.1	9.6
	W	1,888.4	4.5	12.0
	NW	2,122.0	5.2	14.6
no density data	level	136.8	.9	3.3
	N	3,825.8	8.9	27.0
	NE	3,511.8	8.7	28.5
	E	1,515.9	3.8	14.1
	SE	1,635.3	3.6	12.4
	S	2,060.7	4.0	14.1
	SW	1,750.5	3.9	12.1
	W	2,497.9	6.0	15.9
	NW	2,629.5	6.4	18.1
non-forest area	level	10,354.4	71.6	
	N	28,970.0	67.1	
	NE	28,116.8	69.5	
	E	29,380.9	73.2	
	SE	32,497.1	71.1	
	S	37,565.2	72.0	
	SW	30,983.2	68.3	
	W	26,183.5	62.4	
	NW	26,446.2	64.5	
total		364,408.0		

Annex 15: Total area, agricultural and cultivated land, forest and shrubland, and grazing land in relation to agroclimatic zones and aspect

Agroclimatic zone	Total area	Agricultural land		Net cultivated land		Forest land		Shrubland		Grazing land	
Aspect	ha	ha	% of total area	ha	% of agri.	ha	% of total area	ha	% of total area	ha	% of total area
subtropical/subhumid											
level	10,371.7	6,480.6	62.5	3,651.9	56.4	2,839.9	27.4	604.0	5.8	12.1	.1
N	6,837.3	3,899.6	57.0	1,850.7	47.5	2,390.6	35.0	459.1	6.7	44.2	.6
NE	6,081.4	3,292.3	54.1	1,434.7	43.6	2,505.5	41.2	232.5	3.8	39.9	.7
E	5,685.6	3,029.6	53.3	1,438.5	47.5	2,143.5	37.7	355.9	6.3	109.7	1.9
SE	9,085.1	4,327.3	47.6	2,104.2	48.6	3,054.8	33.6	1,161.4	12.8	334.1	3.7
S	10,103.8	4,554.5	45.1	2,024.4	44.4	3,353.4	33.2	1,838.5	18.2	287.5	2.8
SW	8,867.6	4,173.0	47.1	1,858.3	44.5	3,073.1	34.7	1,298.6	14.6	261.2	2.9
W	6,094.0	3,199.5	52.5	1,465.2	45.8	1,755.8	28.8	1,089.6	17.9	30.2	.5
NW	7,170.6	4,067.4	56.7	1,971.1	48.5	2,202.5	30.7	763.9	10.7	80.4	1.1
subtropical/humid											
level	654.7	430.3	65.7	217.1	50.5	195.2	29.8	26.8	4.1		
N	1,357.6	1,058.6	78.0	586.3	55.4	273.2	20.1	25.9	1.9		
NE	1,113.6	958.0	86.0	521.9	54.5	104.9	9.4	50.8	4.6		
E	1,031.5	586.3	56.8	271.4	46.3	319.8	31.0	125.4	12.2		
SE	1,659.0	943.0	56.8	484.3	51.4	399.1	24.1	316.2	19.1		
S	1,213.6	563.7	46.5	258.0	45.8	345.8	28.5	298.6	24.6	.1	
SW	1,594.9	900.0	56.4	436.8	48.5	369.2	23.2	322.6	20.2	2.7	.2
W	1,808.2	905.6	50.1	422.8	46.7	617.7	34.2	278.7	15.4	6.2	.3
NW	1,766.6	1,102.2	62.4	589.1	53.4	544.1	30.8	120.1	6.8	.2	
warm temperate/subhumid											
level	172.0	98.7	57.4	49.1	49.8	12.3	7.1	45.6	26.5	9.8	5.7
N	2,542.9	1,080.7	42.5	472.5	43.7	1,055.0	41.5	313.8	12.3	93.5	3.7
NE	1,944.5	660.8	34.0	270.7	41.0	804.6	41.4	246.9	12.7	221.8	11.4
E	2,805.6	891.4	31.8	348.4	39.1	761.2	27.1	345.0	12.3	783.2	27.9
SE	2,834.6	1,147.2	40.5	458.0	39.9	485.6	17.1	665.4	23.5	463.0	16.3
S	2,366.4	797.7	33.7	317.1	39.7	351.9	14.9	725.4	30.7	408.6	17.3
SW	2,221.7	615.1	27.7	258.3	42.0	485.1	21.8	446.1	20.1	614.0	27.6
W	3,113.2	1,093.4	35.1	458.2	41.9	822.3	26.4	710.5	22.8	413.3	13.3
NW	3,016.8	1,536.2	50.9	694.2	45.2	723.4	24.0	577.5	19.1	173.8	5.8

Agroclimatic zone	Total area	Agricultural land		Net cultivated land		Forest land		Shrubland		Grazing land	
Aspect	ha	ha	% of total area	ha	% of agri.	ha	% of total area	ha	% of total area	ha	% of total area
warm temperate/humid											
level	261.1	161.2	61.7	89.4	55.5	32.8	12.6	58.0	22.2	9.1	3.5
N	2,146.1	1,092.4	50.9	609.7	55.8	768.9	35.8	269.1	12.5	15.7	.7
NE	1,872.6	1,003.2	53.6	447.9	44.7	683.0	36.5	174.7	9.3	11.8	.6
E	1,906.7	871.8	45.7	373.8	42.9	598.0	31.4	420.8	22.1	15.7	.8
SE	2,735.6	999.0	36.5	441.6	44.2	666.5	24.4	974.4	35.6	95.5	3.5
S	2,607.9	994.6	38.1	447.8	45.0	783.9	30.1	726.8	27.9	102.1	3.9
SW	3,526.9	1,765.4	50.1	874.7	49.5	931.6	26.4	786.6	22.3	42.8	1.2
W	3,974.0	2,047.7	51.5	1,125.2	55.0	1,027.8	25.9	828.9	20.9	69.5	1.7
NW	3,206.1	1,682.2	52.5	995.5	59.2	937.7	29.2	566.5	17.7	19.6	.6
cool temperate/subhumid											
level	24.1	4.1	16.9	1.9	47.0	20.0	83.1				
N	1,201.3	83.2	6.9	38.5	46.2	971.0	80.8	141.0	11.7	6.1	.5
NE	748.9	51.3	6.8	23.3	45.4	589.5	78.7	58.7	7.8	49.5	6.6
E	876.0	100.0	11.4	37.0	37.0	585.8	66.9	30.5	3.5	154.2	17.6
SE	823.2	60.2	7.3	18.5	30.7	552.8	67.2	68.3	8.3	124.7	15.1
S	948.2	78.3	8.3	31.3	40.0	432.5	45.6	81.4	8.6	274.7	29.0
SW	890.3	54.3	6.1	20.6	37.9	456.8	51.3	104.2	11.7	226.8	25.5
W	1,051.5	39.5	3.8	15.8	40.0	735.6	70.0	177.8	16.9	79.4	7.6
NW	1,375.4	81.1	5.9	35.6	43.9	1,105.0	80.3	147.3	10.7	35.2	2.6
cool temperate/humid											
level	44.0					37.9	86.1	6.0	13.7	.1	.2
N	4,653.1	95.8	2.1	44.2	46.1	4,274.3	91.9	48.9	1.1	179.8	3.9
NE	4,255.8	155.1	3.7	65.4	42.2	3,759.6	88.3	113.6	2.7	183.6	4.4
E	3,500.4	303.9	8.7	119.0	39.2	2,271.2	64.9	122.4	3.5	634.8	18.2
SE	3,390.3	250.7	7.5	102.3	40.8	2,006.8	59.2	253.1	7.5	582.3	17.1
S	5,190.4	216.5	4.2	91.9	42.4	2,865.0	55.2	251.1	4.8	1,212.3	23.4
SW	5,233.5	268.9	5.1	96.1	35.7	3,276.0	62.6	504.4	9.6	560.2	10.9
W	5,604.4	118.2	2.1	49.4	41.8	4,553.0	81.2	455.2	8.1	221.8	4.0
NW	4,843.5	60.0	1.3	31.5	52.5	4,200.1	86.7	287.2	5.9	148.6	3.1

Agroclimatic zone	Total area	Agricultural land		Net cultivated land		Forest land		Shrubland		Grazing land	
Aspect	ha	ha	% of total area	ha	% of agri.	ha	% of total area	ha	% of total area	ha	% of total area
alpine/humid											
level	70.4					45.3	64.3			5.1	7.3
N	2,334.8					1,297.2	55.6	23.4	1.0	601.9	25.8
NE	1,827.3					994.9	54.4	16.0	.9	570.6	31.2
E	1,791.2					973.3	54.3	22.1	1.2	521.0	29.1
SE	2,277.7	15.6	.7	5.1	32.4	944.1	41.5	142.4	6.3	792.4	34.8
S	3,301.5	2.1	.1	1.0	47.0	1,230.2	37.3	111.9	3.4	1,441.7	43.7
SW	2,349.1	16.8	.7	7.4	43.8	960.2	40.9	70.2	3.0	923.2	39.7
W	2,472.3	8.7	.4	4.1	47.0	1,217.7	49.3	95.2	3.9	651.0	26.4
NW	2,851.1					1,090.6	38.3	93.5	3.3	1,000.7	35.1
alpine/perhumid											
level	726.6	41.8	5.7	26.4	63.1	86.7	11.9	76.4	10.5	126.6	17.4
N	5,771.1	38.1	.7	12.7	33.2	1,525.0	26.4	70.5	1.2	2,748.1	47.6
NE	6,422.2	51.4	.8	26.9	52.3	1,690.8	26.3	272.2	4.2	2,539.4	39.5
E	5,564.1	15.6	.3	5.5	35.4	1,249.9	22.5	346.4	6.2	1,995.4	35.9
SE	5,333.8	61.4	1.2	18.6	30.3	1,241.2	23.3	185.7	3.5	1,758.4	33.0
S	6,755.7	134.7	2.0	68.7	51.0	855.3	12.7	154.6	2.3	3,240.8	48.0
SW	5,644.5	86.4	1.5	44.6	51.7	892.0	15.8	235.2	4.2	2,409.9	42.7
W	5,281.8	4.8	.1	2.3	47.0	941.5	17.8	273.0	5.2	2,100.1	39.8
NW	4,545.1					876.3	19.3	12.3	.3	2,072.3	45.6
alpine/no data											
level	152.2	103.3	67.8	65.2	63.1	7.0	4.6			37.3	24.5
N	732.4	.1				47.1	6.4	230.5	31.5	338.5	46.2
NE	359.7					.2		32.1	8.9	137.6	38.3
E	881.0	13.4	1.5	8.5	63.1					216.7	24.6
SE	933.0	92.7	9.9	58.6	63.1	4.0	.4			233.9	25.1
S	755.9	6.6	.9	4.1	63.1	16.1	2.1	30.5	4.0	452.7	59.9
SW	780.9	41.6	5.3	26.3	63.1	25.0	3.2	130.7	16.7	383.5	49.1
W	1,247.9	28.2	2.3	17.8	63.1	59.8	4.8	66.9	5.4	692.6	55.5
NW	1,046.2	55.6	5.3	35.1	63.1	151.1	14.4	154.9	14.8	549.4	52.5

Agroclimatic zone	Total area	Agricultural land		Net cultivated land		Forest land		Shrubland		Grazing land	
Aspect	ha	ha	% of total area	ha	% of agri.	ha	% of total area	ha	% of total area	ha	% of total area
arctic											
level	1,598.8									234.6	14.7
N	15,392.5									3,077.5	20.0
NE	15,725.2					1.1		5.1		2,400.2	15.3
E	16,011.0					6.5		56.7	.4	2,316.1	14.5
SE	16,534.7					38.8	.2	52.3	.3	2,767.9	16.7
S	18,824.4					.8		141.8	.8	4,042.8	21.5
SW	14,137.1					.5		35.5	.3	2,448.8	17.3
W	11,160.8					1.9		35.3	.3	1,675.2	15.0
NW	11,070.8							.1		1,492.3	13.5
no data	1,229.5	159.1		100.3		155.6		24.9		48.8	
total	364,300.0	66,009.0		31,680.0		89,739.9		24,300.0		58,490.0	

Annex 16: Size of agricultural land in relation to cultivation types and aspect

Type	Aspect	Agricultural land			Cropped land		
		ha	% of aspect	% of total	ha	% of aspect	% of total
C1	level	417.7	5.7		117.7	2.9	
	N	441.6	6.0		124.5	3.4	
	NE	608.9	9.9		171.6	6.2	
	E	290.2	5.0		81.8	3.1	
	SE	545.2	6.9		153.7	4.2	
	S	1072.0	14.6		302.2	9.3	
	SW	1190.6	15.0		335.6	9.3	
	W	551.8	7.4		155.5	4.4	
	NW	396.6	4.6	8.4	111.8	2.6	4.9
C2	level	620.5	8.5		291.5	7.1	
	N	1097.0	14.9		515.4	14.3	
	NE	576.7	9.3		270.9	9.7	
	E	500.6	8.6		235.2	9.0	
	SE	503.2	6.4		236.4	6.4	
	S	555.8	7.6		261.1	8.0	
	SW	644.6	8.1		302.8	8.4	
	W	873.0	11.7		410.1	11.5	
	NW	1264.0	14.7	10.1	593.8	13.6	9.8
C3	N	45.8	0.6		30.1	0.8	
	NE	11.5	0.2		7.6	0.3	
	E	8.7	0.1		5.7	0.2	
	SE	11.5	0.1		7.6	0.2	
	S	21.8	0.3		14.3	0.4	
	SW	68.2	0.9		44.9	1.2	
	W	75.7	1.0		49.8	1.4	
	NW	173.3	2.0	0.6	114.0	2.6	0.9
T1	level	454.7	6.2		128.2	3.1	
	N	582.2	7.9		164.1	4.5	
	NE	1232.0	20.0		347.3	12.4	
	E	1526.9	26.3		430.4	16.5	
	SE	1498.3	19.0		422.3	11.4	
	S	1046.4	14.2		295.0	9.1	
	SW	1019.6	12.9		287.4	7.9	
	W	1097.6	14.7		309.4	8.7	
	NW	922.8	10.7	14.2	260.1	6.0	8.3
T2	level	824.8	11.3		387.5	9.4	
	N	3307.6	45.0		1553.9	43.0	
	NE	2454.5	39.8		1153.1	41.3	
	E	2270.0	39.1		1066.4	41.0	
	SE	3163.0	40.0		1485.9	40.2	
	S	3540.6	48.2		1663.3	51.3	
	SW	3248.8	41.0		1526.3	42.1	
	W	2819.1	37.9		1324.4	37.2	
	NW	2793.7	32.5	37.0	1312.5	30.1	36.2

Annex 16: continued

Type	Aspect	Agricultural land			Cropped land		
		ha	% of aspect	% of total	ha	% of aspect	% of total
T3	level	724.6	9.9		476.6	11.6	
	N	1663.8	22.6		1094.3	30.3	
	NE	1070.1	17.3		703.8	25.2	
	E	782.0	13.5		514.3	19.8	
	SE	920.4	11.6		605.3	16.4	
	S	340.0	4.6		223.6	6.9	
	SW	894.3	11.3		588.2	16.2	
	W	1296.1	17.4		852.4	23.9	
	NW	1882.5	21.9	14.5	1238.1	28.4	19.9
V	level	35.8	0.5		21.3	0.5	
	N	16.5	0.2		9.8	0.3	
	NE	37.9	0.6		22.5	0.8	
	E	148.0	2.5		87.9	3.4	
	SE	342.6	4.3		203.4	5.5	
	S	75.0	1.0		44.5	1.4	
	SW	54.5	0.7		32.3	0.9	
	W	85.3	1.1		50.6	1.4	
	NW	146.9	1.7	1.4	87.2	2.0	1.8
F	level	4251.0	58.0		2684.0	65.4	
	N	195.9	2.7		123.7	3.4	
	NE	180.6	2.9		114.0	4.1	
	E	285.7	4.9		180.4	6.9	
	SE	918.7	11.6		580.0	15.7	
	S	698.9	9.5		441.3	13.6	
	SW	806.1	10.2		509.0	14.0	
	W	648.1	8.7		409.2	11.5	
	NW	1006.8	11.7	13.6	635.7	14.6	17.9
no data		132.2		0.2	83.7		0.3
total		66009.0			31680.0		

C : sloping terrace
T : level terrace
V : valley floor
F : foot slopes/*tars*

Annex 17: Cropped area under different rice-based cropping systems in relation to agroclimatic zones and aspect

Agroclimatic zone	Aspect	Cropping pattern (area in hectares)										% of cropped area
		a	a2	b	b_	d_	e	e2	u	u_	r	
subtropical/subhumid	level	583.3	197.0		195.3	434.1	307.5	115.7	432.6	6.5	201.8	67.9
	N	228.4	8.2		268.0	223.7	93.9	1.7	102.5	0.8	2.1	50.2
	NE	112.1	18.9		186.5	203.8	49.9	14.9	86.2	4.7	7.0	47.7
	E	97.2	27.4		160.2	143.5	62.9	6.4	145.3	9.8	5.3	45.7
	SE	220.0	57.3		166.3	227.9	122.0	20.5	217.3	15.9	14.1	50.5
	S	151.7	49.3		140.5	280.9	156.1	10.4	180.9	19.3	10.3	49.4
	SW	152.3	52.9		104.5	241.4	123.2	22.8	164.9	18.8	6.6	47.8
	W	151.8	29.9		144.7	224.7	65.3	5.5	114.6	1.4	9.8	51.0
	NW	240.8	20.9		197.5	421.7	71.5	7.0	120.2		11.5	55.4
subtropical/humid	level	36.4			4.7	19.4	55.3		34.8	7.4		72.8
	N	49.2	0.7	0.8	65.0	38.5	19.7		78.3	47.0		51.9
	NE	77.5		9.1	107.3	11.2	15.6		23.3	16.4		49.9
	E	50.5	3.5	1.5	26.5	15.9	25.7		23.6	4.8		56.0
	SE	103.5	12.0	0.7	21.2	32.2	59.6		71.1	11.6		65.1
	S	39.8		0.4	19.5	13.3	27.7		28.5	6.2		52.5
	SW	83.0		0.3	23.4	36.2	58.6		27.9	11.7		55.2
	W	39.9	1.3	0.7	36.8	43.5	35.4		36.8	4.8		47.2
	NW	39.1	2.6		27.0	49.4	32.0		107.8	53.8		54.4
warm temperate/subhumid	level	0.1			1.8	2.8			8.6			27.1
	N	0.6			6.4	33.6	2.5		7.9			10.8
	NE	2.1			5.1	11.5	5.5		11.5			13.2
	E	9.6			18.0	12.4	1.5		23.7			18.7
	SE	1.3			9.5	9.8	2.8		60.3			18.2
	S	0.1			11.9	18.1	6.3		24.5			19.2
	SW	0.1			13.1	7.0	0.2		8.5			11.2
	W	1.5			12.3	6.1			18.4			8.3
	NW	8.3			15.8	15.9			17.0			8.2

Annex 17: continued

Agroclimatic zone	Aspect	Cropping pattern (area in hectares)										% of cropped area
		a	a2	b	b_	d_	e	e2	u	u_	r	
warm temperate/humid	level	3.6			7.9	0.1	20.7		13.5	4.2	0.4	56.4
	N	66.7			37.3	11.2	71.4		94.5	8.6		50.2
	NE	76.0		2.6	42.9	5.8	38.7		25.0	4.8		45.2
	E	31.3		7.5	33.4	3.3	27.3		22.5	9.9	0.2	36.2
	SE	23.4		4.6	29.8	4.4	9.9		60.8	25.9	0.2	36.0
	S	17.8		0.7	28.3	3.3	15.4		56.0	22.6	0.4	32.3
	SW	69.4		1.3	34.7	3.1	98.1		63.7	12.8	2.2	32.6
	W	61.9		5.8	29.7	11.9	205.0		137.2	3.3	5.0	40.9
	NW	49.6			20.0	4.5	241.0		199.5	7.4	3.1	52.9
cool temperate/humid	N											
	NE								0.2			0.3
	E								0.3			0.3
	SE								0.1			0.1
	S						0.1		0.5		0.1	0.8
	SW								0.9		0.4	1.4
	W										0.2	0.3
	NW											
total		2879.9	481.7	35.9	2252.8	2825.9	2128.5	205.2	2851.9	340.4	280.8	

Major cropping patterns

a rice - fallow
a2 rice - rice - fallow
b rice - oilseed (b_ upland rice)
d rice - pulses (d_ upland rice)
e rice - cereal
e2 rice - rice - cereal
u maize - rice - fallow (u_ upland rice)
r maize - rice - winter crop

Annex 18: Cropped area under different maize-based cropping systems in relation to agroclimatic zones and aspect

Agroclimatic zone	Aspect	Cropping pattern (area in hectares)										% of cropped area
		u	u_	r	j	j2	k	l	w	x	y	
subtropical/subhumid	level	432.6	6.5	201.8		621.0	72.3	0.2	477.1			49.7
	N	102.5	0.8	2.1		823.0	19.5		78.6			55.5
	NE	86.2	4.7	7.0	0.7	598.6	0.9	1.7	147.1			59.0
	E	145.3	9.8	5.3	0.2	609.4	7.2	2.3	153.5			64.9
	SE	217.3	15.9	14.1	0.9	755.7	29.4	7.9	240.2			60.9
	S	180.9	19.3	10.3	0.5	847.7	8.0	1.1	142.4			59.8
	SW	164.9	18.8	6.6	3.3	703.2	9.6	2.3	157.2			57.4
	W	114.6	1.4	9.8	9.2	616.4	24.7	9.6	53.1			57.2
	NW	120.2		11.5		769.3	5.3	15.7	81.6			50.9
subtropical/humid	level	34.8	7.4			50.6	4.7		3.2			46.4
	N	78.3	47.0			273.7			2.6			69.7
	NE	23.3	16.4			261.0			0.2			57.7
	E	23.6	4.8			109.4	1.4	0.3	6.6			53.9
	SE	71.1	11.6			136.9	1.6	2.5	24.0			51.7
	S	28.5	6.2			105.7	5.9	3.4	4.0			59.6
	SW	27.9	11.7			173.3	11.7		8.0			53.3
	W	36.8	4.8			192.4	6.3		14.2			60.2
	NW	107.8	53.8			250.1			3.3			72.4
warm temperate/subhumid	level	8.6				29.1						76.8
	N	7.9			47.6	182.8		77.5	0.8			67.0
	NE	11.5			25.5	119.1		7.4	2.8		1.1	61.8
	E	23.7			12.6	159.6		8.5	10.9		1.1	62.1
	SE	60.3			9.1	263.7		40.0	13.5			84.4
	S	24.5			9.3	168.6		11.8	22.9			74.8
	SW	8.5			17.0	139.3		19.7	15.4			77.4
	W	18.4			22.8	223.8		63.4	3.5			72.4
	NW	17.0			41.9	338.1		111.4				73.2

Annex 18: continued

Agroclimatic zone	Aspect	Cropping pattern (area in hectare)										% of cropped area
		u	u_	r	j	j2	k	l	w	x	y	
warm temperate/humid	level	13.5	4.2	0.4		32.4				1.2		58.0
	N	94.5	8.6		0.1	228.1	10.9	0.4				59.4
	NE	25.0	4.8			194.6	12.7	3.9			0.1	55.6
	E	22.5	9.9	0.2		181.4	15.2	13.5		0.5		65.0
	SE	60.8	25.9	0.2		223.6	11.0	21.9	0.5	0.6		78.0
	S	56.0	22.6	0.4		218.8	5.6	20.9	2.2	1.2		73.2
	SW	63.7	12.8	2.2		374.5	19.7	20.5	2.0	6.7		57.4
	W	137.2	3.3	5.0		422.0	11.6	13.6	4.0	15.1		54.4
	NW	199.5	7.4	3.1		318.3	9.0	6.5	0.5	9.4		55.8
cool temperate/subhumid	level				0.3	1.0						70.0
	N				1.1	9.5		9.2				51.6
	NE				3.9	7.4					0.2	49.3
	E				3.5	9.8		0.8				38.3
	SE				0.7	7.4		4.1				65.5
	S				4.0	15.8						63.2
	SW				2.7	8.4		2.8				67.7
	W				2.0	4.0		2.9				55.9
	NW				0.2	11.4		7.7				54.2
cool temperate/humid	N				3.0	5.3		0.3				19.6
	NE	0.2			9.9	14.2		0.1			4.3	44.0
	E	0.3			16.6	23.9		0.7			0.1	35.0
	SE	0.1			8.9	25.4		13.0				46.4
	S	0.5		0.1	0.1	31.2		4.5		0.4		40.6
	SW	0.9		0.4		33.9		0.7		1.1		38.7
	W			0.2		23.4		1.0		0.5		50.7
	NW				1.4	13.4		2.3				54.5
total		2851.9	340.4	280.8	259.2	11960.8	304.4	537.8	1675.9	36.9	6.9	

u maize - rice - fallow (u_ upland rice)
r maize - rice - winter crop
j maize or millet - fallow
j2 maize - millet
l maize - cereal
w maize - pulses
x maize - potato
y maize + potato - winter crop
k maize - mustard