REPORT 2

Strategies for improved fodder production in the dry season in the mid-hills of Nepal, using participatory research techniques.

First joint field work to characterise research sites encourage community participation and select households for survey 8th January to 29th January 1998.
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TABLE OF CONTENTS

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LIST OF ABBREVIATIONS

BE	British Embassy
CBO	Community Based Organisation
DFID	Department for International Development
FORESC	Forest Research and Survey Centre
FUG	Forest User Group
HARP	Hillside Agricultural Research Programme
HMGN	His Majesty's Government of Nepal
LAC	Lumle Agricultural Centre
LPP	Livestock Production Programme
NACRMP	Nepal-Australian Community Resource Management Project
NAF	Nepal Agroforestry Foundation
NRI	Natural Resources Institute
NRMP	Natural Resources Management Project
NUKCFP	Nepal-UK Community Forestry Project
PAC	Pakhribas Agricultural Centre
RNRRS	Renewable Natural Resources Research Strategy
SEADD	South East Asia Development Division
UMN	United Mission to Nepal
VDC	Village Development Committee
WATCH	Women Acting Together for Change
WN	World Neighbours

GLOSSARY OF NEPALI TERMS

Nepali	Definition
Bari	Rainfed land, that receives no additional water.
Bhari	One back-load of material
Hal	Area ploughed by a pair of oxen in one day, on second tilling of the land to plant maize.
Kharbari	Rainfed land unsuited to crop growing that is used to grow thatching grass.
Khet	Land that is bunded and receives some additional water during the dry season. Supports two, or three crops per year
Khoriya	Land under shifting, or non-permanent cultivation (status of some kharbari land)
Kusauro	legume residues
Mana	0.5 litres
Nal	millet straw
Pakho bari	Sloping, rainfed land
Ropani	0.05 (one twentieth) of a hectare

SUMMARY

This report covers the first joint field work in Nepal for the project "Strategies for the improved production of fodder during the dry season, using participatory research techniques". The project is funded by the Department for International Development (DFID), Renewable Natural Resources Research Strategy (RNRRS) through the Livestock Production Program (LPP).

The purpose of the visit was to conduct the first joint field visits with collaborators from NRI, NAF and FORESC. The objectives of these field visits were to finalise selection of research sites, characterise the selected sites, encourage community involvement in the research, select households for survey and identify suitable household members for nursery training.

The joint field work was successfully conducted and characterisations of the research sites are contained within this report (appendix 1). Representative households at each research site were selected, and the aims and format for the on-going survey of these households agreed with collaborators (appendices 2 & 3). Activities and responsibilities for the collaborators were agreed in detail for the next 8 month period, together with allocation of the in-country budgets (appendix 6). Progress with activities and milestones are on-schedule (appendix 7). The research project, originally described in seven stages, has been further divided into a total of 11 stages, to facilitate planning of activities and the setting of milestones. As a participative project, continual re-assessment is important to provide the opportunity for the research process to encompass on-going learning from field experiences and farmer input. Hence reflection meetings for reassessment/revision of activities have been built into the research programme. A detailed outline of activities which will initiate the next 5 stages of research, (appendix 8), over the next eight months was agreed. The next phase of research will be planned in September, following feed back from initiation of these 5 stages of research.

A full-time research co-ordinator, Ramji Neupane, has been appointed by NAF. Ramji will combine conducting the research component of a PhD registered with Los Banos University in the Philippines at the same time as co-ordinating the research project. There will be considerable over-lap between the two activities.

Formal approval has been obtained from the Ministry of Forests and Soil Conservation for the project, by FORESC. Following internal discussions the budgeting for activities has been changed by FORESC, though total funding remains unchanged (see appendix 6)

Objectives of visit:

1. Review the initial site selection conducted by NAF and make final selection of research sites.

2. Conduct research site visits and
- characterise the sites
- conduct wealth ranking
- select representative farmers for survey
- initiate nursery training extension approach.

3. Devise survey format for recording farmer's feeding strategies over the year with two collaborating organisations.

4. Discuss next stage of research work with collaborators and agree responsibilities for on-going survey work over the next 8 months.

5. Review activities and expenditure over first 4 months of project.

6. Plan proposed activities and expenditure for next year of the project (January 1998- January 1999).

Strategies for improved fodder production during the dry season using participatory research techniques

Background

1. The research project is funded, from September 1997 for 3 years, under the Livestock Production Programme of the Renewable Natural Resources Research Strategy of the Department for International Development. The project aims to develop strategies for improved production and use of fodder resources, in close collaboration with farm households with different livestock and resource holdings. Research findings will map nutrient flows within household farming systems and indicate the relative importance of off- and on-farm resources. Quantity, nutritive value and seasonal supply of the various feed resources will be identified in order to accurately describe feed-deficit profiles for households of different resource and socio-cultural backgrounds.

2. The research will also assess the impacts of community forestry initiatives on the immediate and longer-term availability of off-farm fodder resources; in particular the consequences of changes in the availability of off-farm resources for the management of private resources and implications for livestock and soil fertility management. Findings will contribute to the development of appropriate management strategies for the improved use and production of fodder resources for farmers with different livestock production systems and resource bases.

3. Community management of forest resources in the hills is a key policy of the Forest Department, and strongly supported by many donor-backed projects. Consequently the issue of impact of these initiatives in terms of long-term sustainability and management of common and private resources is of widespread interest. This project will liaise closely with two other projects that have just started looking at impacts of community forestry in the eastern and western hills, in collaboration with NUKCFP.

Institutional set-up

4. The project involves collaboration between NRI and two Nepal institutions. Within Nepal, the project is being conducted in collaboration with the Forestry Research and Survey Centre, (FORESC) and the Nepal Agroforestry Foundation (NAF), a local NGO. NAF's involvement with forest users' groups (FUGs) is largely in support to the Nepal Australian Community Resource Management Project (NACRMP). NACRMP was fully informed of intended project activities and expressed interest and support for such activities in their operational area. Possibilities for collaborative areas of work are being explored.

5. Close contact will be maintained with the two other research projects in-country looking specifically at the impact of community forestry initiatives on local institutional development and resource management. Both projects are funded by DFID under the RNRRS, and work in collaboration with the Nepal-UK Community Forestry Research Project. "Sustainable Natural Forest Management by forest user groups in the hills of Nepal" is co-ordinated by Dr Yam Malla of Reading University and is located in the western hills, around Baglung. Prayag Tamraka, head of Community Forestry Research in FORESC, is a consultant to this project. "Community forestry in Nepal: Sustainability and impacts on common and private property resource management" is co-ordinated by John Sousson from Leeds University and is based in the eastern hills, around Dhankuta. The present author is contracted to the latter project.

6. The recent government change in policy towards decentralisation of responsibility for local expenditure from the district to VDC level has wide-ranging implications for village-level institutions and their development.

Methodology of approach

7. The objective of the first visit, to develop joint ownership of the research proposal, called for lengthy discussions with collaborators, both individually and together. These discussions were continued during this visit, building and defining the concept of collaboration on an equal basis, rather than in terms of lead organisation and hiring specific consultancies for specified tasks. The process of developing a new approach to work and mechanisms for productive interaction between a government and NG organisation continues.

8. In the field the project is working with local NGOs and CBOs and with communities that have selected themselves as being interested in improving livestock productivity through development of their fodder resources and feeding strategies. Within the communities, discussions are held as to who is responsibility for livestock feed collection and preparation. Women and children tend to be those largely responsible and so it is encouraged that women attend the nursery trainings. Cultural conventions are respected and generally all women groups are selected by the community for training, accompanied in some cases by one, or two respected male representatives of the village.

9. Collaboration between the project and the NGO/CBOs will be formalised by a letter of agreement. This will help maintain transparency with regard to levels of support received and how staff time is used.

Progress with objectives

10. Review the initial site selection conducted by NAF and make final selection of research sites.

Following the inception visit in September 1997, NAF held a days workshop with 11 collaborating NGOs to present the objectives of the proposed research work. Queries were answered and the NGOs invited to select, in association with the communities with which they work, suitable sites for the research work.

Initial site selection visits were made by NAF staff during November and December to the 11 self-selected villages in three districts, Kavre, Dhading and Sindhupalchok. (Report produced by NAF, report 1 of project series).

Criteria for initial selection of research sites:

a) Community where shortages in fodder resources are perceived to be an important problem (as identified in NAFs initial survey of potential research sites).

b) Community has involvement in community forestry activities.

c) Selection to include communities that keep livestock for a range of production objectives. (i.e. production of milk and meat for market, production of milk and meat for subsistence and manure production)

d) The full range of ethnic groups present in the research area and actively involved in livestock husbandry to be included.

e) Communities to contain a minimum of (30) households (to ensure adequate numbers of households of similar resource backgrounds to facilitate discussion and participation).

f) Communities to represent range of agro-climatic zones.

g) Communities to include those both with and without easy access to outside markets

Other important logistical, equity and future extension criteria:

h) Community where the households are not too spread out so that they can be followed-up & monitored easily by the NGO within its working area.

i) Disadvantaged community & groups.

j) Community considers that there is potential for increasing livestock production in the area and is interested and willing to participate in research activities.

k) Community people particularly the women are interested or willing to promote fodder development activities. (Important factor in NAFs experience for uptake and dissemination of findings)

l) There has been no previous NGO or INGO support for increasing fodder production, nor livestock improvement program in the community.

Information was collected on the location of the villages, their access to a road head and markets, ethnicity of the population, farming systems practised and livestock holdings. On the basis of this information, sites were categorised according to altitude, access to markets and representation of ethnic groups. Five research sites were then chosen to represent high, medium and low altitude areas, both close and further from a market and including a range of ethnic groups and livestock holdings. As 11 sites would have been too many to work with for research purposes, the remaining 6 sites were identified as extension sites. These will receive the same nursery training and equipment support, but not the research input. Extension development within these 6 sites would be compared with developments with in the 5 sites receiving research input.

Research sites

Village name	**District**	**Altitude**	**Closeness to market**
Gajuri Chhap	Dhading	Low	Close
Gauthale	Dhading	Low	Distant
Chunkhubesi and Nayagaun	Kabre	Mid	Close
Ange	Sindhupalchok	Mid	Distant
Tiwari	Kabre	High	Distant

Altitude: Low < 1000m, Mid 1000m-1500m, High >1500m
Market: Close (under 1hours walk), Distant (1.5+ hours walk)

Extension sites

Village name	**District**	**Altitude**	**Closeness to market**
Pahare Tole	Dhading	Low	Close
Gaiathok	Kabre	Low	Distant
Patle	Sindhupalchok	Mid	Close
Jamune	Sindhupalchok	Mid	Distant
Palchok	Sindhupalchok	High	Distant
Chautara Sunar	Dhading	High	Distant

11. Conduct research site visits and

- ***characterise the sites***

- ***conduct wealth ranking***
- ***select representative farmers for survey***
- ***initiate nursery training extension approach.***

The 5 selected research sites were visited, accompanied by NAF field staff and NGO staff where possible. Group meetings, women's group meetings and key informant interviews were conducted to meet objectives. The sites were characterised according to location, access to markets and the road head, farming systems practised, livestock holdings and feeding strategies employed, use and availability of forest products, status of community forestry in the village, and households' land holdings and wealth ranks (appendix 1).

12. Devise survey format for recording farmer's feeding strategies over the year with two collaborating organisations.

On completion of the field visits collaborating institutions met together to discuss findings and feed-back from the research sites. A survey format was devised for collecting background information (appendix 2) and a second for bimonthly on-going survey of the selected households livestock feeding strategies that will continue for a year (appendix 3). Initial findings suggested division of the year into three seasons with regard to feed allocation; monsoon, early dry and late dry season. Visits will be made at the start and end of each of these seasons.

13. Discuss next stage of research work with collaborators and agree responsibilities for on-going survey work over the next 8 months.

Collaborators agreed to share responsibility for the survey visits, FORESC conducting start of season visits and NAF end of season visits. FORESC will conduct the next visit at the end of February and another at the end of June. NAF will conduct the visits at the end of April and end of August. NAF will be responsible for the nursery training, cross-visits and follow-up activities. Groups from the 5 research sites will receive training and conduct cross-visits by the end of March 1998. The 6 extension sites will receive extension inputs between April 1998 and June 1998.

14. Review activities and expenditure over first 4 months of project.

Activities and expenditure was reviewed separately with NAF and FORESC project co-ordinators and administrators. Both activities and expenditure are on-target at present.

15. Plan proposed activities and expenditure for the project for the eight-month period (January 1998- September 1998).

Activities up until September 1998 were agreed and a proposed budget for these draw-up with each collaborator (appendix 5).

APPENDIX 1: INITIAL CHARACTERISATION OF RESEARCH SITES

Gajuri Chhap

Introduction
Gajuri Chhap is located in Kumpur VDC, Ward No.3 of Dhading district. The community consists of 33 households of which 20 are Magar, 5 are Damai, 2 are Kami, 5 are Brahmin/Chhetri and 1 is Newar. Total population is 202, of which 106 are women.

The village is located half an hours walk, by local calculation, north of Gajuri village which is on the main Kathmandu to Mugling highway. The lowest point of the village is 250m above Gajuri, 300m above the Trisuli river. It faces south-east and is spread over the hillside from 550m to approximately 750m. Community members own khet land alongside the Machhi river (250m) and kharbari up to approximately 800m. The climate is sub-tropical, but extremes of hot and cold are felt in summer and winter.

Market opportunities
Market within the village?
Some community members sell milk in Gajuri to hotels and more milk could be sold in this way. A milk collection centre was established one year ago, but closed after one month due to lack of demand. Gajuri also provides a good market for livestock.

Cropping Patterns and availability of crop residues
Two crops are grown on khet land, rice followed by wheat. Lower khet land near the Macchi river can support three crops; maize, rice and wheat, or potatoes, but the third is not generally grown due to pest problem of animals from the forest. On bari land the main crop pattern is maize relayed with millet. There is very little double cropping, with a little wheat grown where moisture is sufficient. Some legumes are also grown, either as a sole crop, or intercropped in maize, such as blackgram, soybean and groundnut. Vegetables are grown close the homesteads, including cauliflower, spinach, onions and chilli. Vegetable wastes are fed to milking animals, together with a concentrate made from rice polishings and chopped maize cob sheath.

Forest Resources
The community forest area has been registered for four years, but has been under active community management for a total of nine years. For the first five years they closed the forest, stopping all access. Now the management plan allows for a single entry per year, during Phalgun to lop the trees and weed where necessary. All households participate in the activity and the harvest is divided equally between households. During the rest of the year dry leaves may be collected and the animals grazed, but no fuel or green fodder collected. The community forest area is dominated by Sal, Katus and Chilaune and is managed for timber, rather than for fodder. Villagers say that it is already dense and that there is no room for inter-planting fodder trees. The mango tree area adjoining is more open and they have considered planting trees there, though the interest has been in timber, rather than fodder trees.
The government forest to the south of the village is used by another adjoining village and this has complicated the process of hand-over to community management. The competing claims to primary use have not yet been resolved.

Grazing
Cows, oxen and goats are taken to both the FUG and government forest areas for grazing, but there is little available to eat and the journey is made to water the animals. Buffalo are not grazed and given water in their stall.

Background to fodder scarcity problem
The community recognises fodder shortages as a growing problem; with the number of the households in the village increasing; sub-division of existing households leading to reduced land holdings; reduced access to forest resources, both under community control and government, and an increase in the number of animals kept. Farmers commented that the amounts of crop residues available were limited and lasted less than a month after harvest. They consequently relied quite heavily on forest and cut grass resources and grazing. The critical feed shortage period was identified as being from mid February to mid June. Farmers mentioned

Tanki (as available early in season), Kutmiro and Gideri (new leaves available in mid April to mid June) as highly nutritive fodders of which they would like more.

Characterisation of households according to land holdings and livestock holdings.
The group identified two important types of land holding, khet and pakho bari. Small amounts of kharbari owned by some were considered not important in terms of contribution to fodder supplies. Three households were identified as having just more than 10 ropani of khet land, but these were not considered to have considerably more than others. Households were classified as either having khet land, or not and having larger amounts of pakho bari (>20 ropanis), or smaller amounts (5-20 ropanis). The group identified keeping milking animals, or not, as the major difference between households in terms of livestock. This was because all households kept some small ruminants and at least one draught animal. Under these classifications 6 groupings of farmers emerged, two groups of which contained considerably more members than the others. Discussions around how these group members differed from one another produced a further subdivision based on the number of large livestock, (5, or more large livestock, and < 5 large livestock). Finally 10 farmers were identified to take part in the research, eight from the different groups/ subgroups, and two who were selected as being particularly interested to participate.

Classification	Selected household	Other households in group
1A High bari, khet, milking animals, five or more large livestock	Ganesh Bahadur Magar(A)	Bed Bahadur Magar Tek Bahadur Magar Mukta Bahadur Koirala Gopal Thapaliya
1B High bari, khet, milking animals, less than five large livestock	Dhana Bahadur Magar	Lila Bahadur Magar Ammar Bahadur Magar Dewe Sunuwar Tanka Bahadur Magar Gopal Darji
2 High bari, khet, no milking animals.	E K Bahadur Magar	
3 Low bari, khet, milking animals	Buddhi Bahadur Koirala	
4A Low bari, khet, no milking animals, five or more large livestock	Man Bahadur Koirala	Madan Bahadur Magar Purna Bahadur Magar Rana Bahadur Magar Surya Bahadur Magar Janak Bahadur Magar
4B Low bari, khet, no milking animals, less than five large livestock	Top Bahadur Magar	Kul Bahadur Magar Min Bahadur Magar
5 Low bari, no khet, milking animals.	Mrs Sumitra Magar	Dil Bahadur Magar Hari Bahadur Magar
6 Low bari, no khet, no milking animals	Ganesh Bahadur Magar(B)	Ram Prasad Thapaliya Gopal Thapaliya Ram Bahadur Magar Krishna Bahadur Darji EK Bhahadur Sunuwar Swame Kami Lila Bhadur Darji
7 Interested farmer	Hari Bahadur Magar	From group 5
8 Interested farmer	Lila Bahadur Darji	From group 6

The two groups with only one representative were included at this stage, group 2 as a case study of a household with similar land resources to 1, but no milking animals and group 3 as a case study of a household with similar land resources to group 4, but that manages to keep some milking animals. The group meeting had difficulty identifying a member of group 6 who had land suitable for raising a nursery. As this appears the group with least land and livestock resources, alternative ways of obtaining planting material will be sought if this proves a constraint to research with this group. A second representative from the larger group 6 was not sought, as another representative emmerged as a particularly interested household.

Representation by ethnic group:

Ethnic group	**Proportion within community**	**Number of selected farmers (%)**
Mugar	60%	7 (70%)
Damai/ Kami	21%	1 (10%)
Brahmin/ Chhetri	15%	2 (20%)
Newar	3% (1 household only)	0

Seasonal availability and utilisation of crop residus and farm-grown fodder crops (Gajuri Chhap village)

Fodder types and species	**Kartik**	**Mangshir**	**Poush**	**Mag**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Sraban**	**Badara**	**Aswin**
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Crop residues and by-products												
Rice straw	h xx	xxx	xxx			p			h xx	xxx		
Maize stover										h xx	h xx	
Maize thinnings												
Maize leaves and tops									xxxx	xxxx		
Maize cob sheaths	------- -	-------	------- -	----	------- -					-------	-------	-------
Wheat straw						h xx	-------					
Millet straw	h xx	xxxx										
Buck wheat straw												
Summer legumes												
Green gram		h xx	xxxx		xxxx							
Soya bean		h xx	xxxx		xxxx							
Winter legumes/oilseeds												
Mustard												
Farm-grown fodders												
Cut grass fodder												
Farmland												
Forest (non-FUG)	xxxx	-------	-------	-------					xxxx	xxxx	xxxx	xxxx
FUG managed					xxxx							
Grazing (cattle only)												
Forest	-------	-------	-------	-------	-------	-------	-------	-------	xxxx	xxxx	xxxx	xxxx
Grasslands												
Crop aftermaths												
(not allowed in bari)												

Fodder availability and utilisation: h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

Seasonal availability and utilisation of tree fodders (Gajuri Chhap village)

Fodder types and species	**Kartik**	**Mangshir**	**Poush**	**Mag**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Sraban**	**Badara**	**Aswin**
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Trees on farms												
Gideri		xxxx	xxxx				-------	-------				
Khanyu		xxxx	xxxx	xxxx	xxxx							
Tanki	xxxx	xxxx	xxxx									xxxx
Trees on private land												
Trees in forest												
Bahri		xxxx	xxxx	xxxx	xxxx							
Dabdabe		xxxx	xxxx	xxxx	xxxx							
Dumri		xxxx	xxxx	xxxx	xxxx							
Gayo		xxxx	xxxx	xxxx								
Gideri		xxxx	xxxx				-------	-------				
Kabro		xxxx	xxxx	xxxx	xxxx							
Khanayo		xxxx	xxxx	xxxx	xxxx							
Kutmero		xxxx	xxxx				xxxx					
Tanki	xxxx	xxxx	xxxx									xxxx

Fodder availability and utilisation: h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

Gauthale

Introduction

Gauthale village is in Salang VDC No. 9 of Dhading District. The community consists of 36 households all of which belong to the ethnic group Magar. Total population is 233 of which 116 are male and 116 are female.

The village is located 45 minutes walk, by local calculation, north from the main Kathmandu to Mugling highway, and 30 minutes walk from Parewa Tar on the Dhading road. In the monsoon, the village is less easily accessible due to no all-season crossing place of the Thapal Khola, and takes 2 hours to reach, unless the over-head hand-pulled cable car is used. The village faces south and houses are located from 560m to approximately 700m up the hillside. The climate is approximately sub-tropical, but extremes of hot and cold are experienced in summer and winter. The area is particularly dry in parts and there are few perennial streams.

Market opportunities

No milk is sold outside of the village due to access problems during the monsoon. Some ghee (clarified butter) is sold. The nearest market is Gajuri, ??kilometres by road from ???, their nearest access point on the Kathmandu to Muglin highway.

Cropping patterns and availability of crop residues

The main land holdings are khet and pakho bari. Some kharbari is owned by 15-20% households, but this is so steep that animals are unable to graze there and is only used for growing thatching grass. The majority of households own some khet (28 out of 36), but holdings are small and located some distance 30 minutes to one hour from the village. Three crops per year are possible on some of the khet land, maize, rice, followed by wheat, or potatoes. Two crops of rice are grown on other khet land, but farmers say that production is low. Some 2-crop khet land supports rice followed by wheat.

Maize is the main crop on bari land, in drier parts the sole crop, in wetter areas followed by wheat, or a legume such as green and black gram, soybean, kidney and horse beans. In drier areas a single legume crop may be grown. Some mustard is grown and mustard cake used for human food, not fed to animals. Millet is not grown in the village as conditions are generally too dry for maize-millet relay cropping. Maize crop residue is enough for one month, but spread over two months in feed to the livestock. The crop provides a few thinnings in May/June, and maize leaves and sometimes tops are fed in July/August. Of the legume crops, black and green gram provide the best residues in Kartik and Mangsir. Soybean is harvested 10-15 days before and provides the next best residue. Kidney and horse beans are only grown in small amounts.

Forest resources

The villagers consider all the surrounding forest areas (see map) to be community forest, although they have not yet been formally registered. They started protecting the forest from outsiders three years ago. The sal forest to the south-east of the village is shared with an upper village and all are considered primary users. Member are allowed to graze animals; lop fodder trees; collect forage and collect dead/fallen branches for fuel. Sal leaves are collected for plate making, but otherwise not used for fodder. Timber cutting is not allowed.

Grazing

Only grazing areas are in community forest, and on crop aftermaths for a limited period. Cows and oxen are grazed in the forest regularly, though villagers say that there is little to eat and that they are taken through the forest primarily to water at the river below. Goats are less frequently grazed and particularly not during the growing season. Buffaloes are permanently stall fed. Water is brought to buffaloes and goats when necessary, and when it is available. Water availability is a big problem in the village.

Background to fodder scarcity problem

The community recognises fodder shortages as a growing problem, with the number of the households in the village increasing; sub-division of existing households leading to reduced land holdings and reduced access to forest resources due to the tightening of community control on access to products. This is a common pattern shown by communities preparing to register formally as a Forest User Group, showing their ability to control members and outsiders activities by reducing access and use of the resource. Farmers have heard of

fodder grasses that they could grow on the khet land in winter, but they have not tried this yet, due to lack of access to planting materials and advice as to how to cultivate the grasses so as not to interfere with the subsequent rice crops.
The main fodder deficit period is from Mid March to mid July. Farmers assessment of fodder requirement is determined first by timing and amount of availability, and secondly by quality.

Characterisation of households according to land holdings and livestock holdings.
The group identified two important types of land holding, khet and pakho bari. They identified households as having either high (> or =15 ropani) or low (<15 ropani) of bari land, and either high (5 or more ropani), low (less than 5 ropani), or no khet land. In terms of livestock holdings the group identified these as either high (15 or more animals) or low (less than 15). Under this classification eight groupings were identified. Two groups containing only 1 and 2 members each were combined with other groups with similar land resources. One group, with low bari, low khet and low livestock numbers was particularly large (16). Differences between members were identified as having larger numbers of large ruminants (5 or more), and higher ??lower?? numbers of smaller ruminants (5 or more). The meeting further identified two farmers who were particularly interested to be involved in the research, making a total of nine selected farmers.

Classification	Selected household	Other households in group
1 High bari, high khet, high livestock	?Dhana Bahadur Thapa Magar? (not on HH list)	Surya Bdr. Thapa Magar Prem Bdr. Thapa Magar Jit Bdr. Thapa Magar Min Bdr. Thapa Magar Bhakta Bdr. Thapa Magar
2 High bari, high khet, low livestock	Kum Bdr.Thapa Magar(A)	Lok Bdr. Thapa Magar Chitra Bdr.Thapa Magar Lak Bdr. Ale Magar
3 High bari, no khet, low livestock	Kul Bdr. Thapa Magar	Purna Bdr. Thapa Magar (high livestock) Chandra Bdr.Thapa Magar Lal Bdr. Thapa Magar
4 Low bari, low khet,high livestock	Chhabi Bdr. Thapa Magar	Harka Bdr. Thapa Magar Bed Bdr. Thapa Magar
5A Low bari, low khet, low livestock, 5 or more large ruminants	Bhim Bdr. Ale Magar Yam Bdr. Thapa Magar	Khum Bdr.Thapa Magar(B) Yum Bdr.Thapa Magar Dala Bdr.Thapa Magar Tara Bdr.Thapa Magar Padam Bdr.Thapa Magar Kamal Bdr.Thapa Magar Cham Bdr.Thapa Magar Gita Bdr.Thapa Magar Bir Bdr. Ale Magar
5B Low bari, low khet, low livestock, less than 5 small ruminants	Krishna Bdr.Thapa Magar	Purna Bdr.Thapa Magar Mana Bdr.Thapa Magar Lila Bdr.Thapa Magar Khem Bdr.Thapa Magar
6 Low bari, no khet, low livestock	Thulo Toya Bdr.Thapa Magar	Sano Toya Bdr.Thapa Magar Shyam Bdr.Thapa Magar Tek Bdr.Thapa Magar
7 Interested farmer	Lal Bdr.Thapa Magar	(Group 3)
8 Interested farmer	Lok Bdr.Thapa Magar	(Group 2)

Seasonal availability and utilisation of crop residus and farm-grown fodder crops (Gauthale village)

Fodder types and species	**Kartik**	**Mangshir**	**Poush**	**Mag**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Srabban**	**Badara**	**Aswin**
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Crop residues and by-products												
Rice straw		h xx	xxxx	-------	-------	-------			h xx	xxxx		
Maize stover											h xx	
Maize thinnings								xxxx				
Maize leaves and tops										xxxx	xxxx	
Maize cob sheaths		-------	-------	-------	-------	-------						
Wheat straw							h xx					
Millet straw												
Buck wheat straw												
Summer legumes												
Green gram	h xx	xx										
Soya bean	h xx	xx										
Beans	h xx	xx										
Winter legumes/oilseeds												
Mustard												
Farm-grown fodders												
Cut grass fodder												
Farmland (risers)												
Forest	-------	-------							xxxx	xxxx	xxxx	xxxx
Grazing												
Forest	-------	-------							-------	-------	-------	-------
Grasslands												
Crop aftermaths												
Maize (bari)	-------	-------										

Fodder availability and utilisation: h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

Seasonal availability and utilisation of tree fodders (Gauthale village)

Fodder types and species	**Kartik**	**Mangshir**	**Poush**	**Mag**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Srabban**	**Badara**	**Aswin**
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Trees on farms												
Khanyu		-------	xxxx	xxxx	xxxx	-------						
Kutmiro		-------	xxxx	xxxx	xxxx	-------						
Tanki		-------	xxxx	xxxx	xxxx	-------						
Trees on private land												
(None ?)												
Trees in forest												
Gayo		-------	xxxx	xxxx	xxxx	-------						
Gideri		-------	xxxx	xxxx	xxxx	-------						
Khanyu		-------	xxxx	xxxx	xxxx	-------						
Khanayo	xxxx	xxxx										
Kutmiro		-------	xxxx	xxxx	xxxx	-------						
Tanki		-------	xxxx	xxxx	xxxx	-------						
Saj		-------	xxxx	xxxx	xxxx	xxxx						
Sal												

Fodder availability and utilisation: h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

Tawari

Introduction

Tawari village is located in ward no. 5 of Mahankalchour VDC in Kavrepalanchok district. The community consists of 62 households, of which 42 are Tamang, 17 Mugar, and 3 Bhujel.

The village is located three and a half hours walk from Khopasi, the nearest road point, ??kilometres from Dhulikel. The majority of houses in the community are built along the saddled top of a hill, at 1,750m asl. (see map). Houses at Chhap Danda are lower, on a north-west facing slope, at 1,500m. Land of all aspects is present, with the majority on either north-west facing, or south-east facing slopes. The elevation and exposed position of the village leads to low temperatures in the winter, with a frequent ground frost and snow at times.

Market opportunities

Despite the community's distance from market they are keen to produce both milk and livestock for sale. Their first priority is to produce milk. Thumki village in ward no. 4, just half an hours walk away, already has a milk-collection centre and one could readily be opened in Tawari (according to the ward chairman), if enough milk was being produced. Production of livestock for sale would be their second priority, with traders already visiting the village, looking to buy goats.

Cropping patterns

Approximately half the households own a small amount of khet land that is some half an hours walk down from the village. It consists of a band of very small terraces on either side of the Phyang khola. The main crops grown are rice, planted in June and wheat, planted in November/December. The land is not very productive and the longer time taken to harvest does not allow a third crop to be grown.

All households own two-crop bari land where maize, planted in May and maize intercropped with soybeans is grown, followed by mustard, or wheat, planted in October/November. In more shady areas (largely north-facing terraces) a single crop of maize is raised on bari land. Sometimes *phaphar* (Amaranthus sp.) is also grown on these more shady and infertile areas.

Kharbari is owned by some households which is largely used for the production of thatching grass. Some fodder grasses are found on kharbari land, but quantities were considered very low.

Crop residue use

Due to the small amount of khet land, there is very little rice straw available. The small amount of wheat straw produced is not used for fodder, but used for thatching houses.

Availability of maize stover is dependant on the amount of bari a household has. Some households reported already having finished their stores (by mid January), while others could make theirs last until the end of May. Maize thinnings are fed a month after maize harvest, but these are few, due to little extra seed being sown. The community doesn't use maize tops, of leaves from the maize plants while they are still green. Maize cob sheaths are fed throughout winter as they become available. These are fed direct, with no chopping, or mixing with other feeds.

Soybean is the main legume grown. Some black gram is grown, but this doesn't do well and string beans are grown in kitchen gardens. The few residues from these legume crops are fed in October and November, and are finished very quickly.

The villagers identified no particular pattern to use of mustard cake, describing it as being fed as it became available.

Crop residues are neither bought, nor sold in the village.

Fodder use

Villagers identified just four species of fodder tree present on the terrace risers and farm land, Dhudilo, Painyo, Gogon and Timilo. No one reported planting fodder trees, but protected seedlings when they germinated. Trees are lopped from November/ December to April/May, with main period of use, January/February to April/May.

No tree fodder is collected from off-farm forest areas, only bedding materials.

Five species of grass are identified from on-farm sources, amliso (broom grass) being the only one cultivated. The grasses Budha, Siru, Musakarki and Khare are found both on-farm and in forest areas. They

are collected and used from on-farm sources for four months, from June/July to September/October, and from forest resources for two months, from September/October to November/December.

Forest resources
All near-by forest areas (see map) are now under community management and have been for 3-4 years. Collection of grasses, dry wood and grazing is allowed at any time. The majority of trees are timber species and no cutting is allowed without special permission. Two watchmen are employed to stop illegal cutting and are paid 3 pathi of maize by each household per year. The group is not yet officially registered, but hope to become so soon.

Grazing
There is very little grazing practised in the village. There is no crop aftermath grazing on either khet, or bari land. Larger ruminants are not grazed at all and goats are only grazed a little along paths in the FUG forest areas. Leopard attack on livestock is a problem in the area and restricts the grazing of goats freely in forest areas. All livestock are housed at night for protection, and for warmth.

Background to fodder scarcity problem
The women of the village said that they faced a deficit in all types of feed; crop residue, tree fodders and grasses. They did not differentiate between feeds given to cows, buffalo and goats, except for concentrates (maize flour cooked with vegetable wastes) that is only fed to milking animals, once every 2-3 days. The women were particularly interested in growing a larger amount of grasses as these can be cut more than once a year. During winter months at present there is little grass growth.

Characterisation of households according to land holdings and livestock holdings
The school teacher, Mr Man Bahadur Tamang and the ward chairman, Mr Makkhan Kumar Pyasi led discussions with regard to characterisation of households. They identified over 90 households in the larger Tawari village area, approximately 60 of which are Tamang and 30 Magar. This differed from the original survey which identified the village as consisting of 53 Tamang households. In order to make the ranking manageable they decided to include only the upper settlements (which also share the higher-altitude, exposed-site characteristics). These consist of 42 Tamang and 17 Magar households and 3 Bhujel. Households were characterised according to the total amount of registered land they owned, higher (10 or more hal), or lower (less than 10 hal) holdings; the total number of livestock, higher (10 or more), lower (less than 10), and whether they owned kharbari, or not. Land size was measured in hal, the number of pairs of oxen days taken to plough the area, rather than ropani, as this is the local way of measuring land area. The relationship between *hal* and *ropani* in this area will be explored on a latter visit. In the Western hills of Nepal these terms are considered approximately synonymous.
Under the above classification six groups were identified. There was some difficulty in identification of the women at the meeting with household head names as father/ father-in-laws names were not always recognised. In addition to one representative from each group, the meeting identified four other women who were particularly interested and able to attend the training. Attempts were made to ensure that nobody who just about to leave the village was selected (the marriage season is just about to start). But this was a sensitive subject and not addressed directly.

Classification	Selected household	Other households in group
1 High land, high livestock with kharbari 13 households	Ms Ranjana Magar (Khrishna Bdr Magar)	Krishna Bdr. Lama Jeet Bdr. Tamang Bil Bdr. Singtan Man Bdr. Tumsing Hom Bdr. Tumsing Laldhoj Tamang Jhatak Bdr. Magar Indra Bdr. Magar Narayan Bdr. Magar Roj Bdr. Magar Karna Bdr. Bhujel Budhe lal Tamang
2	Ms Chameli Tamang	Ram Bdr. Tamang(a)

High land, low livestock with kharbari 9 households	(Dil Bdr. Tamang)	Katak Bdr. Thapa Magar Man Bdr. Tamang(A) Kanchaman Bdr. Tamang Ram Bdr. Tamang(b) Gunj Bdr. Tumsing Surya Bdr. Magar Gyan Bdr. Singtan
3 High land, low livestock, no kharbari 11 households	Urmila Magar (Top Bdr. Magar)	Jeet Bdr. Tamang Gunjman Tamang Man Bdr Tamang(b) Sahila Tamang Sanu Tamang Suddha Bdr. Magar Bhim Bdr. Magar Ram Bdr. Magar Man Bdr. Magar Ram Bdr. Tumsing
4 Low land, high livestock, no kharbari. 4 households	Kabita Tamang (Shanker Tamang)	Bal Bdr. Tamang Krishna Bdr. Tamang Gyan Bdr. Magar
5 Low land, low livestock, no kharbari 11 households	Rupaduri Dhujel (Ratna Bdr. Bhujee)	Bishnu Bdr. Tamang Damai Singh Tamang Ganesh Bdr. Ale Gopal Ale Bhakta Bdr. Magar Lal Bdr. Tamang Gyan Bdr. Tamang(a) Makkhan Kumar Pyasi Kaila Tamang Sarkiman Tamang
6 Low land, high livestock, with kharbari 10 households	Thulimaya Tamang (Shyam Bdr. Tamang)	Laxman Tamang Ram Bdr. Tamang Gyan Bdr. Tamang(b) Krishna Bdr, Tamang Kale Tamang Hanuman Tamang Subba Singh Tamang Gyan Bdr. Tamang Dhahe Tamang
7. Intrested farmer	Sarmila Magar (Jhatak Bdr. Magar)	Group 1
8. Interested farmer	Laxmi Magar (Bhim Bdr. Magar)	Group 3
9. Interested farmer	Sharmila Tamang (Damai Singh Tamang)	Group 5
10. Interested farmer	Samjhana Tamang (Bil Bdr. Singtan)	Group 1

Representation by ethnic group:

Ethnic group	**Proportion within community (%)**	**Number of selected farmers (%)**
Tamang	67	50
Magar	17	40
Ale/ Bhujel/ Pyasi/ Singtan	5	10

Seasonal availability and utilisation of crop residues and farm-grown fodder crops (Tawari)

Fodder types and species	**Land type**	**Imp/ Qual.**	**Kartik**	**Mangshir**	**Poush**	**Magh**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Srabban**	**Badara**	**Aswin**
	K/B/ C/P/F	1-n/ h/m/l	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Crop residues and by-products														
Rice straw	K	5L		h	xxxx	xxxx								
Maize stover	B	1	xxxx	xxxx	xxxx	xx---	------	------	------	------				
Maize thinnings	B	5H						------	or---					
Maize leaves and tops	Don't use													
Maize cob sheaths	Use whole		xxxx	xxxx	xxxx	xxxx	xxxx	xxxx						
Wheat straw	Not	used	for	fodd	er,	used	for	thatc	hing					
Millet straw				xxxx	xx---	--								
Buck wheat straw	None													
Summer legumes	B		xxxx	xxxx										
Black gram	B		xxxx	xxxx										
Soya bean	B		xxxx	xxxx										
Winter legumes/oilseeds	Used when													
Mustard	availa ble													
Farm-grown fodders														
NP21	None													
Cut grass fodder														
Farmland											xxxx	xxxx	xxxx	xxxx
Forest FUG			xxxx	xxxx										
Forest (other)	None													
Grazing														
Forest FUG	Goats	use a	little	time	not	fixed								
Forest (other)	None													
Grasslands	None													
Crop aftermaths	None													

Land types: K = Ket, B = Bari, C = crop farmland, P = private land with trees, F = forest
Fodder importance and quality ranking; 1-n ranking of high to low availability, h/m/l ranking of high, medium and low quality (information not always available)
Fodder availability and utilisation: p = planted, h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

Seasonal availability and utilisation of tree fodders (proforma)

Fodder types and species	**Land type**	**Imp/ Qual.**	**Kartik**	**Mangshir**	**Poush**	**Mag**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Srabban**	**Badara**	**Aswin**
	K/B/ C/P/F	1-n/ l/m/h	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Trees on farms														
Dhudilo				xxxx	xxxx	xxxx	xxxx	xxxx	xxxx					
Painyo								xxxx	xxxx					
Gogon						xx	xxxx	xxxx						
Timilo						xxxx	xxxx							
Amliso							xxxx				------			
Trees on private land (none used as fodder)														
Okre														
Lali gurans														
Lapsi														
Khotay sallow														
Gobray sallow														
Ungeri														
Chilaune														
Trees in forests (no fodder trees, used for bedding**)**														
Lali gurans														
Utis														
Khotay sallow														
Gobray sallow														
Grasses			xxxx	xxxx					------	------				
Budha														
Siru														
Musakarki														
Khar														

Land types: K = Ket, B = Bari, C = crop farmland, P = private land with trees, F = forest
Fodder importance and quality ranking; 1-n ranking of high to low availability, h/m/l ranking of high, medium and low quality (information not always available)
Fodder availability and utilisation: p = planted, h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

Ange

Introduction
Ange is located in Langarche VDC, ward No. 9 of Sindhuupalchowk district. The community consists of 60 households, 18 of which are Tamang, 37 Chettri and 5 Kami.

The village is located 30 minutes walk from Tipeni and about two hours walk from Melamchi, from where there is road access to Kathmandu. The height of the village is approximately 1500m asl. and it faces south west.

Institutional background
Mr Mohan Bdr Dhakal is the community organiser for Indrawati Public Services Committee (IPSC), which receives the majority of its funding from World Neighbours (the original donor supporter of NAF). IPSC was holding its annual planning meeting at the time of our visit and we requested that planned activities with regard to the proposed research work, be taken into consideration. Funding will be provided by the project for necessary support and follow-up activities. The NGO already has experience of NAF nursery training and follow-up support in other villages in which it works.

Market opportunities
Tipeni, the small bazaar town, has a limited market for milk and livestock products. The milk collection centre at Melamchi, two hours away, offers an unlimited market for milk and a larger livestock market with access to Kathmandu.

Cropping patterns and availability of crop residues
Two crops are grown on the khet land that is located about half an hours walk from the village alongside the Tipeni to Melamchi path. Rice is planted in the monsoon, harvested in October and rice straw fed in October through to the middle of December. Rice straw is stored by some households and used sparingly through to June. Wheat is grown in winter and wheat straw fed over the three month period from April/May to September/October. The main bari crop is maize relayed with millet. Some legumes such as green gram, soybeans and green beans are also grown. Maize stover is largely fed in August/September time and millet straw in December/January. The cob leaf sheaths of the maize are also fed as the maize is stored on the cob and used throughout the winter.

Forest resources
Local forest areas were handed over to the village FUG for management, 2-3 years ago. Since then the forest has been closed to grazing. Cutting of grasses from the forest is allowed and is an important source of fodder in the monsoon and early dry seasons. A limited amount of fodder lopping is also sanctioned from the community forest areas. All local forest areas in the vicinity of the village are now managed by the FUG.

Grazing
Little grazing is now practised in the village. Khet is grazed by cows, oxen and goats for 1-2 weeks in November/December, after the rice harvest. Bari is grazed by the same animals for 1-2 weeks in April/May, after the wheat harvest. Buffaloes are not grazed. Since hand-over of the community forest, there has been no grazing allowed in the village forest, either. All classes of livestock are thus stall-fed for much of the time.

Background to fodder scarcity problem
The problem has increased recently due to both a reduction in availability of feed resources and an increase in demand for feed. Reduction in feed resources has followed the closure of the forest under FUG community management, in terms of the amount of grazing available and off-farm sources of fodder. The recent increase in the number of buffaloes kept for milk production in the village, has also increased demand for feeds. The villagers identify a long fodder deficit period, from the middle of February to the start of the good rains in the middle of July. There appears to be a particularly critical fodder shortage time in April, before the wheat harvest, when there are no straws available.
The cultivation of trees on terrace risers appears to be limited, though villagers reported other non-productive areas of the farm, such as gullies and infertile areas being used for tree production. Villagers

identify a lack of skills and materials necessary to start producing propagation materials, as the main constraints to the cultivation of required fodder species.

Characterisation of households according to land holdings and livestock holdings
The group meeting identified three categories of land owned by villagers, khet, bari and kharbari. Households were classified according the total amount of registered (khet and bari) land owned; large land holdings (10 or more ropani), average land holdings (5 to 9 ropani) and small land holdings (less than 5 ropani). These holdings were further classified in terms of amount of khet land present; high khet holding (5 or more ropani??), low khet holding (less than 5 ropani). All high land holdings were identified as also contained high khet holdings, average land holdings containing both high and low amounts of khet, and low land holdings necessarily low amounts of khet. Livestock holdings were likewise categorised taking considering the total number of livestock kept; large holdings (10 or more animals), average holdings (5-9 animals), and small holdings (less than 5 animals).

Characterisation	Selected household	Other households in group
1 High land, high livestock numbers		Damei Tamang Bel Bdr. Tamang Ram Bdr. Tamang
2 High land, average number livestock		Dhami Singh Lama Jaspal Singh Lama Chitra Bdr. Thapa Gumam Bdr Tamang Purna Bdr Khatri Bir Bdr. Khadka Sher Bdr. Khatri Lekh Bdr. Khatri Kalu Tamang Tuk Bdr. Khadka Rana Bdr. Khadka Yuba Raj Khadka Jaspal Raj Khadka Rudra Bdr. Khadka(a)
3 High land, small number of livestock		Nur Bdr. Khadka Khamba Bdr. Tamang Purna Bdr. Tamang
4 Average land, high livestock holding		Log Bdr. Khadka Ganesh Bdr. Khadka Ot Bdr. Khadka Lal Bdr. Khadka Khes Bdr. Khadka Tanka Bdr. Khadka Gogan Bdr. Khadka Tek Bdr. Khadka Purna Bdr Acharya
5 Average land, average livestock		Chut Bdr. Lama Bir Bdr. Lama Ram Bdr. Thapa Sher Bdr. Thapa Totra Bdr. Thapa Resham Bdr. Thapa Budhe Tamang Bim Bdr. Khadka Jagat Bdr. Khadka Rohit Bdr. Khadka Merman Singh Khadka Tej Bdr. Khadka

		Bhuj Bdr. Khadka Dala Bdr. Khadka Tuk Bdr. Khadka
6 Medium land, low livestock		Rudra Bdr. Khadka(b) Bikhel Tamang Pancha Tamang Mangal Tamang
7 Low land, high livestock		Man Bdr. Khadka Krishna Bdr Acharya
8 Low land, average livestock		Rajendra Thapa Dhana Bdr. Khadka
9 Low land, low livestock		Noul Tamang Sukkha Tamang Min Bdr. Khadka Saila Kami Kaila kami Gyante Kami Bhim Bdr. Kami Laure Kami

Selection of households has still to be confirmed, as there was some confusion in different members of households being named in the selection process. Categories 2 and 3 to be combined and then this large joint group to be divided in two on the basis of greater, and lesser numbers of large livestock kept. Similarly the large group 5 to be divided in two along similar lines. The small groups 7 and 8 to be amalgamated and a representative chosen from among the owners of higher numbers of livestock. Otherwise one household to be selected from each category.

Seasonal availability and utilisation of crop residus and farm-grown fodder crops (Ange village)

Fodder types and species	**Kartik**	**Mangshir**	**Poush**	**Mag**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Sraban**	**Badara**	**Aswin**
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Crop residues and by-products												
Rice straw	h	h xx	xxxx	xxxx	-------	-------	-------	-------	-------			
Maize stover	xxxx										h xx	xxxx
Maize thinnings								xx	-------			
Maize leaves and tops												
Maize cob sheaths	-------	-------	-------	-------	-------	-------	-------	-------				-------
Wheat straw							h xx	xxxx	xxxx			
Millet straw		h xx	xxxx	-------								
Buck wheat straw		h xx	xxxx									
Summer legumes												
Green gram		h xx	xxxx									
Soya bean		h xx	xxxx									
Beans (bali)	h xx											
Winter legumes/oilseeds												
Mustard						h xx						
Beans (bali)											h xx	
Farm-grown fodders												
Cut grass fodder												
Farmland (risers)									xxxx	xxxx	xxxx	xxxx
Forest	xxxx	xxxx	xxxx	-------	-------	-------	-------		xxxx	xxxx	xxxx	xxxx
Grazing												
Forest									xxxx	xxxx	xxxx	
Grasslands												
Crop aftermaths												
Rice		xxxx										
Wheat							xxxx					

Fodder availability and utilisation: h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

Seasonal availability and utilisation of tree fodders (Ange village)

Fodder types and species	**Kartik**	**Mangshir**	**Poush**	**Mag**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Srabban**	**Badara**	**Aswin**
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Trees on farms												
Badahar												
Khanyu		xxxx	xxxx	xxxx	xxxx							
Koiralo		xxxx	xxxx	xxxx	xxxx							
Kutmiro		xxxx	xxxx	xxxx	xxxx							
Pati				xxxx		xxxx	xxxx					xxxx
Tanki		xxxx	xxxx	xxxx	xxxx							
Trees on private land (as on farms)												
Badahar												
Khanyu		xxxx	xxxx	xxxx	xxxx							
Koiralo		xxxx	xxxx	xxxx	xxxx							
Kutmiro		xxxx	xxxx	xxxx	xxxx							
Pati				xxxx		xxxx	xxxx					xxxx
Tanki		xxxx	xxxx	xxxx	xxxx							
Trees in forests												
Chieuri		xxxx	xxxx	xxxx	xxxx							
Kangiyo		xxxx	xxxx	xxxx	xxxx							
Khanyu		xxxx	xxxx	xxxx	xxxx							
Khimbu		xxxx	xxxx	Leaf	fall			xxxx	xxxx			
Muhni		xxxx	xxxx	xxxx	xxxx							
Saj		xxxx	xxxx	xxxx	xxxx							
Sal		xxxx	xxxx	xxxx	xxxx			xxxx	xxxx			

Fodder availability and utilisation: h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

Chunkhubesi, Nayabasiti and Nayagaon

Introduction

Chunkhubesi, Nayabasiti and Nayagaon are located in ward no. 6 of Dhulikhel municipality in Kavre District. The recent formation of the municipality has brought these previously separate communities together. The group of villages contain 52 Bhramin/Chhetris, 39 Tamang, 5 Magars and 1 Gurung households.

The villages are located 30-45 minutes walk from the main Arniko highway and cover a range from 1,200m asl. at the highway down to 900m asl. at the khet land, by the river. The land faces north through to east, with lots of trees associated with the bari land.

The ward chairman, Mr Binod Parajuli, assisted in gathering representatives from about 20 households together and in further explaining the purpose of our visit and proposed three year programme. The majority of these representatives were women (15) and they were particularly interested and concerned over their households and the village situation with regard to animal feed resources.

Institutional

A local NGO, Nepal Association for the Welfare of the Blind works in the area and has previously worked with NAF in providing nursery training. Ms Sharmila Malli accompanied our visit and will assist in organising subsequent nursery training and follow-up visits. The women in the village remembered previous training through the Women in Development programme, in silage making. This had been done on a group basis with each member contributing a bhari of fresh fodder which was stored in a pit lined with plastic for three months. The silage had then been successfully fed to animals during the fodder deficit period. The enterprise had not been so successful, however, in terms of group dynamics and the attempt to introduce collective production of silage. The women expressed interest in making silage again on an individual, or smaller group basis.

Market opportunities

All households are already selling milk to local markets and the dairy co-operative. Local sales are preferred as these are based on volume of milk supplied, rather than on fat content as the dairy practices. On average households sell 10 mana of milk (5 litres) per day. They identify fodder shortage as acute and spend on average 5,000 to 6,000 rupees per year on purchase of rice straw. Some households report spending up to 12,000 rupees per year. Milk production is a major income earner and households would like to have more than the 1-2 milk animals kept at present, but lack the necessary fodder. Sale of goats for meat is practised to a lesser extent.

Cropping patterns

A complex mixture of cropping patterns are practised in response to the differing potentials of 2 and 3 crop khet and bari land. Only a small number of households posses three crop khet land (5-6). Rice is first planted in June with the start of the rains, harvested in October/November when potato, or wheat is planted. A third crop of potato is planted in January/February. Two-crop khet is owned by just over half the households and follows the same sequence as given for the first two crops above.

All households have two crop bari land, with maize planted in April/May, followed by wheat, or potatoes in August/September. Some of this land becomes three crop bari, when there is sufficient rain, and mustard is grown after the wheat, or potatoes. Some potatoes grown are a long-season variety and when grown do not allow sufficient time for the planting of a third crop. There is no one-crop bari land.

Kharbari land is owned by 5-6 households and is mainly used for production of thatching grass. Some fodder grasses are also collected from this land.

Crop residue use

Rice straw is fed throughout the year, except for August and September. Household production is supplemented with bought supplies from Dhulikel businessmen, who have khet land from which rice is produced, but do not keep livestock. A small bundle (approximately 40cm diameter) costs 7-10 rupees. Maize stover is fed from November/December to March/April. A small amount of maize crop thinnings are available in May and June (one month after planting). Maize leaves, but not tops are fed in July and August. Maize cob sheaths are fed in December and January, as is millet straw (only 1-2 households).

Wheat straw is not fed to animals as it does not assist in milk production. A small amount of summer legumes, including soybean and various green beans are grown. These residues are stored and fed in January/ February. Mustard cake is fed in these months also.

Fodder use
A number of fodder trees are grown adjacent to 2 and 3 crop bari and to a lesser extent on kharbari. The same species are found in each location, only numbers present differ. The most popular fodder tree is Kutmiro, for its high production, nutritious quality and association with high milk production. For a full list of species see "Seasonal availability and utilisation of tree fodders". Painyu, Titepati and Banmara are only eaten a little by goats and are fed only when fodder is very short. There was some disagreement between farmers as to whether Banmara was eaten by goats, or not. Rai Khanyo is known, there are a few trees, but it is not common.
New leaves of Katus and Painyu, cut from farm trees are fed by a few farmers when fodder is short in April/May.
One or two women have a few seedlings of Ipil, Khimbu and Flemengia, introduced through the Women Development program. Some expressed interest in obtaining more materials, while other were not impressed with their performance, particularly Ipil. Two to three women have slips of NB 21 from the same source, but were disappointed in its performance as it only grew sufficiently for cutting during the rainy season.
Kas is the most popular grass for its nutritious value and its availability February to October. Musekharki, Banso and Seru are other local grasses collected from farm land (see chart for timing of availability). There are no grasses available for collection from forest land.

Forest resources
There are three identified community forest areas within the ward, all of which consist of planted pine. Two areas, Mundale Devi and Badase Danda have been formally handed over to the community for 12 years. The third area, adjoining the next ward 4, is shared with another community and agreement has still to be reached on terms of management.
Mundale Devi is closed for most of the year. It is opened once a year, during Desai, for the cutting of grasses which are sold. The money raised in this way is used for community services such as repair of school buildings and payment for forest watchpeople.

Badase Danda is open for collection of bedding, grazing and dry wood throughout the year. Only the cutting of live wood is forbidden.
There is a sizeable area of private forest between Nayabasiti and Chankhubesi which is owned by 15-16 households.
There are no other forest resources in the area that the households can use.

Grazing
Very little grazing is practised. Larger ruminants are permanently stall fed and there is no grazing on crop aftermaths. Goats are occasionally grazed.

Background to fodder scarcity problem
The fact that all households are buying-in rice straw is a strong indication of a universal fodder shortage, coupled with good market opportunities for livestock product sale, particularly milk. The keeping of improved (50% Jersey) cows has increased fodder requirements, these animals requiring as much fodder as buffalo (2-3 bhari per day) compared to local cows that only require one bhari per day.

Characterisation of households according to land holdings and livestock holdings
In the initial visit to the area, only households from Chankhubesi and Nayagaun had been considered which had made a manageable number of households, 62. During this visit the hamlet of Nayabasii, in-between the other two hamlets was identified and the ward chairman was keen that households from all three locations be considered. This led to a rather long selection procedure as 97 households had to be considered. Villagers, however, were highly concerned about their fodder situation and motivated to take part in activities to improve their animal feed supplies.
Villagers identified households as having either high (12 or more ropani), or low (less than 12 ropani) of land. In addition to the total amount of land farmed, the presence, or absence of khet land was also

considered important. In terms of livestock holdings, total numbers of animals kept were considered and the villagers identified these as either high (six, or more), or low (less than six). On the basis of these classifications eight groups were identified from the 97 households. Villagers were requested to select one representative from each group. This they found difficult as many were interested in attending the nursery training. Consequently in the three largest groups, two representatives were chosen. A further 4 particularly interested households were selected to attend the nursery training. Two of the ten selected households have a cross-bred Jersey cow, and one of the interested households.

Classification	**Selected household**	**Other households in group**
1 High land, high livestock, with khet (24 households)	Bir Bdr. Tamang Dhruba P Parajuli	Umakanta Aryal Uddhab P Parajuli Shiba Pd Parajuli Kedar Pd Parajuli Mukunda Pd Pokhrel Gobinda Ghimire Gyanendra Pd. Chaurel Krishna Pd. Sapkota Purna Pd. Ghimire Guru Pd. Nepal Sri Krishna Tamang Sher Bdr. Tamang Baikuntha P Parajuli Bal Krishna Parajuli Ramesh Parajuli Shiba Pd. Pokhrel Lekh Pd. Acharya Chhatrilal Ghimire Rana Bdr. Pokharel Min Bdr. Parajuli Mangal Tamang Jit Bdr. Tamang
2 High land, high livestock, no khet (6 households)	Bidur Pd. Ghimire	Raju Pd. Ghimire Pancha Bdr. Nagarkoti Chaturman Tamang Dhruba Pd. Satyal Hari Pd. Pokhrel
3 Low land, high livestock, with khet (8 households)	Bhakta Bdr. Magar	Naba Raj Pokharel Shiba Pd Adhikari Ram Bdr. Tamang Hari Pd. Pokhrel Naba Raj Nepal Raju Magar Dinanath Pokhrel
4 Low land, High livestock, no khet (18 households)	Govinda Parajuli Raghubir Bdr. Tamang	Surya Bdr. Basnet Rajendra Dhakal Surya Bd. Tamang Padan Bdr. Tamang Shambhu Tamang Tara Chandra Pulami Netra Bdr. Magar Narayan Pd. Pokhrel Meghivath Ghimire Sailya Tamang Ram Bdr. Nagarkoti Bishnu Tamang Shukra Bdr. Tamang Jit Bdr. Gurung Shambhu Pd. Pokhrel Atma Ram Pokhrel
5. Low land, low livestock, with khet (15 households)	Sukuman Thing	Shiba Pd. Neupane Bhuwal Tamang Prem Bdr. Tamang Obindra Singh Tamang Ram Bdr. Tamang(a) Dhana Pd. Ghimire Laxman Tamang Buddhi Man Tamang (Thing) Man Singh Tamang Kaila Tamang Bir Bdr. Thing Chir Kaji Tamang Shukra Bdr. Tamang Ram Bdr. Tamang(b)
6. Low land, low livestock, no khet (18 households)	Kaili Tamang Subhadra Koirala	Shambhu Bdr. Nagarkoti Sitaram Bdr. Nargarkoti Keshannan Tamang Birkha Bdr. Tamang Kashi Ram Tamang Sukaman Tamang Buddhiman Tamang Laxmi Ghising Tamang Krishna Pd. Timilsina Raj Man Tamang Babukarji Tamang Chaure Tamang Kul Bdr. Tamang Ramkari Parajuli Gopal Parajuli Ram Hari Parajuli
7.	Pramod Pd.	Padam Pd. Ghimire Sundarman Tamang

High land, low livestock, with and without khet (8 households)	Parajuli	Janardan Parajuli Sri Ram Parajuli Bishnu Pd Gimire	Indra Bdr. Tamang Damodar Timilsina
8. Interested farmers (4 households)	Shubhadra Sapkota Tarachandra Pulami Suntali Pakharel Myanuka Aryal	Group No. Group No. Group No. Group No.	

Representation by ethnic group:

Ethnic group	**Proportion within community (%)**	**Number of selected farmers (%)**
Bhramin/Chhetri	54	57
Tamang	40	29
Magar	5	14
Gurung	1	0

Seasonal availability and utilisation of crop residues and farm-grown fodder crops (Chunkhubesi)

Fodder types and species	**Land type**	**Imp/ Qual.**	**Kartik**	**Mangshir**	**Poush**	**Magh**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Srabban**	**Badara**	**Aswin**
	K/B/ C/P/F	1-n/ h/m/l	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Crop residues and by-products														
Rice straw	K	1	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx		
Maize stover	B	2		xxxx	xxxx	xxxx	xxxx	xxxx						
Maize thinnings	B	5								----x	x----			
Maize leaves	B	5										----x	x----	
Maize cob sheaths	B	4			xxxx	xxxx								
Wheat straw	Not	used	as	doest	n't	prom	ote	milk	prod	uctio	n			
Millet straw	B	1-2 HH only			xxxx	xxxx								
Buck wheat straw	none													
Summer legumes						xxxx	xxxx							
Green gram	None													
Soya bean						xxxx	xxxx							
Winter legumes/oilseeds														
Mustard						xxxx	xxxx							
Farm-grown fodders														
NP21												xxxx	xxxx	xxxx
Seru				xxxx	xxxx	xxxx	xxxx							
Kas			xxxx				xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx
Banso												xxxx	xxxx	
Cut grass fodder														
Farmland (see above)	yes													
Forest	None													
Grazing (Only on areas bought by business men and left fallow)	no permenant areas	1-2 HH only												
Forest														
Grasslands														
Crop aftermaths	None													

Land types: K = Ket, B = Bari, C = crop farmland, P = private land with trees, F = forest
Fodder importance and quality ranking; 1-n ranking of high to low availability, h/m/l ranking of high, medium and low quality (information not always available)
Fodder availability and utilisation: p = planted, h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

Seasonal availability and utilisation of tree fodders (Chunkhubesi)

Fodder types and species	**Land type**	**Imp/ Qual.**	**Kartik**	**Mangshir**	**Poush**	**Magh**	**Phalgun**	**Chaitra**	**Bisak**	**Jestha**	**Ashad**	**Sraban**	**Badara**	**Aswin**
	K/B/ C/P/F	1-n/ l/m/h	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Trees on farms														
Kutmiro					xxxx	xxxx	xxxx							
Tanki					xxxx	xxxx	xxxx							
Baikano									xxxx	xxxx				
Khanyo					x	xxxx	xxxx	xxxx	xxxx					
Timila						xxxx	xxxx	xxxx	xxxx	xxxx	xxxx			
Painyu										xxxx	xxxx	xxxx	xxxx	xxxx
Kangyo			------	------	------	------	------	------	------	------	------	------	------	------
Banmara	very little	only goats 5L	-----	------	------	------	------	------	------	------	------	------	------	------
Titepati	very little	only goats 5L												
Trees on private land														
Utis (fuelwood)														
Katus	young leaves													
Painyu														
Trees in forests														
No fodder obtained from forest areas														

Land types: K = Ket, B = Bari, C = crop farmland, P = private land with trees, F = forest
Fodder importance and quality ranking; 1-n ranking of high to low availability, h/m/l ranking of high, medium and low quality (information not always available)
Fodder availability and utilisation: p = planted, h = harvested
xx = main period of utilisation of fodder
-- = secondary period of utilisation of fodder

APPENDIX 2

[i]Initail survey of selected research households to determine livestock holdings, livestock production objectives, on-farm fodder resources and perceptions about fodder requirements and deficits throughout the year.

Village name:_____ Date:_____

Household Name:_____ Researcher's name: _____

Names of members of household involved in discussions: _____
_____
_____

1. Livestock holdings by farm household

	Numbers of animals held in different classes		
Age/sex class	**Cattle**	**Buffaloes**	**Goats**
Adult females (cows, does)	( )	( )	( )
Immatures (not breeding, not suckling)	( )	( )	( )
Calves/kids (suckling)	( )	( )	( )
Draught oxen	( )	( )	( )

Number present on farm one year ago ( ) in brackets

2. Seasonality of production and feed needs

	Kar	Mar	Pou	Ma	Pha	Cha	Bis	Jes	Ash	Shr	Bad	Asw
Peak work times for draught oxen												
Main calving seasons: Cows												
Buffaloes												
Main kidding season for goats												

Comments:

[i] kiff/lpp/npsvtstm.doc

3. Types of fodder trees, their numbers and amount of fodder produced from the private land.

Species	Total Number	Number of cuts/year	Months of cutting	Average Prodn./tree (Bhari)	Total Average Prod. per year
Kutmiro					
Gayo					
Khanyu					
Badahar					
Dabdabe					
Tanki					
Gideri					
Bakhre					
Kioralo					
Nimaro					

Please Weigh a Bhari of fodder and record in Kilograms (1 Bhari = ...Kg)

4. Exploring farmers perceptions of feed deficits

Amounts of feed given to different livestock groups

1. How do farmers determine how much
a) total feed to give to an animal, or group of livestock?

b) specific composition of feed given

2. What are farmer's indicators for
a) when an animal has been given enough feed?

b) when an animal has been given insufficient feed?

Farmers description of the feed deficit

3. How do farmers describe different types of feed shortage?
(milk production very sensitive to feed availability and quality
suckling off-spring growth/ survival is second most sensitive characteristic)

i.e.
a) shortage of concentrate
b) shortage of green grass
c) shortage of tree fodder
c) shortage of crop residues (which kind?)
d) other feed-type shortage?
How do they describe them in terms of the locally known feeds i.e.
-tree fodders (specific species if possible)
-straw types
-grass types
How much more of each type would the farmer use if available?

Explore what terms farmers use for describing different shortages and definition of Nepali terms.

Timing

4. When is the major periods of fodder deficit?

5. Are there other times through the year when farmers consider that animals are receiving less than optimal feed?

Do seasonal patterns of calving and milking introduce critical times for milk production (i.e. 3-4 weeks after giving birth) and times of calf weaning (4-6 months after calving)?

5. Details of cropping systems to indicate current use of land and seasonal availability, quantities and utilisation of crop residues:

			First crop (Summer crop)			Second crop			Third crop (Winter crop)		
Land type	Total area	No. HH with this land type	crop plant month	Harv month	Months of residue use	Crop Plant month	Harv month	Months of residue use	Crop plant month	Harv. month	Months of residue use
Khet 3 crop											
Khet 2 crop											
Bari 3 crop											
Bari 2crop											
Bari 1crop											
Khar bari crop											

6. Other fodder associated with different land types:

Land type	Fodder	trees No.	Fodder	shrubs No.	Grasses	Amount (Bhari)
Khet 3crop						
Khet 2crop						
Bari 3/2 crop (specifiy any differences between fodder on 2 crop and 3 crop land)						
Bari 1crop						
Khar bari (used for grazing and/or fodder)						

APPENDIX 3

[ii]Bimonthly survey of selected research households to monitor feeding practices over the different seasons of the year.

Village name:_____ **Date:**_____

Household Name:_____ **Researcher's name:** _____

Names of members of household involved in discussions: _____
_____
_____

1. Allocation of feeds to different classes of livestock

Feed type	**Allocation of feeds to different livestock** **% of total daily collected feeds given (and enter main components of each fodder type)**				**Total daily collection/use of feed**	
	Cows	Buffaloes	Oxen	Goats	100%	Bahri
Crop residue (cereal straws and dry residues)						
Crop thinnings and leaves (green fodders)						
Cut grass						
Fresh						
Dry						
Tree fodder						
Concentrates (kg/day)(2)						
Grazing (hours/day)						
On-farm Forest						
Off-farm Forest						
Aftermath						

1. Enter % of total daily feeds of each type allocated to the total holdings of different types of livestock
2. Enter total concentrates fed to total holding of each type of livesock per day, and name of concentrate type

[ii] Kiff/lpp/npongsfm.doc

2. Please record the average daily collection of fodder from different sources for the household livestock. (Include fodder from storage eg straws)

Types of Fodder	**Source**	**Daily total fed (Bhari)**	**Estimated deficit (Bhari)**
Crop residue (dry residues)			
Crop thinnings and leaves (green fodders)			
Tree and shrub fodder	Forest		
	Privateland		
Cut grasses	Forest		
	Privateland		
Total			

How much fodder/grasses (in Bhari) is being saved daily by grazing livestock in this season?.....Bhari.
(ie how much less fodder required because of grazing)

3. Proportional Contribution of specific fodders in different types of fodder collected for livestock (In Percentage).

Fodder Types and specific fodders	**Contribution in amount Daily fed to animals (%)**	**Estimated deficit from full production (as % of what is already fed)**
Crop residues (straws and dry residues)		
Crop thinnings and leaves (green fodders)		
Grasses		
Fresh:		
Dry:		
Tree and Shrubs		
Kutmiro		
Gayo		
Tanki		
Khanyu		
Dabdabe		
Gideri		
Bakhri		
Pati		
Badahar		
Lapsi		
Others		

4. **Production Objectives**

At this season do you:

Product	Yes	No	Market type/ location Specify whether in village, market (distance), milk co-op etc.	Quantity	Price	Total production
Sell milk						
Sell ghee						
Sell animals						

5. Production objectives and effects on feed allocations in each season

Class of livestock	**Production objective priorities at this season**		**Effects on feeds allocated (note special feeds used)**
		Tick if relevant and rank	(enter only if production objective ticked for this season)
Cattle (cows)	Milk production		
	Ghee production		
	Calf survival		
	Cow condition/survival		
	Manure production		
Buffalo (cows)	Milk production		
	Ghee production		
	Calf survival		
	Cow condition/survival		
	Manure production		
Oxen	Condition/power		
	Manure production		

6. Feed allocations to different classes of livestock (typical daily allocations at season of visit)

	Cattle		Buffaloes		Draft Oxen	Goats
	Cows	Immatures	Cows	Immatures		
Fodder types						
Crop residues and by-products						
Rice straw						
Maize stover						
Maize thinnings						
Maize leaves and tops						
Maize cob sheaths						
Wheat straw						
Millet straw						
Other cereal straw						
Legume straw						
Vegetable by-product						
Farm-grown fodders						
Cut grass fodder						
Farmland fresh						
Farmland dry						
Forest fresh						
Forest dry						
Grazing						
Forest						
Grasslands						
Crop aftermaths						
Trees on farms						
Badahar						
Khanyu						
Koiralo						
Kutmiro						
Pati						
Tanki						
Trees in forests						
Chieuri						
Kangiyo						
Khanyu						
Khimbu						
Muhni						
Saj						
Sal						

APPENDIX 4 TREE, SHRUB AND GRASS LOCAL NAME IDENTIFICATION

Nepali name	Alternative	local names	Botanical name
Amp			Mangifera indica
Anulung			
Badahar			Artocarpus lakoocha
Bakaino			Melia azedarach
Bamboo			Dendrocalamus spp.
Bansu	Bansi		Quercus lamellosa
Barro			Terminalia bellerica
Bhimal			Grewia optiva
Bhimsenpati			Buddleja asiatica
Champ			Michelia champaca
Chilaune			Schima wallichiana
Chiple			Villebrunnea frutescens
Chinne	Chini		Saccharum officinarum
Chuletro			Brassaiopsis hainla
Dabdabe			Garuga pinnata
Dar			Boehmeria regulona
Dhudilo			Ficus neriifolia
Gayo			Bridelia retusa
Gedulo			Ficus clavata
Gideri	Ginderi		Premna barbata
Gogan			Saurauia nepaulensis
Kamle			Pilea wightii
Kavro	Kabro		Ficus lacor
Khanyo			Ficus semicordata var. semicordata
Khar	Khair		Acacia catechu
Kharuki	Kharuko		Pogonatherum incans
Khasreto			Ficus hinpida
Khimbu			Morus alba
Koiralo			Bauhinia variegata
Kutmiro			Litsea monopetala
Laligurans			Rhododendron arboreum
Mahoni (shrub)			
Mayal			Pyrus pashia
Musekhari			Celtin australin
Nimaro*	Nemaro		Ficus auriculata
Peepal lahare			Populus glauca
Pakhuri			Ficus glaberrima
Paro kut			
Pati	Peepal		Pericampylus glaucus
Payun			Prunus cerasoides
Phusro	Phusure		Lindera pulcherrima
Rai khanyo			Ficus semicordata var. montana
Sal			Shorea robusta
Siru			Imperata sp.
Tanki			Bauhinia purpurea
Timila*			Ficus auriculata
Titepate	Gandhe jar		Arteminia vulgarin

Non-fodder tree name identification

Nepali name	Alternative	local names	Botanical name
Bakhare			Reinwardtia indica
Barro			Terminalia bellerica
Botdayaro			Lagerstromia parviflora
Budhayao			
Champ			Michelia Champaca
Chilaune			Schima wallichina
Dumre	Gular		Ficus glomerata
Harro			Terminalia chebula
Kamuno			Syzygium cerasoides
Katus			Castanopsis indica
Khagsi			
Kharsu			Quercus semicarpifolia
Lapsi			Choerospondias axillaris
Madan	Maidal		Randia dumetorum
Padari	Parari		Stereospermum tetragonium
Phalant			Quercus gluaca
Sajh			Terminalia tomentosa
Utis			Alnus nepalensis

Fodder grass local name identification

Nepali name	Alternative	local	names	Latin nomenclature
Amliso	broom grass	Amrisho		Thysanolaena maxima
Banso				
Dhudhe				
Dhus				
Gande				
Kansa	Kansh			Vetiverra zizanioides
Karis				
Kans	Khans			Saccharum spontaneum
Kansa				
Kaule	Kaulo			Machilus oderatissima
Kamle				Pilea wightii
Khar				Typha angustata (FORESC) Cymbopogon microtheca (LF)
Kharuki	Kharki			Lilium nepalensis
Musekhari				Pogonatherum paniceum
Napier				Pennisetium purpureum
Phurki	Go nigalo			Arundineria falcata
Salimo				
Siru	Seru			Imperata sp.

Other forage grasses and legumes

Local name	other	local	names	Botanical nomenclature
Bakula				Vicia faba
Berseem				Trifolium alexandrinum
Lucerne				Medicargo sativa
Molasses				Molasses minutiflora
Oat				Avena sativa
Budemas	pigeon pea			Cajanus cajans
Budemase	Flemengia			Flemegia congesta
Stylo				Stylosanthes humilis
Stylo				Stylosanthes guianensis
Rye grass (perennial)				Lolium perenne
Rye grass				Lolium multiflorum

Information from NAF field worker at Gauthale and farmer who has been growing introduced fodder species for four years.

Management of the introduced species and how they fit into the livestock feed calendar.

Ipil-Ipil
Cut three times a year in March/April, August/Sept and Nov/ Dec.

Guazuma
Cut twice a year from late Jan to early April and in Nov/ Dec.

Khimbu
Cut four times a year, March/April, June/July, August/Sept and Nov/Dec.

NB 21
Cut approximately 10 times a year (dependant on moisture availability)
Every 7 days in the rainy season, every 10 days when drier, ie now in Magh, if moisture sufficient.

Flemengia
Cut twice a year, anytime between July/ August and Sept/Oct, and then between the middle of November and the middle of Jan.

Molasses
Not favoured as it tends to cover the whole terrace and doesn't allow for terrace side cleaning. Can be cut about five times a year, only, as takes longer than NB 21 to regenerate, 2-3 months.

Stylo
Not as favoured as NB21 for similar reasons as molasses. May have greater potential on drier sites?

APPENDIX 5 Plan of activities for the first year within the Improved Strategies for Fodder Production Project

Activity	Timing 1997/98 Sept Oct Nov Dec Jan Feb March April May June July Aug Sept	Institutions involved
Literature review		FORESC/NRI/ NAF
Identification of suitable research villages		NAF
Selection of suitable research villages. Profile the communities in terms of households' livestock type and number, land holding, overall wealth ranking, and presence and access to CPRs, particularly forests.		NRI/ NAF/FORESC
For representative households measure the use of on-farm and off-farm fodder sources over the seasons of the year and the labour used in their collection.		NAF/ FORESC
Through discussions with key informants, representative farmers and group meetings, determine recent changes in fodder sources and the causes underlying these.		NRI/ NAF/ FORESC
Calculate the amount, quality and seasonal requirement of the fodder deficit faced by different groups of farmers. i.e. those with different resource bases and those keeping livestock for different purposes		

APPENDIX 6

Details of activities and commensurate budget for the second six months of the project (April 1st -September 30th 1998) for FORESC in Nepali Rupees

Activities	**Amount**
Salaries	
On-going survey of research sites, field expenses	
Project co-ordinator (20 days @ 1,000)	20,000
Agroforestry officer (10 days @ 1,000)	10,000
Assistant Professional officer (20 days @ 800)	16,000
Field assistant (20 days @ 500)	10,000
TADA 5 sites, 2 staff, for 10 days @ 500	50,000
Preparation of village maps	2,500
Sub-total	108,500
Data compilation and analysis	
Project co-ordinator (15 days @ 500)	7,500
Agroforestry officer (15 days @ 500)	7,500
Assistant Professional officer (15 days @ 350)	5,250
Typing (20 days @ 400)	8,000
Sub-total	28,250
Equipment	
Sleeping bags *3 @ 4,000	12,000
Rucksacks *3 @ 2,000	6,000
Waterproofs*3 @1,500	4,500
Sub-total	22,500
Transportation	
Fuel	8,000
DA to driver (5 days per month over 6 months @ 200 Rp)	6,000
Local transport: taxi, bus fares.	4,000
Sub-total	18,000
Administration	
Stationary and utilities	6,000
Mail services (fax and courier)	13,000
Acount keeping (30 days @ 200)	4,500
Administration staff (30 days @ 200)	6,000
Sub-total	29,500
Miscellaneous	9,250
Grand Total	**216.000**

Revised activities and commensurate budget for the first six months of the project (September 1997- 31st March 1998) for FORESC in Nepali Rupees

Activities	**Amount**
Salaries	
Literature Review	57,500
Site characterisation and household survey, field expenses	
Project co-ordinator (15 days @ 1,000)	15,000
Assistant Professional officer (20 days @ 800)	12,000
Field assistant (20 days @ 500)	10,000
TADA 5 sites, 2 staff, for 10 days @ 500	50,000
Preparation of village maps	2,500
Sub-total	97,000
Equipment	
Computer and printer	128,000
Sub-total	128,000
Transportation	
Fuel	4,000
DA to driver (5 days per month over 3 months @ 200 Rp)	3,000
Local transport: taxi, bus fares.	3,000
Sub-total	10,000
Administration	
Stationary and utilities	5,000
Logistics	3,000
Sub-total	8,000
Grand Total	**293.000**

Details of activities and commensurate budget for the year (April 1st -March 31st 1998) for NAF in Nepali Rupees

S.N	Particulars	Amount (Rs.)
A.	**Salaries & Transportation:**	
1.	Project Coordinator (Rs. 25,000*12)	300,000.00
2.	Field Assistants (10,000*12)	120,000.00
3.	Acountant/part-time (1,000*12)	12,000.00
3.	Transporation (General)	40,000.00
4.	Per diem to Driver (Rs. 200/-day*5 days/month)	12,000.00
	Sub Total:	484,000.00
B.	**NGO Incentives:**	
1	NGO Support (20% subsidies) Rs. 12,000*11 months	132,000.00
2.	Farmer Leader Incentives (Rs. 600*11*8 months)	52,800.00
	Sub Total:	184,800.00
C.	**Training Program:**	
1.	NGO Support Policy Workshop (6*Rs. 300/-day)	1,800.00
2.	Home Nursery Training (using cutting & seedlings)	
	(6 NGOs*2 days*12 participants*Rs.50/-day)	7,200.00
3.	Exposure/Cross Visit	
	(2 days*6 NGO*12 participants*Rs.150/-day)	21,600.00
4.	Agroforestry TOT Training (11*10 days*150/-day)	16,500.00
5.	Veterinary Training (5 NGOs*5 days*150/-day)	3,750.00
6.	Vet. Training Consultant (5 days*@2,000/-day)	10,000.00
	Sub Total:	60,850.00
D.	**Nursery & Planting Materials:**	
1.	Cuttings (60 farmers*200 cuttings)*0.25/-	3,000.00
2.	Seeds (60 farmers*10 species*150/-)	90,000.00
3.	Poly bags & Plastic Sheets (11 NGO*5,000/-)	30,000.00
4.	Water Can (60 can*180/-)	10,800.00
5.	Prunning Saw (60 saw*250/-)	15,000.00
6.	Secature (60*250/-)	15,000.00
	Sub Total:	163,800.00
E.	**Office Expenses:**	
1.	Stationaries & Photocopy	30,000.00
2.	Utilities (Phone, fax, email & courier)	40,000.00
3.	Miscellaneous	30,000.00
	Sub Total:	100,000.00
	Total:	993,450.00
F.	**NAF's Overhead (10% of the total):**	99,345.00
	Grand Total:	1,092,795.00
	Exchange Rate (@1 sterling pound=NRs. 103)	10,609.66

APPENDIX 7 PROGRESS WITH MILESTONES FOR 1997/98

1. Literature review: first drafts produced by December 15th by NAF and FORESC, and circulated. Review to be synthesised and completed by NRI, by January 30th.

First drafts by NAF and FORESC not received until 6th January. During field trip in January/ February the need for additional information with regard to government fodder and livestock research was identified. Revised completion date set as end of February for new inputs from FORESC re fodder and livestock research, end of March for publication of the completed review by NRI.

2. *Identification of potential research sites by NAF in collaboration with member NGOs to be conducted during* research co-ordinator and field worker (NAF).

3. /Dec. Copies of report to be sent to NRI and FORESC by 1st January 1998. Sites suited to research to be identified by all actors during field work in January 1998.

Report prepared by 8th January and copies given to collaborators. Revised report to be produced by the end of February and published in project covers by NAF.

4. *Field study to determine community profiles to be conducted during January 1998. Field study team to consist of farming systems agronomist and livestock nutritionist (NRI), fodder tree specialist and socio-economist (FORESC), research co-ordinator and field worker (NAF).*
Field work undertaken during January by farming systems agronomist and livestock nutritionist (NRI), a forest ranger the agroforestry section (FORESC), research co-ordinator and relevant field workers (NAF), and local NGO staff members.

5. Report outlining community profiles of the selected sites in terms of households' livestock type and number, land holding and overall wealth ranking produced by March 1998. Individuals' responsibility for sections of the report to be decided during planning of the field visit.

Full report of findings from the field work to be produced by the 15th March

5. Next stage of research; study of households' fodder resources and usage patterns during different seasons to be planned. Farmer collaborators with different private fodder resources and different livestock holdings and production systems identified. Study initiated by March 1998.

Format for initial household survey and bimonthly survey of households developed and agreed by collaborators during January 1998. Representative households for survey identified during the first joint field work in January. First survey to be conducted by FORESC during February, beginning of March.

APPENDIX 8 STAGES OF RESEARCH:

- Literature review
- Preliminary identification of research sites
- Final selection of research sites, community characterisation and collaborating farmer selection
- Identification and survey of farmers' present sources of fodder and livestock feed strategies
- Identification of potential improvements to current systems
- Identification and development of locally relevant fodder indicators of fodder deficit
- Nursery training for women representatives chosen by the community
- Visits by representatives to other areas where improved feeding strategies have already been adopted by farming household groups.
- Design and implementation of on-farm and off-farm trials
- On-going monitoring and evaluation of trials in collaboration with the local community
- Modification of trials

These stages of research will not follow necessarily a linear progression as several will run concurrently. Using methodologies associated with action-research, changes in future research stages can be expected following learning and experience from the earlier stages.

APPENDIX 9 **ITINERARY**

7th Jan 20.00	QR2 Airbus A300 Depart Heathrow, Terminal 3
8th	06.00 Arrive Doha
	07.00 QR350 Boeing 727 Depart Doha
	14.10 Arrive Kathmandu
9th	Meetings NAF and FORESC (Ktm)
10th	Planning field work
11th	Planning field work
12th	Field visit to Sindupalchok district
13th	Visit Ange village
14th	Local holiday, travel to Dhading district
15th	Visit Gauthale village
16th	Visit Gajuri Chhap village
17th	Kathmandu, write-up field notes
18th	Kathmandu, write-up field notes
19th	NAF, checking field notes, species lists
	NARP visit livestock Directors
20th	NAF, planning future survey work
21th	Field trip to Tawari (Carey flys back to Britain)
22nd	Tawari
23rd	Chunkabesi/ Nayagaun
24th	Write-up of field notes
25th	Financial planning
26th	Assessment of findings from field work with collaborators
27th	Assessment of findings from field work with collaborators
28th	Wrap-up meetings
29th	Fly to Dankuta via Biratnager
7th	Fly Biratnager to Kathmandu
	Meetings with NAF and FORESC to tie-up loose ends
8th	08.00 QR351 Boeing 727 Departs Kathmandu
	12.15 Arrives Doha
	13.00 QR1 Airbus A300 Departs Doha
	17.45 Arrives Heathrow, terminal 3