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High altitude livestock farming: A participatory appraisal in Himachal Pradesh, India

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The awareness and adoption level of various livestock technologies are immensely low worldwide, including India because of existing research and extension set up and a host of other constraints (Francis and Sibanda 2001). Top down approaches followed traditionally to design livestock development programmes have often failed to deliver desired results (Mukherjee *et al.* 1997). Involvement of beneficiaries in designing, implementation, monitoring and review of a project increases its success tremendously (Hussain *et al.* 2005).The situation warrants involvement of livestock owners by taking into account the local conditions, requirements, resource availability, practices and constraints of resource-poor livestock farmers. Participatory approaches in form of Participatory Research Appraisal (PRA) aim to bring more holistic view of the existing animal husbandry situation before any appropriate technological interventions are made. PRA in livestock production has been identified as important tool for diseases control, rural development and food security (Bolajoko *et al.* 2010). This situation also brings greater involvement of people and ensures more desired results. The information obtained through PRA helps to design better animal projects and delivery systems (Schwabe 1984).

The present study was conducted under Global Environment Facility (GEF)/World Bank-funded NAIP project entitled "*Harmonizing Biodiversity Conservation and Agricultural Intensification through Integration of Plant, Animal and Fish Genetic Resources for Livelihood Security in Fragile Ecosystems*" during 2009–11 in Chamba district, Himachal Pradesh. In this district, 3 blocks namely Bhatiyat, Salooni and Bharmour were selected to represent three different fragile agro-ecosystems. Within these selected blocks, an area of representative village *panchayat* clusters were included. The 3 selected village *panchayat*s were among the remotest *panchayats* of the district. Gola (Altitude:1250–1400 metres Latitude: 7603' 41", Longitude:32 23'33") is a backward *panchayat* as per official records, Bhandal is one among the last *panchayats* (Altitude:1700–1800 metres, Latitude: 75 55' 94", Longitude:32 47,'67") of Salooni block lying at the border of Chamba (HP) and the state of Jammu & Kashmir, while Pranghala (Altitude:2000–2300 metres Latitude: 76 34' 76", Longitude:32 26' 90") is among the highest *panchayats* of Chamba district. (Sharma *et al*. 2010). From each block, thirty livestock owners were selected purposively to include men, women and important key informants which included local veterinary doctor, veterinary pharmacist, *panchayat* representative, traditional cattle and buffalo keepers, sheep and goat breeders etc. These were divided into 3 groups (each group, 10 livestock owners), one group each was of male and female livestock owners and last group comprised of key informants. The grouping was done to collect all relevant information pertaining to livestock feeding, seasonal analysis of diseases constraints etc. During the study participatory modes of information sharing viz. direct observations, village walks, ranking methods, seasonal mapping, informal questioning and discussion with key informants, were used to collect information (Conroy 2002, Morton *et al*. 2002, Jamal and Arya 2004, Anonymous 2007, Singh and Kumar 2008). Based on baseline findings and problem-cause analysis, a package of appropriate technological interventions was developed towards developing a sustainable rural livelihood model for these fragile eco-systems of the region.

Livestock feeding pattern in the region: Seasonal feeding

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Table 1. Livestock grazing pattern around the year in blocks of Chamba district

	Salooni block			Bharmour block			Bhatiyat block		
	Cattle	Buffalo	Sheep and goat	Cattle	Buffalo	Sheep & goat	Cattle	Buffalo	Sheep and goat
January	X	X	X	X	_	LAP	X	X	X
February	X	X	X	X	-	LAP	X	X	X
March	X	X	X	X	-	LAP	X	X	x
April	X	X	X	X	-	HAP	X	X	X
May	LP	LP	LP	X	-	HAP	X	X	X
June	LP	LP	LP	X	-	HAP	X	X	x
July	LP	LP	LP	LP	-	HAP	X	X	X
August	LP	LP	LP	LP	-	HAP	X	X	X
September	LP	LP	LP	LP	-	HAP/LAP	X	X	x
October	LP	LP	LP	X	-	LAP	X	X	X
November	LP/X	LP/X	LP/X	X	-	LAP	X	X	X
December	X	X	X	X	-	LAP	X	X	x

X, Stall feeding and grazing in forestlands/fields; LP, grazing in local pasturelands; LAP, grazing in low altitude pastures; HAP, grazing in high altitude pastures; —, Nil.

resource mapping was done to take a stock of existing livestock feeding pattern. In all the 3 village *panchayats* of 3 blocks, livestock feeding was mostly in form of grazing in community pasturelands, forestlands and open agriculture fields, Table 1.

Livestock grazing pattern has seasonal influence. This influence is more pronounced in Salooni Block where all the livestock species were grazed in local pasturelands for 7 months of the year i.e. May to November. The animals were grazed on green pastures during summers and looked after by livestock owners who live in temporary homesteads made in these pastures. Advent of winter season and consequent fodder scarcity in Nov forces them to bring animals back to villages. At this time (Nov to Apr) stall feeding at household level and local grazing in fields is practiced. Feed and fodder shortage in these months are most common and consequently production fall drastically during this time of year. Seasonal shortage of feeding resources are common in Chamba district (Singh and Misri 2004) and other parts of Himachal Pradesh, where winters and early summers are seasons of fodder scarcity (Dev *et al.* 2009).

In Pranghala (Bharmour block) transhumant migration of small ruminants (sheep and goat) is common. During summers (Apr to Sept) sheep and goat are grazed at local high altitude pasturelands of Bharmour. Advent of winter is marked by seasonal migration of sheep and goat owners to low altitude areas of adjoining district Kangra. During this migration period (Oct to Mar), animals are grazed at low altitude pasturelands of district Kangra and also in some parts of the adjoining State of Punjab (Gurdaspur district). The migratory routes used by sheep and Goat owners are well defined and also the grazing areas are demarcated for different groups of nomads (Misri 1995).Cattle in this Block are grazed on nearby grazing areas and return back in the evening and migration is not practiced for these bovines. buffaloes are not reared in Bharmour which has highest altitude among all the 3 blocks. Farmers generally prefer cattle over buffaloes in parts of Chamba as buffaloes are more prone to reproductive problems and cannot graze on land with steep slopes (Singh and Misri 2004).This may be the probable reason of absence of buffaloes from this block.

In Bhatiyat block, however, all livestock (cattle, buffalo, sheep and goat) are grazed in local forest lands, village fields etc. throughout the year and no major migration of livestock species is practiced.

Awareness level about scientific livestock feeding practices: Semi-structured interviewing tool was used to measure the awareness level of the 90 livestock owners in 3 blocks of Chamba district. Awareness and adoption level of scientific feeding practices was found to be low. Surprisingly, none of the livestock owner had ever heard or used urea molasses treatment of fodder residue. Out of 3.33% respondents who were aware about mineral mixture feeding, only 2.2% were feeding mineral mixture regularly. None of the household had ever fed Urea Molasses mineral blocks.A high% (77.76) of respondents were aware about chaffed feeding through sickles and out of them 34.30% were chaffing

Table 2. Awareness level about scientific livestock feeding practices:

Scientific feeding practices	Awareness level	Adoption level
Urea treated crop residues	0	0
Mineral mixture feeding	3.33%	2.2%
Feeding of urea molasses mineral block	0	0
Chaffed feeding through sickles	77.76	34.30
Concentrate feeding: pregnant and lactating cows	88.8%	33.33%

(N, 90).

Table 3. Matrix ranking of common health problems in livestock of 3 blocks

	Cattle	Buffalo	Sheep and Goat
Ectoparasites	I	II	I
Anoestrous	II	I	_
Mastitis/teat infections	III	III	-
Endoparasites	IV	V	V
Infectious diseases	V	_	III
Diarrhoea	VI	_	-
Partial anorexia	VII	_	-
Newborn deaths due to diarrhoea	III	IV	-
Repeat Breeding	VIII	_	_
Respiratory problems	-	_	IV
Foot infections	-	-	II

condition. Endo-parasitism was prevalent throughout year. Fasciolae and Strongyles, were the most common parasites of cattle, sheep and goat and are present throughout the year. Reportedly, the parasitic load is higher in monsoon and post monsoon season (July to Oct) in Himachal Pradesh (Agnihotri 2006). Anoestrous and anorexia occurred more frequently during the period Nov to March. This is also the period of seasonal shortage of feed and fodder. Diarrhoea is common problem from May to Aug. Hoof infections in sheep and goats were more common during the period from May to Sept. The exercise on diseases ranking can be complex and data often cannot be taken at face value nevertheless use of ranking exercises in livestock healthcare is at exciting stage of development (Heffernan 1994).

Household medications/Indigenous technical practices used: Livestock owners, in particular migratory *Gaddi* and *Gujjar* tribes of Chamba district are using several indigenous technical practices due to non availability of veterinary services at higher altitudes (Singh and Misri 2004). In the study region the absence of appropriate veterinary aid villagers were found to routinely follow certain household treatments (Table 5).Though the efficacy of such treatments need to be assessed and the medications need further scientific validation.

Table 4. Seasonal analysis of common livestock disorders in three blocks of Chamba district of Himachal Pradesh, India

Livestock disorders	January	February	March	April	May	June	July	August	September	October	November	December
Ectoparasites	-			P	P	P	P	P	P			
Endoparasites	P	P	P	P	P	P	P	P	P	P	P	P
Anoestrous	P	P	P								P	P
Anorexia/off-fed condition	P	P	P								P	P
Diarhoea					P	P	P					
Hoof Infections in sheep and goat						P	P	P	P	P		

P, Predominant; rare occurrence.

fodder by sickles only. Almost 88.8% respondents were aware about concentrate feeding to pregnant and lactating cows and 33.33% were regularly feeding them. Singh (2005) reported highly unbalanced livestock feeding schedule in Chamba district with concentrate feeding restricted to lactating cows and working bullocks only. Further, mineral mixture feeding was fed to animals by only 8% of the farmers .

Livestock Health situation in the region: Matrix ranking exercise was done to identify major health constraints in different livestock species (Table 3). Parasitism is a major diseases constraint of cattle, sheep and goat in Himachal Pradesh as a result of poor livestock housing and hygiene (Jithendaran *et al.* 1998). The incidence of ectoparasites in chamba is as high as 61.17% in cattle and buffaloes and 50% in sheep and goat making it a major disease constraint in the region (Anonymous 2008). Mastitis, anoestrous, high neonatal mortality in cattle are also common as a result of poor nutritional and hygiene factors (Singh 2005), (Jithendaran *et al.* 1998). Infectious diseases in sheep and goats are also common in Himachal Pradesh due to lack of veterinary inputs especially to migratory sheep and goat, grazing at high altitudes (Jithendaran *et al*. 1998).

The data revealed a well-defined seasonal pattern for some of the livestock health constraints. Ecto-parasitism was most severe health problem observed during the months from April to Sept., when temperature is more favourable for this

Problem cause analysis and planned technological interventions: The problem-cause analysis (Table 6) revealed that high incidence of parasitic and infectious diseases is the main cause of lowered productivity. Though the state veterinary institutions are entrusted with the responsibility of vaccination against FMD/PPR/HS/BQ/Enterotoxaemia, yet at the implementation level the practices were quite irregular and unsystematic.This has been a case of vaccination programme throughout India (Chawla *et al.* 2004). Probable reasons were shortage of field staff, field constraints in maintaining the cold chain, difficulty in bringing the animal to the veterinary institution, low level of awareness towards the vaccination and a few prevailing misconceptions. In Bhatiyat block, ash residue of firewood from *chullah* was rubbed over body surface to control of ectoparasites. Deworming was practiced by few farmers and that too irregularly (when made available free of cost in nearby veterinary institution).

Table 5. Household medications used by farmers in the absence of veterinary aid

Livestock ailment	Local medication being used by farmer
Ectoparasitic infestation	Ash from *chullah* is rubbed over body surface of the animal where ectoparasites are seen
Diarhoea in animals	*Ajwaain* (*Apium graveolens*) is mixed with salt and fed to animals 2 to 3 times a day
Minor cuts and bruises	Turmeric and mustard oil is mixed and applied over cuts/bruises
Fractures in sheep, goats and cattle	*Pinus* and *devdar (Cedrus deodara)* tree sheets are tied around affected limbs as support for few weeks
Anorexia, off-feed animals	Black salt is rubbed on mouth to treat off-feed animals
Hoof infections	Animals are made to pass through a pit of 9–12 cm deep, filled water with black salt mixed in it
Other GIT disorders: bloat, constipation, impaction	*Himalayan battisa* an *Ayurvedic* veterinary formulation is fed to animals

Table 6. Identified health constraints, possible causes and adopted strategies

Critical livestock health issues	Possible causes	Proposed technological interventions
Ectoparasites	Climatic factors, poor hygiene	Demonstrations planned for application of ectoparasiticidal drugs on animals when the incidence is high
Endoparasites	Deworming was rarely done	Awareness workshops on deworming and vaccination were organised in which dewormers were also provided strategic manner for mass deworming of animals (Mishra *et al.* 2006). Village experiment groups have been planned to demonstrate the results of deworming by taking treated and untreated animals especially small ruminants (Shen 2010)
Infectious diseases	Vaccination was irregular, unsystematic	Mainly done in the event of diseases outbreaks, healthy flocks were vaccinated.
Anoestrous; long inter-calving period	Malnourishment/under-nourishment	High quality mineral mixture feeding was promoted.UMB feeding is being promoted.Demonstrations on Urea molasses enrichment of straws executed especially in months of fodder scarcity.
Repeat breeding	Not bringing animals on right time for insemination	
Partial anorexia	Due to feed and fodder scarcity	Demonstrations on urea enrichment of local feed residues to enhance nutritive value executed especially in months of fodder scarcity.
Respiratory infections	Poor immunity of animals due to low plane of nutrition	Integrated animal health camps have been planned to treat these ailments
Diarrohea	Infectious causes	
Hoof afflictions in sheep and goats	Infectious causes	
Mastitis/teat infections production practices	Absence of clean milk	Video films on hygienic milk production, Correct milking procedures with distribution of udder hygiene kits in form of potash, teat disinfectants, nail cutters have been given to farmers.
Neonatal mortality due to diarrhoea	Absence of colostrum feeding, poor hygiene	Awareness camps about calf feeding and management have been organised

The study highlights the importance of taking into account diversity of grassroot livestock situation through participatory rural appraisals, before undertaking any livestock development intervention. The local conditions make it imperative to make in depth enquiry jointly by livestock owners, key stakeholders and researchers by sharing common platform and arriving at mutually understood solutions (Mukherjee 1997).This would ensure that livestock interventions raise the production base to a higher and sustainable level.

SUMMARY

Participatory livestock appraisal under Word Bank funded National Agricultural Innovation Project (NAIP) in district Chamba of Himachal Pradesh India, highlights that even in 3 different blocks of this district, different modes of animal husbandry practices are in vague. Livestock feeding through grazing has marked seasonal influence. Summer grazing in

local pasturelands, stall-feeding during winters, seasonal transhumant migration of livestock, grazing in local community lands and forestlands are common ways of feeding, though their predominance varies between 3 blocks. Seasonal shortage of feeding resources was observed, which contributed towards low animal productivity. In general, awareness and adoption of scientific animal feeding and health practices was found to be low. Matrix ranking of animal health constraints depicted rank orders of important diseases. Further analysis revealed that common ailments had well established seasonal patterns. Suitable technological interventions have been planned after participatory appraisal of livestock rearing practices of the region, based on these observations.

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