

Livestock farming and fodder trees in Lamjung District

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Summary

In a random sample of forty-eight households, a survey was made from which data are presented that help to describe the relationships between ethnic group, landholding, number of fodder trees, number of livestock, etc. Information was gathered on the species of fodder trees that are grown and on their relative value to the farmers. Questions were also asked about the problems of raising livestock and of growing fodder trees and improved grasses.

Introduction

Livestock raising is a fundamental component of Nepalese farming systems. Animal manure is needed for the crops. Meat and dairy produce are used to feed the owners and their families. Animal-power is used to till the soil and for transport. According to Tulachan, Tiwari & Whittier (1982) livestock accounts for 16 % of the national GDP and 25 % of the agricultural GDP.

The main problem in raising livestock is the shortage of feed. The animal population per unit of cultivated area is one of the highest in the world (Tulachan, Tiwari & Whittier, 1982; Rajbhandary & Shah, 1981). Overgrazing and excessive lopping of forest trees has caused continuous deterioration of the mountain ecosystem. Studies have shown that there is an acute shortage of feed in the hills, and that the feed from crop residues, fodder trees on farms, forest trees and range land is inadequate in quantity and its quality is so poor that it cannot meet the nutritional requirements of the livestock population. The shortage is particularly acute in the dry season. Although several attempts have been made to overcome the problem of livestock feed in Nepal, in reality not much success has been achieved so far.

Fodder trees grown on the farms are one of the main feed sources. A few studies have been made, but they do not give a clear picture of the kinds of fodder trees that are grown or the quantity of leaf fodder obtained. This study has therefore attempted to:

- investigate the kinds of trees grown and preferred by the farmers,
- determine what factors are important in the growing of fodder trees,
- investigate some problems of fodder tree cultivation in the hills,
- investigate hill livestock raising and its problems generally.

The area studied was the Sunderbazar Panchayat in Lamjung District. Sunderbazar village is about 26 km north of Dumre bazaar on the Kathmandu-Pokhara road.

Method

A list of households was obtained from the panchayat office. Forty-eight household heads were randomly selected from the list. An interview schedule, containing both closed and open-ended questions, was prepared and pre-tested. The sample household heads were then interviewed. The data collected were tabulated and analysed. They are set out in Tables 1-12.

Results and discussion

Description of the sample population.

A number of ethnic groups live in the area: Brahmin, Chhetri, Gharti, Kumal, Gurung, Magar, Tamang, Damai, Sharki, Kami, and Newar. More than half the respondents were Brahmin and Chhetri (Table 1). There were 344 people in the 48 households, 50.3 % female and 49.7 % male. Family size was 3-12,

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mean 6.7. The 15-59 age group contained 61 % of the sample, and 36 % were less than 15 years old (Table 2).

The average land holding was 22.4 ropanis (approx. 20 ropanis = 1 ha) with a range of 0-70 ropanis; one in twelve of the respondents was landless (Table 3). The higher castes, Brahmins and Chhetris, had larger holdings (Table 4). Of the total cultivated land, 46 % was 'upland' ('bari' or 'pakho').

Although the main source of income was farming, 5 % of household heads supplemented it by government service and 6.5 % from teashops and the sale of rakshi (alcohol).

Livestock holdings by farm size and ethnic group

All respondents had some animals (Table 5). On average each family had 7.6 ruminants, of which 15% were cows, 22 % bullocks, 18 % female buffaloes, 1 % male buffaloes, and 44 % goats.

Larger farms had a larger number of livestock ($r = 0.813$).

Table 6 shows the livestock kept by different ethnic groups. Every ethnic/caste group had some ruminants. The average of total ruminants ranged from 2.5 for Damai to 10.6 for Gharti. Considering only the bovines, the average ranged from 0 for Kami to 5.6 for Brahmins. Pigs were kept only by the lower castes, Gharti, Damai, Kumal and Sharki.

Livestock farming system

No respondents engaged in commercial livestock production, although a few had taken loans for pig production from the local small farm development office.

A few had cross-bred (Murrah + local) buffaloes. Of those who had pigs all but one kept improved breeds. All the cows were of local breeds; they were kept mainly for the production of manure and milk for household consumption. The bullocks were kept as draught animals. Most farmers who had buffaloes sold milk and ghee.

Most cowsheds were thatched; only a few had stone walls. Goats were kept in small enclosures attached to one side of the farmhouses, or in some cases under the stairs inside the houses. Poultry were kept in small

wooden structures. The sheds were cleaned daily, except for goats and poultry. No disinfectants were used.

Feeding practices varied with the season. Most animals were partly stall-fed and partly put out to graze but some were entirely stall-fed. Grazing was on stubble, communal grazing lands, nearby forests, or river banks. Green grass was available from Jesth to Ashwin (mid-May to mid-October). For the rest of the year the main sources were rice straw and tree fodder; during this period tree fodder was the only source of green roughage. During Kartik (October-November) and Falgun to Baisakh (mid-February to mid-May), 40 % of the farmers were totally dependent on tree fodder, and another 37 % reported that this applied to them in Kartik. Most give 'kundo' to their milking animals and working bullocks. This is a mix of maize flour, rice husks, kitchen waste and a little salt, boiled in water. Some add the fine husks of black grams, or millet flour. No commercial concentrates were used.

Problems in livestock raising

The most serious problem was shortage of feed. The next most serious was the incidence of diseases and parasites (Table 7).

Only about a tenth of the respondents grew improved grasses. The reasons for not doing so were lack of knowledge, lack of seeds, lack of suitable land, or the belief that there was no profit in growing them (Table 8).

Table 9 shows the major diseases and parasites. Liver fluke was reported the most important by 73 % of respondents, followed by external parasites, haemorrhagic septicaemia, and piroplasmosis.

Fodder trees

Fodder trees were grown by 85 % of households, mainly on bunds and around homesteads. None were grown on 'khet' (irrigated rice) land. Only a few of the farmers had their own forest land, where fodder trees were to be found along with the other forest trees.

Most fodder trees grew naturally, but sometimes the farmers collected saplings of selected species and planted them on bunds, farm boundaries, or on 'bari' land ('upland'). The number of fodder trees was correlated with the

area of upland owned ($r = 0.884$). Some thirteen species of fodder trees were being grown, of which 51 % were dabdabe (Garuga pinnata) and gideri (Premna integrifolia). These two species are grown by the majority of farmers, not because they are especially liked, but because they are easy to grow, and sometimes grow naturally. Artocarpus lakoocha, Ficus glaberrima, F. auriculata, F. lacor, Bauhinia purpurea and B. variegata are the preferred species. Kutmiro (Litsea polyantha) accounts for 9.5 % of the fodder tree population; badahar (Artocarpus lakoocha), 11.2 %; and kavro (Ficus lacor), 7.2 % (Table 10). The number of fodder trees per household ranged from 0 to 55, mean 8.75.

Table 11 shows the productivity of various species (as roughly estimated by the farmers), the season of lopping, and the number of times they are lopped in a year. The lopping season varies not only with species, but depends also on the availability of other feed. In general, the trees are lopped when green forage from other sources is not available. Some species, such as Ficus auriculata (F. roxburghii), F. glaberrima, F. hispida and Garuga pinnata are usually lopped in two seasons, summer and autumn.

The weight of leaves plus branches lopped varied from 50 kg/tree for gayo (Bridelia retusa), thotne (Ficus hispida) and khanayo (F. semicordata = F. cunia), to 375 kg/tree for badahar and pakhuri (F. glaberrima). The average estimated total lopped material per household was 1081 kg (Table 12). About 45 % of this (486 kg) is leaf fodder (Shah, 1980) and it is worth noting that the average household therefore also obtains 594 kg/year of fuelwood from its fodder trees. The average amount of leaf fodder available per ruminant was calculated to be 64 kg/year. There was a positive correlation between number of fodder trees and ruminant number per household ($r = 0.745$).

Considering that it is becoming more and more difficult to obtain firewood from the fast disappearing natural forests, and that the farmers are in great need of more leaf fodder, the best species to plant would be those which give high production of both leaves and firewood, viz. pakhuri, badahar, kavro, kutmiro and nimaro (Ficus auriculata). The farmers were asked to say which trees they would prefer to plant if seedlings were

available. Their first choices were badahar and pakhuri, second nimaro, kutmiro, kavro, koiralo (Bauhinia variegata) and tanki (B. purpurea) and the least liked were gideri, dabdabe, gayo, thotne, khanayo and barro (Terminalia belerica). The farmers were also asked what were the main constraints on planting fodder trees. Their replies were: plants not available, 41.7 %; problems in protecting planted trees, 18.7 %; shortage of suitable land, 12.5 %; and lack of labour and money, 10.4 %. There was no response from 16.7 %.

Despite the small sample size, preliminary inferences can be drawn from the original data on a number of other relationships which highlight the kind of topics that would benefit from further study: there appear to be considerable differences between the number of fodder trees per ruminant owned by households of different ethnic groups; the number of fodder trees per unit area of upland decreases with increasing farm size.

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References

Rajbhandary, H.B.; Shah, S.G. (1981). Trends and projection of livestock production in the hills. In Nepal's Experience in Hill Agricultural Development. Proceedings of a seminar held in Kathmandu, March-April 1981. Min. of Food and Agriculture.

Shah, S.G. (1982). Phewa watershed, animal husbandry and feed resources, survey result and recommendation. Department of Soil Conservation and Watershed Management and Integrated Watershed Management Project.

Tulachan, P.M.; Tiwari, K.R.; Whittier, H.L. (1982). Village livestock (bovine) farming and its problems in Sharadanagar Panchayat, Chitwan. IAAS Journal 4 (1/2).

Keywords: Artocarpus lakoocha; Bauhinia purpurea; Bauhinia variegata; Bridelia retusa; Ficus auriculata; Ficus glaberrima; Ficus hispida; Ficus lacor; Ficus semicordata; Garuga pinnata; Litsea polyantha; Premna integrifolia; Terminalia belerica; fodder.

Tables

1 - Sampled household heads by ethnic group

	Number	%
Brahmin	16	33
Chhetri	11	23
Gurung	4	8
Gharti	3	6
Kumal	3	6
Sharki	3	6
Magar	2	4
Damai	2	4
Newar	2	4
Tamang	1	2
Kami	1	2

3 - Farm size

Ropanis*	Number	%
Nil	4	8
Less than 10	11	23
11-20	13	27
21-30	5	10
31-40	6	12.5
41-50	9	19

*20 ropanis = 1 ha approx.

2 - Age classes of sampled households

	Less than 5	5-9	10-14	15-59	More than 60	Total
Male	16	20	25	106	4	171
Female	21	22	21	103	6	173
Total	37	42	46	209	10	344
Percentage	11	12	13	61	3	100

4 - Farm size in ropanis by ethnic group

	Nil	1-10	11-20	21-30	31-40	More than 40	Total
Brahmin	0	0	4	4	3	5	16
Chhetri	2	2	2	0	2	3	11
Gharti	0	0	3	0	0	0	3
Kumal	0	2	0	0	1	0	3
Gurung	0	1	2	1	0	0	4
Magar	0	1	1	0	0	0	2
Tamang	0	1	0	0	0	0	1
Damai	0	2	0	0	0	0	2
Sharki	1	2	0	0	0	0	3
Kami	1	0	0	0	0	0	1
Newar	0	0	1	0	0	1	2
Total	4	11	13	5	6	9	48

5 - Average livestock number by farm size

Ropanis No. of households	Nil	1-10	11-20	21-30	31-40	More than 40	Mean
	4	11	13	5	6	9	48
Cows	0.5	0.6	0.85	1.4	1.5	2.0	1.13
Bullocks	0.5	1.40	1.70	2.0	2.0	2.0	1.64
Female buffaloes	0.25	0.72	1.50	1.6	1.5	2.11	1.35
Male buffaloes	0	0	0.15	0	0.16	0.22	0.10
Total bovines	1.25	2.72	4.2	5.0	5.16	6.33	4.22
Goats	2.75	2.46	2.80	6.0	1.84	5.22	3.38
Total ruminants	4.0	5.18	7.0	11.0	7.0	11.55	7.60
Pigs	0	0.6	0.23	0	0	0.11	0.22
Poultry	2.5	4.3	5.0	5.8	6.5	12.0	6.20

6 - Average livestock number per household by ethnic group

	Cows	Bullocks	Female buff.	Male buff.	Total bovines	Goats	Total ruminants	Pigs	Poultry
Brahmin	1.75	1.8	1.8	0.25	5.6	3.3	8.9	0	4.8
Chhetri	0.90	1.90	1.64	0.09	4.53	3.8	8.4	0	6.8
Gharti	0.6	2.0	1.0	0	3.6	7	10.6	1	7.0
Kumal	1.67	2.0	0.33	0	4.0	1.67	5.67	0.6	13.0
Gurung	0.5	1.75	1.5	0	3.75	2.75	6.5	0	7.5
Magar	0.5	1.5	1.0	0	3.0	3.0	6.0	0	7.0
Tamang	2.0	2.0	0	0	4.0	3.0	7.0	0	8.0
Damai	0.5	0.5	1.5	0	2.5	0	2.5	1.5	5.5
Sharki	0.33	0	0	0	0.33	4.33	4.66	1	4.6
Kami	0	0	0	0	0	4	4	0	0
Newar	1	2	1.5	0	4.5	2	6.5	0	4.5
overall	1.13	1.64	1.35	0.10	4.22	3.38	7.6	0.22	6.2

7 - Livestock problems: order of importance

	Respondents (48)	
	No.	%
Feed supply	27	56
Diseases and parasites	15	31
Marketing	3	6
Housing	2	4
Breeding	1	2

8 - Reasons for not growing improved forage grasses

	Respondents (44)	
	No.	%
Lack of knowledge	22	50
No seed available	6	14
Lack of land	6	14
No profit	5	11
No opinion	5	11

9 - Major livestock diseases

	Respondents	
	Number	%
Liver fluke	35	73
Haemorrhagic septicaemia	10	21
Foot and mouth	5	10
Piroplasmosis	10	21
External parasites	15	31
Fowl pox	11	23
Tympany	4	8
Diarrhoea, dysentery, constipation	6	12.5

10 - Fodder trees grown

	Households	Trees	Trees/household
Gideri, <u>Premna integrifolia</u>	30	101	3.4
Kutmiro, <u>Litsea polyantha</u>	14	40	2.8
Kavro, <u>Ficus lacor</u>	21	33	1.5
Koiralo, <u>Bauhinia variegata</u>	2	2	1.0
Badahar, <u>Artocarpus lakoocha</u>	20	47	2.35
Dabdabe, <u>Garuga pinnata</u>	30	113	3.8
Gayo, <u>Bridelia retusa</u>	10	15	1.5
Thotne, <u>Ficus hispida</u>	16	30	1.8
Khanayo, <u>Ficus semicordata</u>	9	15	1.6
Tanki, <u>Bauhinia purpurea</u>	6	12	2.0
Barro, <u>Terminalia belerica</u>	1	1	1.0
Pakhuri, <u>Ficus glaberrima</u>	6	8	1.3
Nimaro, <u>Ficus auriculata</u>	2	3	1.5

11 - Cutting season. Cuttings per year.
Farmer estimates of yield (fresh weight) per tree per season

	Cutting season	Number of cuttings	Biomass, kg		
			min.	max.	av.
Gideri	Kartik-Paush (mid-Oct. to mid-Jan.)	1	25	100	75
Kutmiro	Chaitra-Baisakh (mid-March to mid-May)	1	50	200	125
Kavro	Chaitra-Jesth (mid-March to mid-June)	1	50	300	175
Koiralo	Kartik (mid-Oct. to mid-Nov.)	1	50	125	75
Badahar	Ashwin-Kartik (mid-Sep. to mid-Nov.)	1	100	750	375
Dabdabe	1. Baisakh-Jesth (mid-April to mid-June) 2. Ashwin-Kartik (mid-Sep. to mid-Nov.)	2	25	100	75
Gayo	Kartik-Mangsir (mid-Oct. to mid-Dec.)	1	25	125	50
Thotne	1. Ashwin (mid-Sep. to mid-Oct.) 2. Chaitra (mid-March to mid-April)	2	25	75	50
Khanayo	-		25	100	50
Tanki	-		25	100	75
Barro	-		25	125	75
Pakhuri	1. Kartik (mid-Oct. to mid-Nov.) 2. Chaitra (mid-March to mid-April)	2	100	1250	75
Nimaro	1. Baisakh-Jesth (mid-April to mid-June) 2. Ashwin-Kartik (mid-Sep. to mid-Nov.)	2	50	150	100

12 - Estimated annual production (fresh weight in kg) of leaf fodder and fuelwood from the fodder tree population of the sample

	Number of trees	Average fodder production per tree*	Total fodder production	Average fuelwood production per tree*	Total fuelwood production
Gideri	101	33.75	3409	41.25	4166
Kutmiro	40	56.25	2250	68.75	2750
Kavro	33	78.75	2599	96.25	3176
Koiralo	2	33.75	68	41.25	83
Badahar	47	168.75	7931	206.25	9694
Dabdabe	113	33.75	3814	41.25	4661
Gayo	15	22.50	338	27.50	413
Thotne	30	22.50	675	27.50	825
Khanayo	15	22.50	338	27.50	413
Tanki	12	33.75	405	41.25	495
Barro	1	33.75	38	41.25	41
Pakhuri	8	168.75	1350	206.25	1650
Nimaro	3	45.0	135	55.0	165
Totals			23350		28532

*Calculated from data in Table 11 and the ratio of foliage to fuelwood (45:55) provided by Shah (1982). The totals are equivalent to 486 kg of fodder and 594 kg of fuelwood (or 1081 kg biomass) for each of the 48 households.