Goat Husbandry Practices in Mewar Region of the Southern Rajasthan

दक्षिणी राजस्थान के मेवाड़ क्षेत्र में बकरी पालन पद्धतियाँ

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(Animal Production)

By

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1. INTRODUCTION

Association of man and animal is since time immemoriable. Man has used animals for food, clothing and shelter. Livestock sector plays an important role in Indian economy. In India, the employment in livestock sector is approximately 9.8 million in principal status and approximately 8.6 million in subsidiary status. The contribution of animals to food and agricultural production in the world has been estimated to be between 30 and 40 per cent of the total value of food and agricultural production. Of the total buffalo and cattle breeds of the world, around 75 and 20 per cent respectively are available in Asia and 50 and 5 per cent in India. Among small ruminants, 6 per cent of sheep and 17.97 per cent of the goat of the world are available in India. Small ruminants sector plays an important role in the development of rural economy of India. Goats are one of most important source of meat in India accounting for 7.8 per cent of total produce. The demand for goat meat is progressively increasing as Indian consumer prefers goat meat among all other meats (Sen *et al*, 2004)

In Southern Rajasthan tribal population is more and they live on hilly tops of the Arawali and utilize the flaxy on plain area, wherever available between the hills for cultivation of crops and keep normally 3-5 milch animals including cow, buffalo and goat as a part of mixed farming system. The cattle, buffaloes and goats are mostly non-descript type and their upkeep is far from the scientific lines. The daily production from animals is very low as the animals are genetically poor and get nutritionally poor feed both quantitatively and qualitatively and largely dependent upon grazing in hilly terrain.

The contribution of Agriculture sector to the total GDP in 1950 –51 was 50.50 per cent of which the share of animal husbandry was 15.50 per cent; from 1980-81 to 1994-95 period the contribution of Agriculture sector fell from 46.4 to 36.8 per cent, while the contribution of Animal Husbandry as per cent of Agriculture went up from 18.63 in 1980-81 to 26.4 per cent in 1994-95. The contribution of livestock and Fisheries sector to the Agriculture sector during 2001-02 was 28.3 per cent of the value of the out put. The contribution of this sector to the total GDP was 7.35 per cent. India's exports earning from livestock sector rise from Rs. 691.22 crores in 1987-88 to Rs. 42255.9 crores in 2002-03, which speaks about potential of Animal Husbandry sector to boost national economy. Among livestock species, goat was the earliest ruminant to be

domesticated by man in around 6700 BC. Goat (*Capra hircus*) rearing is the backbone of economy of small and landless farmers in arid and semi-arid region and plays a significant role in the livelihood and provide nutritional security (Kumar *et al*, 2001). Goats in India are important and play a crucial role in meat market by contributing 36 per cent of the total meat produced in the country (Khan and Singh, 1995). Goats contribute more than 52 per cent of households total income towards nutrition and food security of the family of goat keepers (Kumar *et al*, 2003). Goat enterprise is well suited to weaker sections of rural household with small land or community based feed resources utilization in western Rajasthan (Rohilla and Chand, 2004). Goats have substantial share in Indian as well as Asian meat industry supplementing to the demand of food from the huge population and also contributing in the milk production to a limited extent. Goats have served the mankind earlier and longer than cattle and sheep. They are often termed as the poor man's cow. Goats have advantages over other animals and widely adopted. Goats thrive well and reproduce in tropical, cold, humid as well as dry regions. Goats can consume a wide variety of grasses, weeds, leaves and small branches of bushes and trees and crop residues that would otherwise go waste and cause pollution. They are gentle and easy to control and require less space to maintain as compare to cattle and buffalo. The goats can be milked any time of the day and are therefore named as the moving refrigerators. Goats milk is good for children, old and sick persons as it is easily digestible and has medicinal value. Chevon (Goat meat) is preferred over other meat because it is leaner and there is no religious taboo against its consumption (Singh, 2004). Goat is considered to be one of the hardiest animals. India is endowed with the largest livestock wealth in the world particularly small ruminants. Goats are considered to be the wealth of the poor and hence their role is immense in poverty alleviation, income and employment generation.

They serve in every, possible way by producing milk, meat, skin, mohair and manure. It is an insurance against crop failure and weather aberration and provides alternate source of income to the farmers round the year. Goats are capable of with standing almost all types of climates and topography, existing in our country (Kumar *et al*, 2001). Goat farming is also gaining importance due to the sub division and fragmentation of land holdings on one hand and surplus family labour on the other. Recognizing the importance of small ruminants in shaping the rural economy and their contribution to the national income both central and state Government are devoting considerable attention for its development.

Even though this tribal belt is rich in total animal strength yet the progress of animal husbandry does not seem to be satisfactory. Adverse climatic conditions, poor management,

inadequate marketing facilities and poor genetic material are fundamental constraints faced by the people, in this area..

India has 20 well-defined breeds and several other strains of goats. Sirohi goat is the most preferred goat breed over other breeds of Rajasthan (Marwari and Jhakhrana). World's current goat population is around 767.9 million. Asian region has the highest and over 63.20 per cent of the world population of goats. India possessing 124.50 million (17.97%) of the world goat population and ranks second (Singh, 2004) after China. In Rajasthan 16.80 million goat which is 13.59 per cent of Indian goat population and 34 percent of total livestock population. Udaipur, Rajasamand, Chittorgarh and Bhilwara districts of Mewar region of the Southern Rajasthan have, 1.164, 0.499, 0.637 and 0.740 million goats, respectively (Livestock census, 2003). The goat population has increased in Asian and African regions while it decreased in America, Europe and Russia during the last three decades. The overall world growth rate, however, has been almost uniform during the last 25 years. The growth rate in India varied from 0.94 to 5.13 per cent with an over all average of 3.10 per cent during 1951-2003. This increase in goat population is higher than other livestock species, indicating their economic importance and adaptation to ecologies where they are pre dominant. The Asian region contributed 52.98 per cent of the milk, 72.50% of the meat and 78.35 % of the fresh skins of the world production of goats. India produced 21.53 per cent of the milk, 11.86 per cent of the meat and 14.78 per cent of the fresh skins of the world and 40.63 per cent of the milk, 16.36 per cent of the meat and 18.87 per cent of the fresh skins of the Asian goat production (FAO, 2002). Around 89 per cent of the goats in the world are reared primarily for meat. In India about 41 per cent of the total population of goats is slaughtered for meat every year. The per capita annual availability of Chevon in India was 505 gm. Goats contributed 2.12 per cent of the total meat and 1.60 per cent of the total milk production in the world. Thus Asian region among the world and India among the Asian countries contributed highest quantities of all the important goat products. Goat acts as regenerator of vegetation through dispersal of seeds in its droppings and vegetative propagation through browsing. Goats also help in dispersal of grass, bush and tree seeds. It is easier to increase the population of goats than cattle and buffaloes because the capital investment is relatively low, and requirements per animals are small, reproductive rates are higher both due to shorter breeding interval and high prolificacy and they can be managed by spare family labour and do not require any extraordinary housing facilities and management skills. There is much less risk in goat farming in drought prone areas where large mortality occurs due to frequent droughts.

Looking to the importance of goats the present study has been undertaken to analyse the current status of goat husbandry and investigate the prevailing and traditional management practices followed by the goat rearers of Udaipur, Rajsamand, Chittorgarh and Bhilwara districts with following specific objectives.

1. To acquire information on the prevalent goat management practices in the study area.

2. To determine the role of human resources in goat rearing.

3. To study the effect of flock size on management practices.

4. To identify the constraints being perceived by the respondents in adoption of improved goat husbandry practices.

5. To suggest suitable goat rearing practices.

2. REVIEW OF LITERATURE

2.1 PREVALENT GOAT MANAGEMENT PRACTICES

2.1.1 Family Status

The information available on goat husbandry practices in farmers flock is limited in the literature. The literature available on the goat husbandry practices is reviewed below.

Kumar *et al.* (1985) studied the economic feasibility of small, medium and large goat unit and revealed that goat rearing was a economic proposition particularly for the rural poor and land less labourers under the existing socio economic conditions of the area.

Ahuja and Rathore (1987) observed that families keeping more goats had a lower social ranking while those keeping larger herds of cattle and buffaloes have higher status. Large flocks of goats are owned by small landholders or landless families.

Verma and Prasar (1991) reported that the goat owner can repay all the debt within 5 years and rate of profit from 6th year onwards will be Rs. 572.75/ doe/year.

Deoghare *et al.* (1992) conducted a study in Farah block of Mathura district in Uttar Pradesh and revealed that the overall average size of land holdings was 5.34 acres. The overall average goat holding was 4.46 goats. He also reported that gross income per goat was Rs. 776.00 in marginal farms, Rs. 753.44 in medium farms Rs. 703.99 in large farms and Rs. 682.23 in small farms. The average gross income per household per goat was Rs. 735.20. The net return expenditure was highest in goat farming as compared to other livestock and crop farming system. The goats were more economical than sheep. The relative economics of 1 buffalo Vs 5 goats unit in Rajasthan was also studied and it was observed that the profit per annum was Rs. 1945 from goat unit and Rs. 1775 from buffalo unit (Pasha 1990). Goats in desert kept under range conditions are 40 to 160% more economical than sheep and that an indigenous goat may provide Rs. 250 per year to a small farmer besides 2 quintal of manure and benefits of clearing obnoxious weeds and thorny bushes (Gosh and Khan 1980).

Oberor *et al.* (1992) studied that goat rearing was found to be more remunerative than sheep rearing and it was recommended for tribal sephereds to divert resources in goat rearing.

Pawar and Thambe (1994) observed that the goat industry which was consisted with 11-12 invested goat gave maximum gross profit of Rs. 12149 and net profit of Rs. 1692 during the crop period of 230 days, i.e. 124 days of lactation period and 106 days of dry period.

Singh *et al.*, (1995) conducted a study on 150 households of Mathura districts (U.P.) and reported that the share of capital investment in a goat enterprise was 70.34 per cent on goats. 17.31 per cent on housing and 4.35 % on tools and equipment's. Capital investment per goat was lowest (Rs. 753.64) in large sized flocks and highest (885.98) in small sized flocks. Variable and fixed costs were in the ratio of 71:29. Labour accounted for 37.19% and feeds and fodder 32.67% of the total expenditure. Income from milk, sale of surplus animals including added value of stock acceleration and sale of manure accounted for 56.88, 41.05% and 2.07% respectively. A net income of Rs. 253.67, 423.42 and 237.81 was availed per annum per goat by small, medium and large flock keepers, respectively.

Deoghare (1997) conducted a study on the goat keeping households in the Jamunapari goat breeding tract of Chakarnagar block of Etawah district in Utter Pradesh. The study revealed that the total cost of meat production was highest on 9 to 12 months age (Rs 332.41), followed by 6 to 9 months age (Rs 243.58) and low cost of meat production was observed upto 6 months age (Rs. 180.82). Taking cost (cash cost and depreciation) in to account, the average cost of production per kg of meat was highest (Rs 3.92) on up to 6 months age followed by Rs. 3.07 and 3.09 up to 6 to 9 months age and 12 months age, respectively. The cost of production per Kg of meat over cost where all the input was taken into consideration, upto 6 months age was Rs 30.54 while upto 6 to 9 months and 9 to 12 months age it was Rs. 27.49 and Rs. 29.23, respectively.

Saadullah *et al.* (1997) studied goat production system in Bangladesh and concluded that goat rearing is an appropriate intervention in a capital scarce situation and it can contribute to household income significantly.

Deoghare and Khan (1998) calculated that the annual cost of rearing a Barbari goat on small sized flock was Rs. 90.15 whereas on medium and large sized flocks, it was Rs. 79.77 and Rs. 77.31, respectively. The net annual income per goat was highest on small sized flocks as compared to medium and large sized flocks. Net return per rupee was Rs. 0.31.

Sagar *et al.*,(1998) concluded that the landless, marginal, small, medium and large categories of goat farmers significantly differ in some characteristics, relevant to goat husbandry.

which the goat extension workers should keep in their mind while formulating and implementing the programmes for goat improvement.

Pandey *et al.*, (1999), studied that average capital investment per goat by the tribal and non-tribal goat owners was Rs. 404 and Rs. 518, respectively. Income from sale of animals was higher than income from milk. Cost of labour was most important component. Little expenditure was made on feeding, as the goats were mainly kept on grazing. Non-tribals were spending more money and getting gross income of Rs. 430 per goat as compared to the tribal (Rs. 266). Profit margin was 2 to 3 folds when family labour cost was not taken into account.

Goetsch *et al.*, (2000) concluded that group pens and forage access may not enhance average daily gain (ADG) of artificially reared goat kids by promoting early dry feed consumption restricted feeding regimens can yield pre-weaning and early post-weaning ADG comparable to adlibitum milk intake.

Jangam *et al.*, (2001) conducted a study on 483 goat rearing households belonging to landless (63.56%) marginal (12.42%), small (13.26%), medium (9.31%) and large (1.44%) categories from 60 village spread over four districts of Vidarbha region. The average family size was 5.08. Out of 483 households 39.54 to 41.20 per cent goat keepers reared goats in medium (6-10) to large (>10) flock size while rest of the households maintained goats in small (1-5) flock size. About 58.17 per cent family members of the survey farmers were literate.

Kumar *et al.*, (2001) reported that a total of 30.23 per cent of households were primarily engaged in animal husbandry (AH) as well as agriculture profession. The land holding size of 72.09 per cent goat keepers ranged from one to twenty hectares while 27.91 per cent households were landless. Literacy rate was 16.66, 40.91 and 45.32 per cent among women, men and children, respectively. The income for 45.32 per cent goat breeders was less than Rs. 10,000 for 41.51 per cent ranging from 11000 to 20000 and for 13.21 per cent belonged to income group of more than Rs. 20,000 per annum. They concluded that 86.79 per cent goat breeders still live below the poverty line and need much attention to improve their economic status.

Gokhale *et al.*, (2002) reported that literacy rate among the goat rearing families was 59%. Amongst the literate 39% were educated up to primary education level, while 20% were educated up to high school.

Joshi (2002) studied the average family size in rural areas was low at 6.8 in comparison to 8.42 in urban areas indicating farmers in urban areas living in join family while in rural area residing in nuclear family at tribal belt of Southern Rajasthan.

Selvam and Safiullah (2002) concluded that rearing of small ruminants is the back bone of small and landless farmers in Tamilnadu. They accommodates about 8 per cent population of small ruminants in the country. Small ruminants like sheep and goats are a special class of herbivores and occupy a unique place in farming system of areas with limited land and water resources.

Singh (2002) observed that goat rearing is a supplementary income generating venture. It is a low risk activity for the poor tribal people. It contributed significant share in providing employment and income to all categories of tribal house holds in general and poor tribal people in particular. The study further indicated that goat rearing was fully adopted in tribal culture irrespective of economic status of tribal farmers.

Kumar and Deoghare (2003) studied the goat production system adopted by landless households in south-west semi-arid region of Uttar Pradesh and reported that the rural landless people working as agricultural labours have adopted goat rearing as their subsidiary or main enterprise. Goat and sheep were observed to be the most appropriate livestock for these landless rural poor, as only 7 per cent of them were illiterate keeping buffalo and cattle. All the goat farmers were illiterate except 4.4 per cent farmers whose main occupation was service or trading. The goat rearing enterprise was given first priority by 39 per cent of the farmer where as 54 per cent farmers choosed goat rearing as second, in priority of enterprises.

Lawar (2003) observed that out of 938 Sangamneri goat owners surveyed maximum goat keepers were from the Hindu (93.67%) community followed by Muslim (5.87%) and Christian (0.46%).

Pathodiya (2003) observed that majority of goat keepers (60.77%) followed Agriculture and Animal Husbandry as the primary profession while 10.98% of surveyed population depends only on Animal Husbandry. The OBC people were maintaining 50.58 per cent of the goat surveyed followed by ST groups. While only 7.09 per cent were maintained by farmers of General caste.

Shinde *et al.*, (2003) conducted a study to analyze the economics returns to the farmers from goat rearing in Rajasthan and reported that in initiation of goat rearing venture, cost of

animals constituted 80.64 per cent, housing 15.49 per cent and tool, equipment 3.87 per cent of total investment involved. The depreciation on fixed cost as sheds, equipments and interest on seed money contributed 11.21, 2.79 and 85.97 per cent, respectively. The variable costs on labour, feed and fodder, prophylaxis and treatment constituted 56.17, 37.58 and 6.22%, respectively. Total expenditure, which included fixed and variable cost/ goat/ year was Rs. 683.45%. The income from sale of milk, surplus animals and manure constituted 50.64, 39.42and 9.92% of the total receipts respectively. The gross income/ goat/ year was Rs. 911.30 and net income/goat/ year was Rs. 227.85. They concluded that goat rearing is reasonably remunerative providing Rs. 1.34 against every rupee invested.

Mishra *et al.*, (2004) worked out the economics of goat farming in Satna district of Madhya Pradesh and reported that the major source of income from goat rearing was through sale of milk and male kids. The overall gross income from goat rearing was Rs. 3058.40 for a flock size of 13.77 goats per house hold and annual gross income per goat per household was Rs. 222.15. The overall mean of income through sale of goat or kid was Rs. 1232.55, which constituted about 40.30% of total income (gross return). The income from sale of manure constituted about 8.37% of total income. It was observed that the gross income per house hold per year was highest (Rs. 3516.11) for marginal farmer category, followed by small (Rs. 3076), landless (Rs. 2966.35) and medium (Rs. 2674.61) farmer's category. They also reported that the net return per rupee of expenditure was highest in landless and marginal farmers (1:1.55) categories and lowest in medium farmers (1:1.37) categories.

Pathodiya *et al.*, (2004) reported that the main occupation of the farmers of native tract of Sirohi goat is Agriculture + Animal Husbandry in Southern part of Rajasthan. The overall literacy was observed as 25, 6 and 46 per cent in men, women and children's, respectively. The goat keepers prefer to live in nuclear family with little variation with caste. Majority of the farmers had thatched house. Further 51 per cent goat keepers had 1-5 bighas land while 9.35 per cent goat keepers were landless.

Rai and Singh (2004) reported in their study of rearing practices of Jhakharana goat in farmer's flock in Rajasthan that goats are primarily reared by small and marginal farmers of lower educational status. Major communities engaged in goat rearing are Yadav, Burva, Jatav and Kumhar.

Deshpande (2005) observed that literacy percentage was 39.00 in men. However majority of goat keepers were illiterate. The source of drinking water is well and pond in the village.

Kumar and Sagar (2005) conducted a study on 262 goat keeping households of south western, semi arid zone of U. P. and eastern semi arid zone of Rajasthan. The initial investment on goat enterprises is the traditional activity and a way of life for most farmers. Goat rearing was adopted as a subsidiary or main enterprise to utilize the family labour, goat keepers earned a net annual income of Rs. 1302 to 1873 per goat in different categories. The goat rearing was a major source of employment for women, especially in the small size category.

Raghavan (2005) observed that majority of farmers (66.0%) listen to radio/T.V. programmes and equal number of than access to training classes and almost all of than are interested to learn more if classes are arranged.

Sharma (2005) reported in his study that literacy rate was 40.00 per cent and among the educated farmers, majority (35.00%) had education up to the primary level. It was evident from the results that the majority of the farmers fall in the middle age group followed by old and young age group with per cent distribution of 48, 38 and 14, respectively. Information collected on occupations of goat keepers at different location revealed that majority of goat keepers (66.00%) followed Agriculture + Animal Husbandry and 17 per cent on Agriculture. It is evident from the results that other backward caste category farmers (57.00%) are more interested towards goat keeping followed by SC and ST caste farmers. The average land holding of the goat rearers surveyed was 7.39±0.94 biggas (1.18±0.94 ha). The average irrigated, unirrigated and pasture land of surveyed goat keepers of different location were 3.46±0.56, 4.22±0.58 and 2.12±1.29 biggas, respectively. The overall average goat holding of surveyed goat keepers was 22.96±2.24 goats per goat keepers.

Tailor *et al.* (2005) observed that all the respondents surveyed belonged to Hindu religion. Majority (80.00 %) of shepherd belonged to OBC followed by ST (7.78 %), SC (7.78%) and general caste (4.44%). Out of 450 families surveyed 254 (56.44%) were nuclear and 196 (43.56%) were joint families. All the sheep breeders under survey had both animal husbandry and agriculture as main occupation. The overall average total land holding per family of housed surveyed was 4.57 acres. The overall literacy rate in adult men (26.32%).

2.2 ROLE OF HUMAN RESOURCES IN GOAT REARING

Safilios-Roths child (1983) reported in male, a survey of 5 villages among the marka, peuth Rimaibe and curge ethnic groups showed that goats and sheep were mostly owned by women either through inheritance from their mothers or through purchase with income from selling of agricultural produce. Ownership represents prestige and security to the women in case of divorce or season emigration of husband, and allows them to meet family and social obligations.

Wahyuni *et al.*, (1983) conducted socio-economic surveys in Indonesia and indicated that the women's share of involvement in rearing small ruminants increased with increasing number of animals reared. Additionally, literate women were more involved in the physical activities of management than in decision making probably because of their perception for the animals needs. Illiterate women by comparison, involved their husbands in all activities

Deoghare *et al.*, (1992) studied the pattern of man-power investment in the Farah block of Mathura district. The involvement of family labour (Male, female and children) was highest on large farms (53.95 days), followed by medium farms (52.01 days), marginal farms (45.18 days) and small farms (38.06 days). This clearly indicated that the investment of labour increased with the increase in number of goats. The involvement of female labour was maximum in all categories of farms. Further, they revealed that livestock enterprise plays a very important role in providing gain full employment to the farmer's families, including women and children in the rural area.

Rangnekar and Rangnekar (1992) conducted a study to understand the role of women and children in the traditional goat production systems in Gujarat and Rajasthan. It was revealed that milking is the responsibility of women. Grazing was done mostly by men and to some extent shared by children. However, in tribal communities and lower castes, women used to graze the animals. Bringing fodder, for supplementary feeding at home, is shared by children. Care of young kids was invariably the responsibility of women and the girls. Decisions regarding milk disposal were taken by women and those regarding breeding, by men, irrespective of area. More than 80 per cent women from pastoralists, tribal and lower castes communities involved in the study were illiterate.

Singh (1996) conducted a study of possibilities and prospects of employment in goat rearing. He reported 123.28 days employment in large flocks followed by medium (83.30 days) and small (39.24 days). Total value of family labour was estimated Rs. 848.35.

Kumar and Deoghare (2001) studied the economics of contratual arrangement in goat rearing, prevailing in Mathura district of U.P. and reported that women and children were low consistently involved in a variety of activities concerning the management of goats. Children and women contributed 50.55 per cent share of total labour requirement, which otherwise has negligible opportunity cost.Employment generation through goat production was observed as 167.96 man days/annum for male, 78.33 man days/ annum for females and 95.41 man days/ annum for children.

Raghavan, (2002) observed that females are generally engaged in sale of milk, manure and animals and concluded major participation of women in goat farming instead of male members in Kerala State.

Samanta (2002) reported that women plays a major role in goat rearing in West Bengal and observed women's dominance in 90% flock for goat management practices. The role of children was 20 per cent in the form of grazing and kid rearing. The breeding management was performed by male members and female provides help in kidding of does.

Chaudhary and Barhat (2003) conducted a survey under All India Co-ordinated Research Project (AICRP) Bikaner unit and revealed that women were associated in grazing, cleaning and feeding operations in small flocks having less than 20 goats. In milking, sale of milk, sell of goats, the role of women declined proportionality with the increase in flock size. It was found that women had no role in breeding operations in all size of flocks due to cultural taboo.

Kumar and Deoghare (2003) assessed the goat production system adopted by landless households in south-western semi-arid regoin of Uttar Pradesh. They revealed that goat rearing was a major source of income for women of the household. This enterprise was under the control of women in more than 50 per cent household. The decision and control over the return from goat rearing, were also in the hands of women in these families.

Kumar *et al.*, (2003) reported that majority of the goat unit in small (54.0%) and medium (50.0%) categories were completely under that control of women of the family. The most earnings from goat rearing in these households went to women.

Pathodiya (2003) observed that women involved in cleaning, feeding, milking, care of young stock, care of sick animals, grazing, sale of milk and sale of animals, 91.32, 87.48, 51.42, 47 91, 28.38, 20.70 and 6.51 per cent, respectively. The man are mainly involved for sale of animals, sale of milk, grazing, care of sick animal, care of young stock, milking, feeding and cleaning 91.82, 76.46, 50.75, 35.73, 34.05, 11.52, 9.85 and 6.34 per cent, respectively. The children are also mainly involved in the grazing of animals and help to care and sick animals in surveyed area of Southern Rajasthan.

Marketing

Bhardwaj, and Chauhan (2004) found in their study on role of women in buffalo dairy farming in Bahadurgarh district of Haryana that majority of the women had knowledge about ecto-parasites (80%) of animals. Women were found to possess practical knowledge about common diseases of animals (86%) and shed management (94%) in the majority of cases.

Chaudhary *et al.*, (2004) reported that women's role in livestock keeping is an old age tradition and plays a major role in rearing animals and women carry out most of the work of livestock management, however, the development, extension and training programme are generally not for involvement of women but for extending the benefits to them. Role of women in livestock rearing mostly concentrate on management, feeding practices, watering, cleaning and milking of dairy animals. The livestock management are always traditional responsibility of women.

Gurjar and Pathodiya (2004) reported that women are mainly involved in cleaning (91.32%), feeding (87.48%), milking (86.48%), care of young stock (51.42%), care of sick animals (48.0%), grazing (28.30%), sale of milk (20.70%) and sale of animals (6.5%).

Raghavan *et al.*, (2004) observed that the general practice is to use the female animals for milk and to sale the males for slaughter at the age of 8 to12 months in Malabari goats at Thrissur, Kerala.

2.3 FLOCKS SIZE AND ITS EFFECT ON MANAGEMENT PRACTICES

Singh and Ram (1987), found that small (5-9 goats) and medium size flocks (Above 16 goats) in the goats breeding areas of Punjab. The capital investment on an average size of flock in hilly region was Rs. 8353 and in plains it was Rs. 10513. Taking cost (cash and depreciation) in to account a goat keeper could earn Rs. 250 per month from a small size flock was Rs. 800,

respectively. Geneteby (1991) reported that farmers prefer medium flocks size restricted to 6 goats.

Wani *et al.*, (1993) revealed that majority of farmers (43.9%) own goats in number ranging between 11-20. The highest percentage of farmers (24.6%) had flock size below 10 goats and they followed stall-feeding. The percentage of farmers maintaining more than 21 goats were comparatively less and the flocks were maintained on sole or partial grazing system. They reported in their survey of 57 goat keepers regarding reproductive performance of Sanganeri, higher economic returns under proper environment condition.

Gefu *et al.*, (1994) indicated that mean flock size per household was 2.4 and 6.2 for sheep and goats, respectively. Approximately 22 % of households kept only sheep and 62 % only goats. Roy (2001) found that farmers preferred to keep small flock, limited to 1 to 16 adult females due to limited feeding resources.

Kumar *et al.*, (2001) conducted a survey which covered 179 goat keeping household and observed that 50 per cent households possessed less than 10 goats while 37.63 per cent households possessed 50 goats each.

Samanta (2002) found in a study of Black Bengal goats under field (Annual Report 2001-02) it was found that majority of the goat farmers reared a flock size of 1 to 4 goats (56%), of course, quite a good number of farmers maintained the flock having 5 to 8 goats (33 %). However, a flock size of more than 8 goats were very few (11%).

Gokhale *et al.*, (2002) revealed in survey of 421 rural families of Maharashtra State that the average holding of the goat keeper was 5.67±0.41 that constituted 2.17% of his livestock holding while small ruminants were 22%.

Pathodiya (2003) in a survey indicated that 81% farmers having less then 15 goats and 50.58% of goats surveyed maintained by the other backward communities (OBC).

2.3.1 Housing Practices

Rangnekar *et al.*, (1992) reported that goats are not provided any special housing. Farmers tie them in cattle sheds while tribal families keep them in house itself or under a tree. The agro-pastoralists or pastoralists who keep bigger flocks, house the animals in compound made with thorny bushes.

Tanwer (1994) reported in his study that during summer loose housing system is prevalent and in winter season, goats are housed in Kaccha house, usually no flooring material is used in the goat sheds. Manger was not provided in the sheds. Further due to lack of proper drainage system, urine keep on accumulating on the floor leading to unsanitary conditions. In majority of the cases all categories of animals were housed all together. Roy (2001) reported that goats were housed in covered accommodation with biological fencing.

Gokhale *et al.* (2002) reported that most of goat keepers (46.9%) housed their animals in special thatch shelter followed by 35.86 per cent in thorny compound. While 14.48 per cent goat keepers used their own residence. Only 9.2 per cent goat keepers constructed permanent cement houses for their goats.

Samanta (2002) concluded that the majority of farmers (82.63%) used to house their goats in kaccha house and that of 3.6 per cent in brick walled house. Further, more than 90 per cent farmers kept the goats, with in their own residential house and only 9.5 per cent farmers had separate housing facility for their goats.

Swami, (2002) reported in a survey on 93 families, keeping Marwari goats that most of the goat keeper (93.54%) kept their animals in open and thatched houses. Only 4.30 per cent farmers kept their goats in pucca houses and remaining farmers use the combination of the two, to house their goats.

Kumar and Deoghare (2003) reported that 46 per cent goat keepers did not have any structure to house their goats. Ten per cent of goat keepers had covered goat sheds inside their home and another 8 per cent used open sheds having fencing in their family houses. Only 27 per cent goat keepers constructed separate covered goat sheds. The walls of goat sheds were mostly made up of mud and the roof was made up of thatch. The contribution of CPRs other than grazing in terms of wood for goat shed, house construction and grass and tree leaves was estimated to be 106, 482 and 557 on small, medium and large categories, respectively.

Pathodiya (2003) concluded that farmers kept their animals almost equally in both open and close houses. The roofing and flooring material is usually Kaccha type. Some of farmers who had less than 20 goats are having mangers for feeding their animals. The survey also shows that goat keeper kept their animal in ventilated house with full boundary wall attached to residential house, while only 3.17 per cent goat keepers kept separate from their residential house.

Rai and Singh (2004) revealed that housing for goats was provided by most of farmers, eighty per cent goat houses were primarily made up of stone enclosures with thatched roof and Kaccha floor. Floor space, ventilation and sanitation of goat houses were proper. Nearly 12 per cent farmers kept goats along with other domestic animals in their own houses. Keeping the animals in the own house is not a good practices with respect to health and hygiene.

Sharma (2005) revealed that survey results indicate that maximum goat rearers (82.00%) house their animals attached to their own residential house. It was also observed that 66.00 per cent of goat rearers have open and Kaccha flooring type house while only 10.00 per cent goat rearers have closed house with Pucca floor for their goats. The survey shows that 85.00 per cent goat keepers kept their animal in ventilated house. Sixty four per cent goat keepers housed their kids in separate house while 30.00 per cent goat keepers have separate house for male and females. Only 38.00 per cent goat rearers isolated their kid and 74.00 per cent goat rearers provides separate house for breeding buck.

Singh *et al.*, (2005) reported that the Mehsana goats are mostly maintained on zero input under extensive production system. The farmers adopted both, open (49.01%), and closed (11.68%) type of housing. The goats were housed mostly in the night (56.98%) and kept loose (78.75%) with adults and male kids (51.52%). The majority goat house were part of residence (52.43%). The floor and walls were usually kaccha type without drainage system for urine and faeces.

2.3.2 Feeding Practices

Singh (1973) emphasized that well managed goat rearing enterprise was bound to be remunerative. He stressed the need for proper management of goat like hand feeding when there is acute shortage of grazing is felt.

Mittal and Ghosh (1980) observed that goat is hardy and tolerant animal which feeds on shrubs and has a wide ecological distribution because of its feeding habits. It is highly productive due to twining and short kidding interval. They observed that goat was at least 119 and 135 per cent more economical than sheep and cattle, respectively.

Intodia (1988) reported that all the goats possessed by the tribal respondents were non-descript with very poor milk yield. The feeding of concentrate to the milking goats was reported to be either nil or in small quantities in the early stage of lactation.

Bharava (1989) reported that in many parts of Rajasthan transhumance production is still practiced and there is synergistic interaction between goat keepers and farmers. The migration routes are well established and during migration the goats are herded on the harvest fields of farmers for a couple of days and allowed to eat crop residues while enriching the field with animal excrete.

Huq *et al.*, (1990) categorized the managemental practices as good, average and poor and found that 55% of farmers followed average management practices and 45% farmers followed poor management practices in respect of housing, feeding and availability of drinking water to their goats.

Nagpal *et al.*, (1990) reported that growth of animals was fastest in semi-intensive systems of goat management as compared to intensive system. He also compared the growth rate in different breeds and found higher rate of growth in Marwari goats.

Kaul (1991) studied goat rearing practices in the Semiarid farming system of Mathura region with regard to goat feeding and observed that the farmers depend mostly on tree leaves which contain sufficient quantity of proteins. There were no signs of mal nutrition among the village goats and they seem to be quite healthy. He found that fodder trees and goats are interlinked.

Rangrekar *et al.*, (1992) conducted field studies to understand the goat production system and farmers perceptions in 3 districts each, in Rajasthan and Gujarat states. They found that all the goat keepers grazed their animals on common property resources like grass lands, forest and road side grasses. However, 20-30 per cent of the goat keepers in Rajasthan and more than 40 per cent in Gujarat used to provide supplementary feeds particularly for lactating goats. The grazing time varies with the region, community and season ranging from 4 hrs to 9 hrs per day. Socio-economically backward families practice 100 per cent grazing with no supplementary feed.

Kushwaha *et al.*, (1999) reported that farmers generally graze their animals in 'Tal' i.e. common pasture, which is near to their village. These 'Tals' were generally at a distance of 1-3 km from the village. Farmers were grazing their flocks for 10-12 hrs in summer and 8-10 hrs in winter. Sheep are maintained mainly on grazing in this region. Supplementary diet was offered to the advanced pregnant ewes, lambed ewes and lambs. Breeding rams were provided concentrate throughout the year. Supplementation was also offered during adverse climatic conditions. The

amount of concentrate varied from 100 – 500 gm depending upon the economic status of the farmer. The period of supplementation varies from 15 days to whole year.

Kulkarni *et al.*, (2000) reported that stall feeding in sheep and goats is also becoming popular due to the paucity of grazing land.

Kumar et al (2001) observed that the extensive management system is used in all households of Marwari goats in arid zone of Rajasthan. Farm women and children used to go for grazing of small flock where as people engage labour for grazing of large flocks. The supplementary feed is given to only milking does. The trees are purchased for pruning and post harvesting crop residues are most effectively utilized by migrating flocks.

Gokhale *et al.*, (2002) found that nearly 69.12 per cent of the goat rearers lop the trees for feeding. Trees which grazing about 82.89 per cent offer at the time of grazing at stream, well or ponds. He observed that nearly 6 per cent of goat rearers spent 1 hour or less time of the day for management of their does, 11.16 per cent spent between 2 to 4 hr, 15-20 per cent 4 to 6 hr while majority of goat rearers (66.27%) spent 6 to 8 hrs or more time with their goats. Thus more than three fourth of the goat rearers enjoy the goat keeping as full time occupation.

Raghavan (2002) conducted a survey on Malabari goat keepers and reported that grazing was done either on own land or on the land of neighbours. Mineral supplementation was practiced only by 0.81 per cent farmers. Farmers used to spare less than 2 hours on goat rearing practices.

Rao (2002) conducted a survey in Ganjam district of Orissa and reported that goats were almost raised under zero input system. Supplementary feeding was not in practice except in few cases where the lactating does were provided with kitchen waste.

Samanta (2002) in his survey work reported that 100 per cent goats were reared through grazing in Kolkatta district of West Bengal.

Swami (2002) concluded that the system of management is mostly extensive with 95.69 per cent flocks. While, only 4.31 per cent flocks were under intensive system of management in Bikaner district of Rajasthan.

Kumar and Deoghare (2003) concluded that the goats were mostly dependent on common grazing resources for their feeding. The goats were grazed for 3 hrs to more than 6 hrs/per day.

The goats were also provided supplementary feeding to some extent especially in the scarcity period.

Pathodiya (2003) reported that very few goat keepers had their own land while 97.16 per cent goat keepers used community land for grazing in the surveyed area. The survey indicate that most of the farmers used unchaffed green and dry fodder with separate unsoaked concentrate in semi stall feeding practices Rao (2003) reported that farmers of Ganjam district in Orissa do not provide concentrate to their goats.

Rai and Singh (2004) concluded that goats are raised mainly under three system of management i.e. extensive, semi intensive and stall feeding systems. In extensive system goat were by and large raised on browsing of shrubs and forest leaves. Fifty six per cent of farmers with their large size flocks usually practice this system of management in which goats are allowed to grazed for 6-8 hrs and no concentrate feeding was provided. In semi intensive system of management 0.5 to 1 kg barley/bajra gruel was offered to high producing does along with 4-5 hrs grazing. This system was followed by nearly 37 per cent goat keepers. Remaining 7 per cent goat keeper reared goats under stall feeding in which goats were provided concentrate. Goats were also provided kitchen waste along with dry and green fodder. Lopping of trees was a routine practice of grazers in this area for all kinds of feeding management.

Sharma (2005) observed in his study that majority of goat rearers (83.00%) not adopted pala making of leaves for goat during scarcity of fodder. It was observed that 67.00 per cent goat rearers did not fence their pasture land by using biomass and stone wall. Lopping of tree was a routine practice of grazing in the study area. 29.00 per cent goat rearers on overall basis fed green fodder, 13.00 per cent dry fodder and 46.00 per cent concentrate to their goats. It was also observed that 85.00 per cent goat rearers did not fed mineral mixture to their goats and kids. However, a few goat rearers fed the mineral mixture to goats and kids.

Singh *et al.*, (2005) conducted a survey in the home tract of Zalabadi goats of Gujarat to assess the feeding system. He reported that the goats were exclusively maintained under range grazing (8-10 hrs) without any supplementary feeding. The goat keepers were forced to walk 8-15 km in search of adequate grazing material. The small ruminants were solely dependent upon uncultivated fodder, crop residues, grasses and shrubs. The common biomass available in barren land in the form of grasses, bushes, herbs, shrubs and trees were Ber, Khejari, Babul, Ardu, Zepti and Zingvo. However, the bucks were provided cakes and groundnut oil during breeding season due to their excessive use for breeding purpose as ratio of buck to doe's was 1:80. Range grazing condition to meet out the basic requirement of small ruminant is poor in this area.

2.3.3 Breeding Practices

Handa and Gill (1986) investigated the management practices adopted by different categories of farmers in Ludhiana district. The study revealed that bellowing as a source of heat detection was followed in buffaloes (59.00%) and cows (43.18%), respectively. Geneteby (1991) reported average age of first kidding as 14 months and June month was the peak-kidding season.

Krishnamurtty *et al.*, (1992) reported that out of 88 farmers interviewed in Ajmer district, nearly all the respondents considered colour as important criteria for good breeding buck there was no agreement about colour. Good length and height were mentioned by 22 farmers good milk traits of the dam by 6 and 20 mentioned folded ears.

Tanwer (1994) concluded that the goat owners of tribal area were aware only about few symptoms for detection of heat. Most of the goat owners relie on bleating as a symptom of heat in the goats. Majority of the goat owners did not possess their own breeding buck. He also found that all animals come in heat-during the month of June- July. He further reported that goat owners of the tribal area do not take any extra care of pregnant animals. Majority of goat owners did not castrate their male kids.

Kale and Tomar (1999) reported the least squares means for various reproduction traits like number of services per conception, service period, gestation length, litter size at birth, kids born in lifetime, kidding per cent on the basis of does available, kidding per cent on the basis of does bred and fertility per cent, as 1.29±0.03, 178.88±9.99, 151±6.63, 1.65±0.02, 3.04±0.13, 51.98±2.11, 67.08±1.91 and 94.07±1.74, respectively. They revealed that better reproductive management is necessary to obtain higher conception rate under stall feeding condition.

Nithrawal (1999) shows that bellowing and vibration of the tail frequently by animals are the main symptoms of heat detection known to all respondents goat owners. The data indicate that majority of farmers (71.66 and 75.00%) do not possess their own breeding buck in both tehsils. On the contrary they use community buck for breeding purpose which was non-descript in tribal and non tribal area of Jaipur district in Rajasthan.

Misra *et al.*, (2000) found that all the farmers use their own bucks for breeding purpose. He also reported the willingness of farmers to accept technological interventions for improving their traditional practices of goat production.

Jaitner *et al.*, (2001) found that women play major role in small ruminant production, representing 52% of the owners of sheep, 67% of the owners of goats and 43 % of the owners of

both sheep and goats. The average number of animals owned was quite low i.e. about 6 head each of sheep and goat, out of which about 3 were breeding females.

Verma *et al.*, (2001) reported that the extra ration to breeding males was provided by about 50 per cent of the farmers in the semi arid climate of Rajasthan. The majority of farmers adopt restricted breeding practices to avoid kidding during extreme winter and summer.

Gokhale *et al.*, (2002) concluded that 53.68 per cent of the goat rearers maintain their own bucks for breeding purpose. More than two third (70%) of these goat rearers felt that the bucks can be used efficiently for breeding purpose at the age of 1 to 2 years although 25 per cent of them were of the opinion that the bucks can be introduced to active breeding even before the age of one year. Approximately half (45.60%) of the goat rearers did not have any breeding facilities. Nearly 38.4 per cent goat owners used scrub bucks, roaming freely, for serving their does. Only 28.50 per cent of the goat owners bred their does with the superior bucks.

Rao (2002) reported that prevailing practice of breeding was random mating system. The farmers select the breeding bucks from their own flock. On an average one buck was used for 15-20 goats in a village.

Swami, (2002) reported reproductive performance of Marwari goats in field on the basis of numbers of does available for breeding. He revealed that conception rate and kidding percentage was 78.55 and 73.94, respectively.

Kumar and Deoghare (2003) concluded that the twining rate was found to be highest in the large category that was 58.2 per cent followed by 13.1 per cent in small category and 12.0 per cent in medium category.

Singh and Roy (2003) reported least square means of age at first kidding, kidding interval, service period, dry period and gestation period as 773.44 ±13 28, 388.80±6.26, 255.76±6.95,213.25±6.55 and 147.62±0.11 days, respectively and observed significant influence of year of kidding on AFK, DP, GP and KI in Jamunapari goats.

Pathodiya *et al.*, (2004) reported average service period, dry period, lactation length and kidding interval for Sirohi goats in field conditions as 141.02±2.41, 136.91±2.03, 166.26±1.33 and 306.07±2.46 days, respectively.

Rai and Singh (2004) concluded that does usually exhibited symptoms of heat from second fortnight of April and maximum goats showed oestrus in the month of June and July which resulted in to maximum kidding (50%) during November- December. Nearly 30-35 per cent goats exhibited oestrus during October to December. However, some goats (10-15%) also showed heat in other months.

Pathodiya *et al.*, (2005) studied the reproduction and production parameters of Sirohi goats in the farmers flock. They reported that kidding interval varied from 287.5 to 340 days, gestation period 148.5 days, dry period 151.3 to 177 days, service period 136.1 to 89.1 days, lactation period 136 to 167 days and lactation yield 60 to 65 liters.

Rai and Singh (2005) conducted a study on Jhakhrana goats under field conditions. They collected data on production parameters from 229 goats and reproduction parameters from 318 goats, belonging to 77 farmers of Jhakhrana and its surrounding 8 villages in Alwar district of Rajasthan. They reported kidding interval and twining rate as 287.78±9.89 days and 1.54 ±0.16, in semi intensive and 332.86±9.34 days and 1.32±0.16 in extensive system of management, respectively.

Sharma (2005) revealed that the most common symptoms of heat was bellowing (100.00%) followed bc tail vibration (71.00%), frequent urination (53.00%) and mounting (48.00%). Natural service was taken for breeding in goat by all the goat rearers in the study area. Results revealed that more than 56.00 per cent of the goat rearers did not have their own breeding buck, whereas, 44.00 per cent goat rearers used their own breeding buck. The overall average number of breedable goats per buck was 32.08±0.60 in the study area. Majority of goat rearers (86.00%) observed the pregnancy by abdominal appearance. Twenty seven per cent goat rearers provides separate house to pregnant doe's. Results show that 62.00 per cent of surveyed goat keepers did not castrate their male kids. Thirty nine per cent goat keepers used physical appearance as selection criteria for selecting breeding buck.

Singh *et al.*, (2005) collected the information on 1318 goat households, randomly from 256 villages in 3 districts of north Gujarat. They concluded that most of goats show the symptoms of heat during two seasons in a year (Summer and winter). But the Mehsani goats in their home tract have only one breeding season i.e. summer and avoid winter breeding season.

2.3.4 Health Care Practices

Buddle *et al.*, (1988) reported that highest proportion of deaths in goats were directly related to managemental problems. In larger flock's microbial diseases including Pasturella pneumonia was a major problem. Death from nematode infestation were predominately observed in goats aging 12 months and older. White muscle disease was the major trace element deficiency causing death in goats.

Gefu *et al.*, (1994) reported that mortality was below 3.5 % in small ruminants i.e. sheep and goat. Sawargaonkar *et al.*, (1996) observed that highest mortality in kids was due to Pneumonia.

Das *et al* (1997) reported that the mortality rates were found to be higher in females (76.12%) than males (40.90%). The mortality was highest (94.81%) in South-West monsoon, followed by in post-monsoon (61.74%), summer monsoon (59.64%) and winter seasons (40.90%), respectively. Among the diseases Pneumonia (10.26%) and Enteritis (10.26%) were highly prevalent.

Deoghare and Sagar (1999) observed that maximum goat keepers used indigenous drugs for treatment of ailing goats in the Mathura district of U.P. Gupta *et al.*, (1999) revealed that maximum mortality in pre weaning Jamunapari kids was due to pneumonia (44.44%), followed by colisepticemia (21.30%). General weakness and uremia also accounted for 6.48 and 5.56% mortality, respectively.

Kulkarni *et al.*, (2000) reported that the type of floor plays an important role in controlling the parasitic infestation. Humidity and infection invariably reflects the body weight, overall performance and health status. Parasitic load was lower in slatted flooring than mud flooring.

Sagar and Deoghare (2000) concluded that situational, socio-economic and extension characteristics were positively and significantly correlated with the adoption of health care practice in goat in all four categories of goat farmers and are extremely important in goat improvement programmes.

Singh *et al.*, (2000) reported that Johne's disease was more prevalent in the goats, reared under village conditions in Uttar Pradesh. Incidence of the disease was related to size of the herd probably because in smaller herds where incidence was lower, the animals were grazed

Sharma (2005) reported on an average 56.00 per cent goat rearers were vaccinated their goats against various diseases like FMD, HS, BQ, ET and Pox. He also observed on an average 76.00 per cent goat rearers practiced deworming in their goats for internal parasites.

Swami *et al.*, (2005) reported that goats were mainly affected by digestive disorders (9.18%) ,followed by respiratory diseases (4.87%), skin and orthopaedic ailments (3.37%) and miscellaneous (5.37%) including reproductive disorders.

2.3.5 Marketing

Mittal and Ghosh (1985) reported that the male kids are usually sold at the age of 6 months. Ahuja and Rathore (1987) found that bucks are sold from an age of 2-3 months i.e. immediately after weaning to the age of 12 months.

Naidu *et al.*, (1991) found that in India 50 to 73 per cent goats slaughtered are below 6 months of ages while 26 to 50 per cent are 12 months old. According to report of research Raghvan (2001-02). The average age at which kids are sold was 4.39 months and the price Rs. 625.93 in Malabari goat's fields.

Rangnekar *et al.*, (1992) concluded that goat milk is disposed off mostly by mixing with buffalo milk, for tea making and for sweets besides home consumption .The small farmers or landless labourers use goat milk for tea or feeding children and there is hardly any surplus for sale

Tanwer (1994) reported that animals are sold in the village itself to the butchers. No private agency, co-operative society helps the farmers in marketing of their animals.

Pal and Agnihotri (1995) revealed that contribution of purchased in puts in goat rearing was negligible. The proportion of goat milk marketed was very small whereas, good potential existed for increasing the marketability of goat milk, as it has many medicinal properties and scope. Efforts should be made to create market for goat milk, as most of the goat milk is presently adulterated with cows or buffalo milk

Deoghare and Kumar (2003) concluded that the majority of the small sized flock owner (29.29%) prefer to sale their goats in market. On the other hand highest number of medium flock (62.77%) and large-flock (51.88%) owners preferred the weekly market. On an average 50.81 per cent goat farmers preferred to sell goats right in the village market, 27.77% in village as well as

weekly market, 39.90 per cent in weekly market and 2.02 per cent in district market. This shows that majority of the small sized flock owner preferred to sell goat in village itself. It might be due to the fact that small number of animals are available for sale and better bargaining strength at the farm/ village than in the weekly market.

Kumar and Deoghora (2003) reported that the families of goat keepers had access to goat milk for a period of 186 to 197 days. Consumption of goat milk in the household was 442.02, 470.96 and 558. 82 liters in small, medium and large categories, respectively. The goats served as a living bank for the goat keepers, which could be utilized at any time for acquiring food and to fulfil other needs of the family. The farmers maintained flock size constant each year by selling the new born kids at the age of 6 to 10 months

Deoghare and Kumar (2003) reported that farmers usually sale male kids at an early age. first to meet their urgent needs and than even female kids were sold. Majority of farmers (42.19%) with small size flock sale the kids at an early age to avoid the future risks and a few farmers (18.75%) sale the kids to reduce the flock size.

Tripathi *et al.*, (2004) revealed that the goat farmers received higher price for female animals then male. The reason might be due to the fact that farmers are interested in purchasing of females for breeding purpose and rearing. Further the females coming for sale were usually of higher body weight and were at breeding age.

2.3.6 Kid rearing practices

Bagga (1967) found that first suckle of calf was given by majority of respondents within 2 to 3 hours of birth. Raut *et al.*, (1977) observed that weaning was not practiced in rural area.

Khuspe *et al.*, (1980) reported that none of the also died because of suffocation as results of housing mismanagement. The mortality rate was as high as 15-33 per cent in kids. He also reported that none of the farmers adopted dehorning and weaning practices.

Malik and Sohal (1984) observed that majority of respondents were adopting recommended practices of calf rearing to a medium extent. The practices that were adopted more extensively by larger percentage were colostrum feeding protection from weather and regular watering.

Handa and Gill (1986) reported that about 30 per cent of dairy farmers adopted deworming practices in their calf. Rangnekar and Rangnekar (1992) observed care of young kids was invariably the responsibility of women and the girls in traditional goat production systems in Gujarat and Rajasthan.

Singh and Singh (2000) reported that deworming in calf is seldom performed by majority of the farmers Kumar *et al.*, (2003) observed that mortality rate was as high as 15-33 per cent in kids. Several kids died because of suffocation as result of housing mismanagement.

Rao and Patro (2003) reported in his survey of Ganjam field unit at Bhubaneshwar (Orissa) that during heavy rains a make shift shelter is the only; type of temporary shelter which is made available for the new born and young kids.

Bohrey and Jain (2004) revealed that body weight and weight gain of goats were significantly higher in semi intensive system of management. The male showed significantly higher gain in body weight than female kids.

Garg (2004) reported that 95 percent farmers fed colostrum to the calves within two hours. Kumar Arun *et al.*, (2004) concluded on the basis of present results that in addition to free grazing for 8-10 hrs. concentrate supplementation at the rate of 2 per cent of live body weight was best for optimizing the growth performance and to increase carcass yield of Kutchi male kids.

Rao (2004) reported that new born kids are kept separately from the adults during night time. The new born kids are either left at a place in the jungle in the care of one to two persons. The kids are allowed to suckle their mothers twice daily and milking is not done till the kids reach three months of age. As the kids attain 15-20 days of age these are given succulent green leaves particularly Neem leaves. On attaining three months of age the kids are taken for grazing along with the adults.

Rohilla and Khem Chand (2004) concluded that alternate day concentrate feed supplementation is equally beneficial as in daily feeding in kids for improving growth in kids and also reduced the feed cost making it more economical.

Sharma (2005) found at 64.00 per cent goat keepers housed their kids in separate house while, 30.00 per cent goat keepers have separate houses for male and female. Only 38.00 goat rearers isolated their kids.

Singh *et al.*, (2005) collected the information on limited feed and fodder resources, extensive production system and high mortality in kids under two breeding seasons usually lead farmers for adoption of one breeding season.

2.4 CONSTRAINTS IN ADOPTION OF IMPROVED GOAT HUSBANDRY PRACTICES

Rangnekar *et al.*, (1992) observed that there were two major problems that emerged were marketing of milk and health control. Economy precluded veterinary help, breeding facilities, in form of marketing available good buck are already conscious of the need for proper selection of breeding males.

Nitharwal (1999) reported that breeding buck of high genetic potential is not available (Either exotic or cross bred or indigenous pure breed) in the village and its surroundings.

Kulkarni *et al.*, (2000) reported that shortage of sufficient fodder has been observed as the main constraint in closure of newly started ventures. The daily weight gain in experimental sheep was lower than goats, however, it was comparable to the weights in sheep and goats maintained under semi intensive condition (Kulkarni 1996).

Misra *et al.*, (2000) reported that more than 2/3rd of farmers sold their live animals for meat. Majority of farmers expressed their views that sheep and goats rearing are least risky, needs minimum investment and provide cash as and when it is needed. Traditional methods of management are being followed in feeding, breeding and housing and large extensive system of sheep and goat rearing is being adopted.

Veeranna (2000) indicated that majority (66%) of the respondents had medium level of adoption followed by low (22%) and high (12%) levels of adoption of scientific goat rearing practices. Majority of tribals had favourable attitude towards goat farming.

Roy (2001) observed that the Vilayati babool, inadequate veterinary health, forest and police department harassment, attack of wild animals and non availability of fodder were the major constraints identified during survey of Jamunapari goats rearers.

Kumar (2003) study on problems experienced by sheep farmers in Rajasthan were found in a random sample of 150 sheep rearers of three districts (Jaipur, Ajmer and Tonk) of Rajasthan,

India, estimated at village and districts levels. Pooled values for three districts were also estimated. The gravity of the problem was judged through the magnitude of its RBQ value. The scarcity of grazing area/land was found to be most serious problem faced by sheep rearers. Non-availability of green fodder and lack of infra-structural facilities and marketing facilities for wool was another important problems reported by the farmers. Diseases prevalence in different villages had different pattern.

Kumar *et al.*, (2003) observed that the incidence of diseases and parasitic infestations is one of the major constraints in the development of goat enterprise, contributing towards substantial losses to the goat keepers.

Mohan and Singh (2004) conducted a study to assess the constraints faced by the goat rearers in Farah block of Mathura, U.P. They reported that proper treatment and vaccination facilities at village level are not available, breeding bucks are scanty, grazing area is decreasing day by day. Marketing problems, lack of money to open goat farms, limited feed resources, limited space for housing, limited source of income, lack of Govt. schemes for goat improvement and problems by middle men were the constraints.

3. MATERIALS AND METHODS

This chapter is an important aspect for conducting a study in order to achieve the objectives. In this field study, desired observations on various goat husbandry practices in Mewar region of the Southern Rajasthan were recorded during a period of one year (July 2004 to June 2005) by using interview schedule, interview guide and direct observations method. The materials used and methods applied in the present study are described under following sub sections.

3.1 Locale of research

3.2 Selection of goat rearers/ respondents

3.3 Construction of interview schedule

3.4 Conducting the interview and data collection

3.5 Tabulation of data

3.6 Analysis of data and statistical tests applied

3.1 Locale of research:

The total area of Rajasthan is 3,42,239 sq. kilometers, with total human population of 5,64,73,122, and livestock population 49.14 million including 16.80 million goats (Table 3.1). Mewar region of southern Rajasthan is an important part of state from an ancient time. The people living in this region are different in race and their customs. Culture and traditions are entirely different as compared to the people living in other region of state.

The study was conducted in Udaipur, Rajasamand, Chittorgarh and Bhilwara districts of Mewar region of the Southern Rajasthan. Distribution of livestock and goat population in four selected districts of Mewar region are shown in Table 3.2. Geographically these districts are situated in the lap of "Arawali hills" of the Southern Rajasthan. The region has a typical sub tropical climate characteristically associated with mild winter, moderate summer and high relative humidity. The districts were selected for present investigation because highest number of goat population of Rajasthan reside in these districts. There is too much scope to raise the socio-economic status of poor farm families through goat husbandry but the work done in the area on prevalent goat husbandry practices is very scanty.

Table 3.1 Livestock status of Rajasthan

S. No.	Livestock	2003	1997	Increase or Decrease	
				Nos.	%
1	Cattle	10853492	12141402	-1287910	-10.61
2	Buffaloes	10446167	9770490	675677	6.92
3	Sheep	10031822	14584819	-4552997	-31.22
4	Goats	16808030	16971078	-163048	-0.96
5	Horses and ponies	25323	24016	1307	5.44
6.	Mules	2691	3202	-511	-15.96
7	Donkey	142678	185604	-42926	-23.13
8	Camels	498023	669443	-171420	-25.61
9	Pig	337763	304920	32843	10.77
Total		49145989	54654974	-5508985	-10.08

Source- Board of Revenue for Rajasthan, Ajmer. Livestock census 2003 (Provisional)

Table 3.2 Distribution of livestock population of surveyed districts of mewar region

S. No.	Livestock	Udaipur	Rajsamand	Chittorgarh	Bhilwara	Total
1	Cattle	1038263	251987	694048	602330	2586628
2	Buffaloes	530405	200704	408618	312743	1452470
3	Sheep	204493	120641	10475	446680	782289
4	Goats	1164316	499334	637965	740352	3041967
5	Horses and ponies	1379	818	1249	1365	4811
6.	Mules	16	-	5	2	23
7	Donkey	6163	2227	2729	2942	14061
8	Camels	9125	3815	4533	5951	23424
9	Pig	10865	4100	7391	11388	33744
Total		2965025	1083626	1861279	2123753	7939417

Source- Board of Revenue for Rajasthan, Ajmer. Livestock census 2003 (Provisional)

.3.1.1 Selection of Tehsils

The selection of two tehsils from each districts was done with the help of census reports and district books with reasonably high goat rearing population. Two tehsils were

selected from each district viz. Vallabhnagar, Mavli (Udaipur), Nathdwara, Devgarh (Rajasamand), Chittorgarh, Dungla (Chittorgarh), Mandal and Baneda (Bhilwara).

3.1.2 Selection of villages

From each tehsil, three villages were selected randomly. Thus, total twenty four villages were selected for survey.

3.2 Selection of goat rearers/ respondents

The selection of goat rearers formed the ultimate unit of sample. A list of goat rearing families of the selected villages was prepared with the help of village Sarpanch and Patwari. Fifteen goat rearing families were interviewed from each village.

Thus, 360 goat rearers formed the base of survey for present study. They were categorized in to three categories on the basis of flock size:

i) Small holding (1-10 goats)

ii) Medium holding (11-20 goats)

iii) Large holding (Above 20 goats)

Five goat rearers were selected randomly from each holding. Total 360 goat rearers were selected from 24 villages of 8 Tehsils of four districts of Mewar region of the southern Rajasthan. List of villages, tehsils and districts are given in Table 3.3.

3.3 Construction of interview schedule

The required data were collected, keeping in view the objectives of the study, using well structured interview schedule developed by the investigator with help of experts on the subject (Appendices No. 1). Relevant information on the following aspects related to the research work.

1. Personal particulars of goat rearers and his family.
2. Detail information about the goats possessed by the respondents.
3. Land holding of goat keepers in the study area.
4. Details of goat rearing practices like housing and feeding practices.
5. Breeding practices, health care and other management practices followed by different categories of goat rearers.
6. Role of human resources in goat rearing.
7. Constraints being perceived by the respondents in goat husbandry.

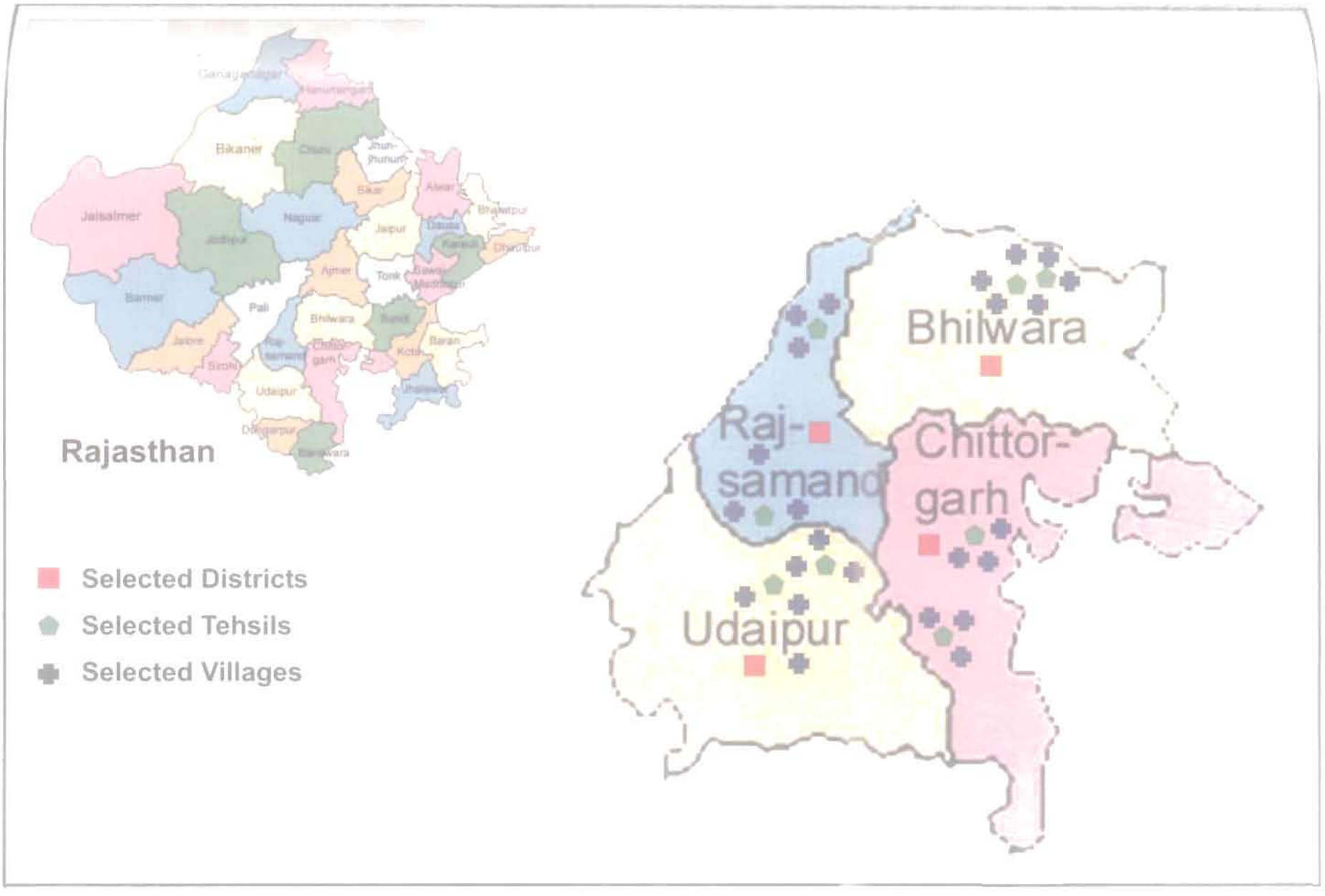

Plate 1 : Map of Surveyed Goat Rearing area of Mewar Region

Table 3.3 Detail of surveyed area

Districts	Tehsils	Goat population	Villages	No. of respondents
1. Udaipur	1. Vallabhnagar	101937	1. Khokharwas	15
			2. Rundera	15
			3. Tarawat	15
	2. Mavli	80656	4. Gadoli	15
			5. Golwara	15
			6. Vajmia	15
2. Rajasamand	3. Nathdwara	85307	7. Dhayla	15
			8. Kunthwa	15
			9. Nichalioden	15
	4. Devgarh	81586	10. Madaria	15
			11. Maliawas	15
			12. Heerakheda	15
3. Chittorgarh	5. Chittorgarh	23387	13. Bojunda	15
			14. Chothpura	15
			15. Japarkheda	15
	6. Dungla	42685	16. Idra	15
			17. Rawatpura	15
			18. Lothiana	15
4. Bhilwara	7. Mandal	101212	19. Mandal	15
			20. Gudda	15
			21. Dhuvala	15
	8. Baneda	35648	22. Baneda	15
			23. Balapur	15
			24. Kamalpura	15
Total				360

Source-Animal husbandry livestock census, 2003 (Provisional)

3.3.1 Personal particulars of goat rearers and his family members

Personal particulars of the respondents included name, caste, category, age, village, Tehsil, District, religion, main occupation, education, number of family members, type of family, family size, income from goat husbandry, income from other sources, total income, source of irrigation, details of livestock, different sources of scientific goat husbandry information.

3.3.2 Detailed information about the goats possessed by respondents

This portion deals with number of goats possessed by the respondents. Data of on breeding bucks, kids and their marketing pattern, age at which animals were sold, criteria for marketing of animals, use of goat products mainly milk etc.

3.3.2.1 Housing management practices

Under the housing practices, schedule was developed to record the various informations pertaining to this operation. It included, type of housing, distance from residence, manger, source of drinking water, drainage and sheds for different categories of goats.

3.3.2.2 Feeding practices

Feed is the most critical input in production of goats. Therefore, to record various parameters of feed, fodder and concentrate feeding following informations were gathered using the schedule.

Feed and fodder resources available in the area summarized in following sub-heads:

i) **Crop residues** – The quantity of crop produced depends upon production of grains/pulses in a given year, the crops depends on various factors like quantity and distribution of rain, type and quality of soil, crop cultivation and management practices, availability of irrigation water, varieties of crops, temperature, humidity and a host of similar factors. The common green fodder, grain and pulses crops cultivated in Mewar region of Southern Rajasthan, whose residues are used for grazing of goats are listed in Table 3.4.

ii) **Grasses**- This fodder resource includes grasses from forest land, community pastures or permanent pastures, grasses that are grown on fallow and uncultivated land, road sides, canal banks, bunds etc. Goats are taken for grazing on above sites, in the surveyed area. For lactating, pregnant and growing animals, there is no other way but to supplement grazing with concentrates, fodder crops and crop residues. The quantity of grasses consumed by grazing is difficult to estimate as the growth of grasses and its accessibility for grazing vary from season to season, year to year and place to place. Small ruminants derive their full requirement from grazing. The common grasses found in the study area are listed in Table 3.5. Which are used for grazing of goats.

Table 3.4 Common green fodder and grain crop cultivated in Mewar region

S. No.	Common Name	Botanical Name
1	Lucern	*Medicago sativa*
2	Berseem	*Trifolium alexanndrinum*
3	Oat	*Avena sativa*
4	Maize	*Pennesetum typhoideum*
5	Barley	*Hordeum vulgare*
6	Wheat	*Triticum aestivum*
7	Soyabean	*Glaycin max*
8	Groundnut	*Archis hypogea*

Table 3.5 Common grasses found in the study area

S. No.	Common Name	Botanical Name
1	Motha	*Cyperus rotundus*
2	Dhaman	*Cenchrus setigerus*
3	Dhub	*Cynodon dactylon*
4	Pathar chatta	*Trianthema manogyna*
5	Anjan	*Cenchrus ciliaris*
6	Baru	*Sorghum halpense linn*

iii) **Top feeds-** Leaves of many trees and shrubs constitute a useful and main source of feeding. Goats derive their major portion of sustenance from tree leaves, which are either browsed by them or if stalled, are fed from lopped branches. As this is done by small individual stockowners, availability of nutrients from tree/shrub leaves from consumed by goats can not be easily determined. Further the yield of tree leaves/ shrubs vary from species to species, age of tree/shrubs, amount and distribution of rainfall, temperature, humidity, lopping intensity and frequency, edibility of leaves and toxic factors present. The top feeds available for feeding of goats, in the Mewar region of southern Rajasthan are listed in Table 3.6.

Table 3.6 The top feeds available for feeding of goats in Mewar region of the southern Rajasthan

S. No.	Common Name	Botanical Name
1	Babool	*Acacia arabica*
2	Neem	*Azadirachta indica*
3	Keeker	*Acacia nilotica*
4	Ber	*Zizyphus rotundifolia*
5	Khezari	*Prosopis cineraria*
6	Imli	*Tamarindus indica*
7	Subabool	*Leucaena leucocephala*
8	Peapal	*Ficus religiosa*
9	Sheesham	*Dalbergia sp.*
10	Thur	*Euphorbia spp.*
11	Ardu	*Ailanthus excelsa*

iv) **Cultivated green fodder-** The area under cultivated green fodder in the country is very low which is also true for Rajasthan and Mewar region of southern Rajasthan. The common green fodder cultivated in the region are listed in Table 3.4.

Further informations on type of feed, grazing site and time, lopping of trees and, time of concentrate feeding were also included in the interview schedule

3.3.2.3 Breeding practices

Breeding is an another important factor of goat husbandry. Following information was incorporated in the schedule pertaining to breeding practices.

(a) Breeding season

(b) Heat detection

(c) Detection of conception

(d) Criteria of selection of breeding buck

(e) Reproductive problems

3.3.2.4 Health care practices

The preventive measures as well as the treatment of ailing animal directly reflects the health status of a farm. Though animals are prone to various health disorders, even the

Plate 2 : DATA COLLECTION BY RESEARCHER AT VILLAGE

Plate 3 : ROLE OF WOMAN IN MILKING

contribution of poor management practices in the emergence of a health problem to some extent can not be ruled out. Proper medical and health care could minimize the cost of production. Therefore, schedule was developed to record the availability and source of veterinary facility, treatment provided, knowledge and practice of deworming of the animals and incidence of diseases in goat.

3.3.2.5 Other management practices

Other management practices covered in the interview schedule are care of pregnant animals and new born kid, marketing, care of breeding buck, goats covered per breeding buck, castration of male kid and dehorning and cleaning of manger and water trough.

3.3.3 Role of human resources in goat rearing

It refers to the participation of men, women and children of different socio-economic status in term of actual work done on different goat rearing activities. It was measured with the help of a structured schedule developed for this purpose. Following activities of goat rearing included:

(a) Feeding

(b) Cleaning

(c) Milking

(d) Grazing

(e) Sale of animal

(f) Sale of milk

(g) Care of young stock

(h) Breeding

(i) Care of sick animal

(j) Ecto-parasites

(k) Endo-parasites

3.3.4 Constraints being perceived by respondents in goat management

This section of schedule covered constraints which can winds the adoption of improved goat rearing practices by the respondent. For this, with the help of experts and literature, constraints relating to, housing, feeding, breeding health care and other management practices were enlisted. The schedule also included economical condition, literacy and availability of loan facilities, which may also act as constraints. In each selected

village, five goat respondents with goat rearing experience were interviewed. Firstly, the five respondents were collectively asked to identify the constraints in their village in relation to goat rearing. Based on pooled information finally sixteen (16) constraints were considered for present study. Each respondents was asked separately to rank the constraint without having interaction with the remaining farmers. Thus, each respondents had his own independent opinion regarding the seriousness of the constraints he faced.

3.4 Conducting the interview and data collection:

The schedule were finalized after sample pretesting. The pretesting of interview schedule was carried out with the ten respondents, which were not included in this study. At the time of pretesting, the purpose of the interview schedule and study was explained to the goat rearers. The pre testing helped in altering the contents and sequence of the question at certain places. After modification in the light of pre-testing, the final interview schedule was prepared which helped in recording more concised informations.

After having selecting goat rearers, the researcher paid repeated visit to concerned villages and developed a good rapport with the concerned farmers to gain their confidence. The researcher's personal professional qualifications and experience greatly facilitated in rapport building. Before administering the schedule, the objective of the study was explicity explained to the goat rearers. The question from the schedule were asked to them in their own dialect, ensuring that they had perceived the question correctly so as to avoid an interpretational variation of the questions put before them. The answers obtained were recorded in the interview schedule and only one respondent was interviewed at a time.

3.5 Tabulation of data

The responses to each of the question in the schedule were coded and tabulated respondent wise in a master sheet. The qualitative data were quantified accordingly and tabulated to draw meaningful inferences. Therefore, appropriate tables were prepared, keeping in view the specific objectives of the study.

3.6 Analysis of data and statistical test applied

To data analysis the collected information several basis statistical tools and methods were use. The following statistical treatments were used for interpretation of data:

1. Frequency Distribution

The total number of respondents in the survey.

2. Percentage

Simple comparisons were made on the basis of percentage.

3. Mean

It was obtained by total of each statement divided by total number of respondents.

4. Standard error (SE)

It was calculated by mean of each statement divided by square ($\sqrt{n}$) of total number of respondents.

5. Chi Square (χ^2)

This test was used to observe the effect of flock size on different goat husbandry management practices (Snedecor and Cochran, 1967).

6. Rank based quotient (RBQ)

On the basis of ranks provided by the farmers, rank based quotient (RBQ) for each constraint was calculated at village level on basis of the formula (Sabarathnam and Venila 1996).

$$RBQ = \sum_{i-1}^{n} \frac{f_i (n + 1 - i)}{Nn} X\ 100$$

Where, F_i = the frequency of farmers for the i^{th} rank of the constraint

N = the numbers of farmers

n = the number of ranks

Similarly, the RBQ values at district level and the pooled RBQ values of the four districts were calculated using weighted average of village and district level values.

The finally based on the observed facts, the main management constraints of goat husbandry have been identified and these suitable remedial measures have been suggested.

4. RESULTS

The results of the data collected in accordance with the research methodology laid down in preceding chapter have been presented in detail in this chapter for the sake of convenience the results of the present investigation are presented under following sub-heads:

4.1 PREVALENT GOAT MANAGEMENT PRACTICES IN THE STUDY AREA

4.1.1. Family status

The family status with respect to family profile, caste, religion, age, type and size of family, education, main occupation, income generation, land resource, irrigation source, animal resources and media information of the selected respondents taken in for the study are summarized as follows.

The majority (98.05%) of goat rearers belongs to Hindu religion while only 1.94 per cent goat rearers were Muslim in the surveyed area, whereas maximum at 5.56 per cent Muslims were engaged in goat rearing in the survey area of Bhilwara district.

The overall result also indicated that 56.94 per cent goat keepers prefer to live in nuclear family, while rest 43.06 per cent live in joint family in the study area. The maximum goat rearers of Udaipur district. (74.44%) live in nuclear family. Information collected indicated that maximum (53.06%) goat keepers of experiment area possesses more than 5 members and 68.89 per cent of Rajsamand district goat keepers have more than 5 members in a family.

The overall literacy rate of study sample was 35.28 per cent and among the educated farmers, majority (25.0%) were educated up to primary level, followed by 7.50 per cent educated up to middle and only 2.78 per cent educated up to metric and above 77.78 per cent goat rearers were found to be illiterate in Bhilwara district, followed by Chittorgarh (74.44%), Udaipur (68.89%) and Rajsamand (37.78%) districts.

The majority of the respondents (60.28%) had open wells as irrigation source. The proportion of household using other irrigation sources were 18.33 per cent canal and 6.39 per cent tube well. The 15.0 per cent respondents do not have any source of irrigation and completely depends on rain water. The proportion of open well was highest in Udaipur (75.56%) as a source of irrigation and lowest in Bhilwara district, while number of tube well

TABLE 4.1 FAMILY STATUS OF RESPONDENTS

Particulars	Districts				Total
	Udaipur	Rajsamand	Chittorgarh	Bhilwara	
1. Religion					
a. Hindu	89	90	89	85	353
	(98.89)	(100.00)	(98.89)	(94.44)	(98.05)
b. Muslim	1	0	1	5	7
	(1.11)	0	(1.11)	(5.56)	(1.94)
2. Type of Family					
a. Joint	23	50	36	46	155
	(25.56)	(55.56)	(40.00)	(51.11)	(43.06)
b. Nuclear	67	40	54	44	205
	(74.44)	(44.44)	(60.00)	(48.89)	(56.94)
3. Family Size					
a. Small (<5 Members)	54	28	40	47	169
	(60.0)	(31.11)	(44.44)	(52.22)	(46.94)
b. Large (>5 Members)	36	62	50	43	191
	(40.00)	(68.89)	(55.56)	(47.77)	(53.06)
4. Education					
a. Illiterate	62	34	67	70	233
	(68.89)	(37.78)	(74.44)	(77.78)	(64.72)
b. Primary	22	42	15	11	90
	(24.44)	(46.67)	(16.67)	(12.22)	(25.00)
c. Middle	5	10	6	6	27
	(5.56)	(11.11)	(6.67)	(6.67)	(7.50)
d. Metric & above	1	4	2	3	10
	(1.11)	(4.44)	(2.22)	(3.33)	(2.78)
5. Irrigation Source					
a. Well	68	56	54	39	217
	(75.56)	(62.22)	(60.00)	(43.33)	(60.28)
b. Tube well	3	3	11	6	23
	(3.33)	(3.33)	(12.22)	(6.67)	(6.39)
c. cannal	6	10	23	27	66
	(6.67)	(11.11)	(25.56)	(30.0)	(18.33)
d. Rain	13	21	2	18	54
	(14.44)	(23.33)	(2.22)	(20.00)	(15.00)
6. Media Information					
a. Yes	5	38	72	3	118
	(5.56)	(42.22)	(80.00)	(3.33)	(32.78)
b. No	85	52	18	87	242
	(94.44)	(57.78)	(20.00)	(96.67)	(67.22)

Figures in parenthesis indicate percentage

possessed by goat rearers were maximum in Chittorgarh (12.22%) as compared to other districts. The cannal as a source of irrigation was maximum (30.0%) in Bhilwara district while it was minimum in Udaipur district. The survey indicates that goat rearers of surveyed area more or less depends on rains as source of irrigation .

The overall result shows that 67.22 per cent goat rearers of the study area did not have any media for getting information while, 32.78 per cent goat respondents receiving information through media. The 80.00 per cent goat rearers of Chittorgarh district use radio, TV and news paper etc. for knowledge and minimum 3.33 per cent in Bhilwara (Table 4.1).

A total of 360 goat rearing families having 2298 family members were surveyed. Out of these men, women, child- male and child female were 24.32, 24.80, 25.55 and 23.33 per cent, respectively in the surveyed area of four districts. Information collected indicated that all categories of human beings ratio were equal in family structure. Maximum men and women of Chittorgarh district while maximum child male and child female of Rajsamand district were available in goat rearing families as compared to other districts (Table 4.2).

Table 4.2 District wise family statistics of respondents

Family members	Districts				Total
	Udaipur	Rajsamand	Chittorgarh	Bhilwara	
Men	131	141	157	130	**559**
	(26.25)	(21.30)	(28.14)	(22.45)	**(24.32)**
Women	139	142	149	140	**570**
	(27.86)	(21.45)	(26.70)	(24.18)	**(24.80)**
Child-Male	118	194	131	144	**587**
	(23.65)	(29.30)	(23.48)	(24.88)	**(25.55)**
Child-Female	(111)	185	121	165	**582**
	(22.24)	(27.92)	(21.68)	(28.50)	**(25.33)**
Total	**499**	**662**	**558**	**579**	**2298**
	(21.71)	**(28.81)**	**(24.29)**	**(25.19)**	**(100.00)**

Figures in parenthesis indicate percentage

It was evident from the result that the majority of family head of the goat rearers fall in the 35-60 years (67.22%) followed by below 35 years (22.50%) and above 60 years (10.28%) age groups (Table 4.3).

Table 4.3 Average age of family head of respondents

Particulars		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
< 35 yrs	Mean ±SE	32.86±0.86	32.75±1.03	29.93±0.92	30.89±0.86	**31.19±0.49**
	No. of respondents	14	12	27	28	**81**
		(15.55)	(13.33)	(30.00)	(31.11)	**22.50**
35-60 yrs	Mean ±SE	48.0±0.89	48.6±0.76	49.35±1.04	48.26±0.96	**48.50±0.45**
	No. of respondents	63	75	46	58	**242**
		(70.00)	(83.33)	(51.11)	(64.44)	**67.22**
> 60 yrs	Mean ±SE	66.38±1.04	65.0±0.0	67.76±0.88	71.25±4.73	**67.43±0.75**
	No. of respondents	13	3	17	4	**37**
		(14.44)	(3.33)	(18.89)	(4.44)	**10.28**
Overall	**Mean ±SE**	**48.3±1.17**	**47.03±0.93**	**47.0±1.52**	**43.88±1.26**	**46.55±0.62**
	No. of respondents	**90**	**90**	**90**	**90**	**360**
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	**(100.00)**

Figures in parenthesis indicate percentage

Among the total goat rearers majority at 58.61 per cent belong to backward caste category followed by schedule tribe (18.06%), schedule caste (15.83%) and general caste (7.50%.). Among all the three categories of goat rearers based on flock size, majority belongs to OBC. Similar proportion of goat rearers belongs to OBC in all the four districts surveyed (Table 4.4).

Information collected on main occupation of goat rearers in different districts revealed that majority of goat keepers (64.44%) followed Agriculture + Animal Husbandry as the primary occupation followed by19.72 per cent Agriculture, 8.89 per cent Animal Husbandry, 4.44 per cent service and 2.50 per cent business. The maximum at 73.33 per cent goat rearers of large flock size adopted Agriculture + Animal Husbandry as main occupation followed by medium (63.33%) and small (56.67%) flock size. Maximum 81.11 per cent goat rearers of Bhilwara district adopted Agriculture + Animals Husbandry as a main occupation followed by Chittorgarh (70.0%) (Table 4.5).

Table 4.4 Distribution of respondents according to their caste

Particulars	Castes				Total
	SC	ST	OBC	General	
Household					
Small	25	18	71	6	**120**
	(20.83)	(15.00)	(59.17)	(5.00)	**(100.00)**
Medium	20	22	64	14	**120**
	(16.17)	(18.33)	(53.33)	(11.67)	**(100.00)**
Large	12	25	76	7	**120**
	(10.00)	(20.83)	(63.33)	(5.83)	**(100.00)**
Districts					
Udaipur	5	25	56	4	**90**
	(5.55)	(27.78)	(62.22)	(4.44)	**(100.00)**
Rajsamand	16	16	52	6	**90**
	(17.78)	(17.78)	(57.78)	(6.67)	**(100.00)**
Chittorgarh	11	20	50	9	**90**
	(12.22)	(22.22)	(55.55)	(10.00)	**(100.00)**
Bhilwara	25	4	53	8	**90**
	(27.78)	(4.44)	(58.89)	(8.89)	**(100.00)**
Overall	**57**	**65**	**211**	**27**	360
	(15.83)	**(18.06)**	**(58.61)**	**(7.50)**	**(100.00)**

Figures in parenthesis indicate percentage

4.1.2 Land Resources

The average land holding of goat rearers of surveyed area was 1.26±0.44 ha,. The highest land holding was possessed by goat rearers of Udaipur district (1.46±0.99 ha) and lowest land holding was of Bhilwara district (1.06±0.69 ha). Survey also showed that 46.94 per cent goat keepers had below 0.8 ha, 27.50 per cent had 0.8-1.6 ha and 21.11 per cent had above 1.60 ha land, while 4.44 per cent goat owners were landless in the study area.

The overall average irrigated, unirrigated and pasture land of surveyed goat keepers of different location were 0.51±0.17, 0.54±0.21 and 0.34±0.22 ha, respectively. The higher proportion of irrigated land (0.67±0.50 ha) was in the Chittorgarh location, while maximum unirrigated land (0.69±0.21 ha) was possessed by goats rearers in Bhilwara district. The average land covered under pasture in surveyed area was only 0.34±0.22 ha (Table 4.6 and 4.7).

Table 4.5 Distribution of respondents according to their occupation

Particulars	Service	Business	Agri.	AH.	Agri.+AH.	Total
Small	7	5	28	12	68	**120**
	(5.83)	(4.17)	(23.33)	(10.00)	(56.67)	**(100.00)**
Medium	5	3	27	9	76	120
	(4 17)	(2.50)	(22.50)	(7.50)	(63.33)	**(100.00)**
Large	4	1	16	11	88	120
	(3.33)	(0.83)	(13.13)	(9.17)	(73.33)	**(100.00)**
Districts						
Udaipur	5	0	16	9	60	90
	(5.56)	0	(17.78)	(10.00)	(66.67)	**(100.00)**
Rajsamand	6	7	30	11	36	90
	(6.67)	(7.78)	(33.33)	(12.22)	(40.00)	**(100.00)**
Chittorgarh	2	2	19	4	63	**90**
	(2.22)	(2.22)	(21.11)	(4.44)	(70.00)	**(100.00)**
Bhilwara	3	0	6	8	73	90
	(3.33)	0	(6.67)	(8.89)	(81.11)	**(100.00)**
Overall	**16**	**9**	**71**	**32**	**232**	**390**
	(4.44)	**(2.50)**	**(19.72)**	**(8.89)**	**(64.44)**	(100.00)

Figures in parenthesis indicate percentage

Table 4.6 Distribution of goat respondents accross land holding

Land (ha.)		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
Landless	Mean ±SE	0	0	0	0	**0**
	No. of respondents	4	6	4	2	16
		(4.44)	(6.67)	(4.44)	(2.22)	**(4.44)**
< 0.8 ha.	Mean ±SE	0.53±0.23	0.56±0 19	0.52±0.25	0.49±0.18	**0.53±0.10**
	No. of respondents	39	48	36	46	**169**
		(43.33)	(53.33)	(40.00)	(51.11)	**(46.94)**
0.8-1.6 ha.	Mean ±SE	1.27±0.34	1.31±0.31	1.25±0.32	1.28±0.26	**1.28±0.15**
	No. of respondents	23	20	25	31	99
		(25.55)	(22.22)	(27.78)	(34.44)	**(27.50)**
> 1.6 ha	Mean ±SE	3.40±2.12	3.08±3.03	2.99±2.30	2.98±3.53	**3.14±1.28**
	No. of respondents	24	16	25	11	76
		(26.67)	(17.78)	(27.78)	(12.22)	**(21.11)**
Overall (ha.)	**Mean ±SE**	**1.46±0.99**	**1.14±0.84**	**1.39±0.95**	**1.06±0.69**	**1.26±0.44**
	No. of respondents	**90**	**90**	**90**	**90**	**360**
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

Table 4.7 Land holding of respondents (Mean ±SE)

Land (ha)	Districts				Overall
	Udaipur	Rajsamand	Chittorgarh	Bhilwara	
Irrigated	0.53±0.33	0.31±0.19	0.67±0.50	0.53±0.21	**0.51±0.17**
Unirrigated	0.54±0.43	0.48±0.30	0.47±0.53	0.69±0.21	**0.54±0.21**
Pasture land	0.39±0.47	0.35±0.47	0 25±0.27	0.38±0.49	**0.34±0.22**
Total (ha)	**1.46±0.99**	**1.14±0.84**	**1.39±0.95**	**1.06±0.69**	**1.26±0.44**

4.1.3 Income Generation

Information collected on income generation by goat husbandry occupation indicated that 53.33 per cent goat keepers earned less than Rs. 5000 per annum, 29.44 per cent earned income between Rs. 5000-10,000 and 17.22 per cent earned more than Rs. 10,000 annually through goat rearing. The average income of goat keepers through goat rearing was Rs.6973.33 ±290.01 per family per year, while it was maximum at Rs. 8761.11±751.41 in Udaipur district followed by Rs. 8037.78±545.57 for Chittorgarh district.

The annual average income of goat rearers generated through other sources was Rs. 9744.49±578.03 per family per year, while the total income of goat keepers family including goat occupation was Rs. 16737.22±674.03 per family per annum. 51.94 per cent household earned total income between Rs. 10,000 to 25,000, 34.72 per cent having total income less than Rs. 10,000 and only 13.33 per cent goat rearers earned more than Rs. 25000 per year through goat rearing and other sources. The goat keepers of Chittorgarh district earned maximum income of Rs. 19971.11±1694.38 per family per year from goat rearing and other resources. The detail information on income generated through goat rearing, other resources and total income are summarized in Table 4.8, 4.9 and 4.10 respectively.

4.1.4 Animal Resources

The overall animal resource information of the selected household is presented in Table 11. Among the total livestock maintained by goat keepers maximum 60.78 per cent were goat, 26.74 per cent sheep, 6.24 per cent cattle and 6.23 per cent buffalo indicating that the area taken for the study is goat rearing tract of Mewar region of Rajasthan. Results also revealed that average goat holding per goat rearers was highest (18.61±1.35) in Bhilwara followed by Rajsamand (18.57±1.38), Chittorgarh (17.02±1.03) and Udaipur (15.62±0.97) district. The overall average goat holding of surveyed goat keepers was 17.46±1.18 goats per goat keeper. For other animal species average flock size was 7.68±2.16 sheep, 1.79±0.22

buffalo and 1.79±0.22 cattle per household. The sheep flock size per house hold was maximum at 16.67±2.67 in Rajsamand district, while buffalo holding were equal (2.04±0.25) in Rajsamand and Chittorgarh districts and goat rearers of Bhilwara district having highest numbers of cattle than other districts.

Table 4.8 Average annual income from goats

Income groups (Rs)		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
<5000	Mean ±SE	3475.0	3390.63	3408.82	3231.48	3366.67
		±167.06	±23.74	±219.27	±198.16	±89.45
	No. of respondents	40	64	34	54	192
		(44.44)	(71.11)	(37.78)	(60.00)	(53.33)
5000-10000	Mean ±SE	7826.93	7833.33	8393.94	7517.24	7919.81
		±299.87	±372.91	±264.71	±278.82	±149.98
	No. of respondents	26	18	33	29	106
		(28.89)	(20.00)	(36.67)	(32.22)	(29.44)
>10000	Mean ±SE	18583.33	16125.0	14369.57	17000.00	16524.19
		±1323.86	±952.61	±1090.80	±2395.67	±740.77
	No. of respondents	24	8	23	7	62
		(26.67)	(8.89)	(25.56)	(7.78)	(17.22)
Overall	**Mean ±SE**	**8761.11**	**5411.11**	**8037.78**	**5683.33**	**6973.33**
		±751.41	±426.91	±545.57	±465.16	±290.01
	No. of respondents	**90**	**90**	**90**	**90**	**360**
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	**(100.00)**

Figures in parenthesis indicate percentage

The information collected indicate that out of total livestock the goat population were 74.55, 47.54, 61.92 and 68.01 per cent in Udaipur, Rajsamand, Chittorgarh and Bhilwara districts, respectively. Of the overall goat population 21.62,22.97, 53.50 and 2.11 per cent were young male, young female, adult female and breeding buck, respectively. The district wise information on animal resources area are shown in Table 4.12, 4.13, 4.14 and 4.15.

Table 4.9 Average annual income of respondents from other sources

Income groups (Rs)		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
<5000	Mean ±SE	3595.74	3243.24	3464.29	3516.13	**3461.54**
		±194.10	±200.15	±269.71	±201.37	**±106.42**
	No. of respondents	47	37	28	31	**143**
		(52.22)	(41.11)	(31.11)	(34.44)	**(39.72)**
5000-10000	Mean ±SE	8225.81	8000.00	8325.00	8694.44	**8326.09**
		±277.0	±258.09	±241.40	±275.51	**±131.75**
	No. of respondents	31	31	40	36	**138**
		(34.44)	(34.44)	(44.44)	(40.00)	**(38.33)**
> 10000	Mean ±SE	35500.00	16954.55	30090.91	17521.74	**23594.94**
		±7119.56	±682.17	±4524.46	±2034.69	**±2654.10**
	No. of respondents	12	22	22	23	**79**
		(13.33)	(24.44)	(24.44)	(25.55)	**(21.94)**
Overall	**Mean ±SE**	**9444.44**	**8233.33**	**12133.33**	**9166.67**	**9744.49**
		±1440.33	**±604.25**	**±1554.96**	**±775.99**	**±587.03**
	No. of respondents	**90**	**90**	**90**	**90**	**360**
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	**(100.00)**

Figures in parenthesis indicate percentage

Table 4.10 Overall annual income of respondents

Income groups (Rs.)		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
>10000	Mean ±SE	7894.85	7209.30	8521.74	7961.54	**7812.0**
		±300.56	±339.03	±280.58	±311.17	**±698.75**
	No. of respondents	33	43	23	26	**125**
		(36.67)	(47.78)	(25.55)	(28.89)	**(34.72)**
10000-25000	Mean ±SE	16402.44	16810.81	17036.54	15605.26	**16416.58**
		±659.96	±786.01	±536.66	±536.10	**±307.19**
	No. of respondents	41	37	52	57	**187**
		(45.55)	(41.11)	(57.78)	(63.33)	**(51.94)**
>25000	Mean ±SE	43906.25	30000.00	47700.00	37285.71	**41229.17**
		±4854.60	±1184.07	±5864.75	±5136.80	**±2679.84**
	No. of respondents	16	10	15	7	**48**
		(17.78)	(11.11)	(16.67)	(7.78)	**(13.33)**
Overall	**Mean ±SE**	**18205.56**	**13688.89**	**19971.11**	**15083.33**	**16737.22**
		±1603.68	**±863.88**	**±1694.38**	**±925.71**	**±674.03**
	No. of respondents	**90**	**90**	**90**	**90**	**360**
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

Table 4.11 Average livestock holding of respondents

Particulars		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
Goat	Mean ±SE	15.62±0.97	18.57±1.38	17.02±1.03	18.61±1.35	**17.46±1.18**
	N	1406	1671	1532	1675	**6284**
		(74.55)	(47.54)	(61.92)	(68.01)	**(60.78)**
Sheep	Mean ±SE	1.68±0.86	16.67±2.67	6.61±2.99	5.77±2.15	**7.68±2.16**
	N	151	1500	595	519	**2765**
		(8.01)	(42.67)	(24.05)	(21.07)	**(26.74)**
Buffalo	Mean ±SE	2.02±0.25	2.04±0.22	2.04±0.24	1.04±0.19	**1.79±0.22**
	N	182	184	184	94	**644**
		(9.65)	(5.23)	(7.44)	(3.82)	**(6.23)**
Cattle	Mean ±SE	1.63±0.19	1.78±0.22	1.81±0.24	1.94±0.24	**1.79±0.22**
	N	147	160	163	175	**645**
		(9.89)	(4.56)	(6.59)	(7.10)	**(6.24)**

Figures in parenthesis indicate district wise percentage

Table 4.12 Species wise average livestock holding of respondents in Udaipur district

Particulars		Categories				Total
		Young male	Young female	Adult female	Breeding male	
Goat	Mean ±SE	3.9±0.25	3.86±0.29	7.71±0.49	0.16±0.04	**15.62±0.97**
	N	351	347	694	14	**1406**
		(24.96)	(24.68)	(49.36)	(0.99)	**(74.55)**
Sheep	Mean ±SE	0.20±0.10	0.30±0.15	1.17±0.60	0.02±0.01	**1.68±0.86**
	N	18	26	105	2	**151**
		(11.92)	(17.22)	(69.54)	(1.32)	**(8.01)**
Buffalo	Mean ±SE	0.18±0.05	0.76±0.06	1.09±0.12	0	**2.02±0.25**
	N	16	68	98	0	**182**
		(8.80)	(37.36)	(53.85)	0	**(9.65)**
Cattle	Mean ±SE	0.50±0.09	0.29±0.06	0.54±0.08	0.03±0.08	**1.63±0.19**
	N	45	26	49	27	**147**
		(30.61)	(17.69)	(33.33)	(18.37)	**(7.79)**
Overall	**Mean ±SE**	**4.78±0.13**	**5.19±0.15**	**10.51±0.24**	**0.50±0.13**	**20.95±1.33**
	N	**430**	**467**	**946**	**43**	**1886**
		(22.80)	**(24.76)**	**(50.16)**	**(2.28)**	**(100.00)**

Figures in parenthesis indicate percentage with in species

Table 4.13 Species wise average livestock holding of respondents in Rajsamand district

Particulars		Categories				Total
		Young male	Young female	Adult female	Breeding male	
Goat	Mean ±SE	2.88±0.11	3.51±0.14	11.7±0.29	0.48±0.13	18.57±1.38
	N	259	316	1053	43	1671
		(15.50)	(18.91)	(63.02)	(2.57)	(47.54)
Sheep	Mean ±SE	2.22±0.24	3.60±0.34	10.54±0.52	0.29±0.10	16.67±2.67
	N	200	325	949	26	1500
		(13.33)	(21.67)	(63.27)	(1.73)	(42.67)
Buffalo	Mean ±SE	0.29±0.10	0.56±0.09	1.18±0.11	0.02±0.15	2.04±0.22
	N	26	50	106	2	184
		(14.13)	(27.17)	(57.61)	(1.09)	(5.23)
Cattle	Mean ±SE	0.26±0.11	0.48±0.10	0.90±0.13	0.14±0.16	1.78±0.22
	N	23	43	81	13	160
		(14.37)	(26.87)	(50.62)	(8.12)	(4.55)
Overall	**Mean ±SE**	**5.64±0.19**	**8.16±0.28**	**24.32±0.02**	**0.93±0.13**	39.06±3.47
	N	**508**	**734**	**2189**	**84**	3515
		(14.45)	**(20.89)**	**(62.27)**	**(2.39)**	(100.00)

Figures in parenthesis indicate percentage with in species

Table 4.14 Species wise average livestock holding of respondents in Chittorgarh district

Particulars		Categories				Total
		Young male	Young female	Adult female	Breeding male	
Goat	Mean ±SE	3.80±0.12	4.40±0.16	8.41±0.20	0.41±0.11	17.02±1.03
	N	342	396	757	37	1532
		(22.32)	(25.85)	(49.41)	(2.41)	(61.92)
Sheep	Mean ±SE	0.96±0.62	1.10±0.66	4.53±0.88	0.02±0.35	6.61±2.99
	N	86	99	408	2	595
		(14.45)	(16.64)	(68.57)	(0.34)	(24.05)
Buffalo	Mean ±SE	0.21±0.10	0.67±0.12	1.67±1.43	0	2.04±0.24
	N	19	60	105	0	184
		(10.33)	(32.61)	(57.06)	0	7.44
Cattle	Mean ±SE	0.74±0.16	0.22±0.14	0.6±0.15	0.24±0.14	1.81±0.24
	N	67	20	54	22	163
		(41.10)	(12.27)	(33.13)	(13.50)	(6.59)
Overall	**Mean ±SE**	**5.71±0.31**	**6.39±0.35**	**14.71±0.55**	**0.68±0.13**	6.87±0.34
	N	**514**	**575**	**1324**	**61**	2474
		(20.78)	**(23.24)**	**(53.52)**	**(2.47)**	**(100.00)**

Figures in parenthesis indicate percentage with in species

Table 4.15 Species wise average livestock holding of respondents in Bhilwara district

Particulars		Categories				Total
		Young male	Young female	Adult female	Breeding male	
Goat	Mean ±SE	4.41±0.15	4.18±0.15	9.57±0.26	0.46±0.10	**18.61±1.35**
	N	397	376	861	41	**1675**
		(23.70)	(22.44)	(51.40)	(2.45)	**(68.01)**
Sheep	Mean ±SE	0.74±0.34	0.90±0.38	4.08±0.76	0.07±0.16	**5.77±2.15**
	N	67	79	367	6	**519**
		(12.91)	(15.22)	(70.71)	(1.16)	**(21.07)**
Buffalo	Mean ±SE	0.11±0.12	0.27±0.13	0.67±0.15	0	**1.04±0.19**
	N	10	24	60	0	**94**
		(10.64)	(25.53)	(63.83)	0	**3.82**
Cattle	Mean ±SE	0.42±0.12	0.30±0.11	1.16±0.14	0.07±0.14	**1.94±0.24**
	N	38	27	104	6	**175**
		(21.71)	(15.43)	(59.43)	(3.43)	**(7.11)**
Overall	**Mean ±SE**	**5.59±0.19**	**5.62±0.21**	**15.47±0.46**	**0.59±0.11**	**27.37±2.64**
	N	**512**	**506**	**1392**	**53**	**2463**
		(20.79)	**(20.54)**	**(56.52)**	**(2.15)**	**(100.00)**

Figures in parenthesis indicate percentage with in species

4.2 ROLE OF HUMAN RESOURCES IN GOAT REARING

Use of surplus family member is one of the important component of livestock rearing in India. Although the work is carried out jointly but survey was conducted with respect to distribution of management operations like feeding, cleaning, milking, grazing, sale of animal, sale of milk, care of young stock, breeding operation, care of sick animal, ecto-parasites and endo-parasites where results are presented as follows:

4.2.1 Feeding

The overall results indicated that women in 47.50 per cent cases, were involved in feeding at home after grazing while men and children in 43.33 and 9.17 per cent cases, respectively (Table 4.16). The district- wise data shows that women play major role in feeding at Rajsamand and Udaipur districts (75.55 and 54.44 per cent, respectively). On the other hand, men were dominant in feeding of goats at Bhilwara and Chittorgarh districts (66.67and 55.55 per cent, respectively). In this activity, the role of children were very low (2.22 to 16.67%).

Table 4.18 Role of human resources for milking operation

Districts	Men	Women	Children	Total
Udaipur	16	68	6	**90**
	(17.78)	(75.55)	(6.67)	**(100.00)**
Rajsamand	43	47	0	**90**
	(47.78)	(52.22)	0	**(100.00)**
Chittorgarh	31	55	4	**90**
	(34.44)	(61.11)	(4.44)	**(100.00)**
Bhilwara	30	58	2	**90**
	(33.33)	(64.44)	(2.22)	**(100.00)**
Overall	120	228	12	**360**
	(33.33)	(63.33)	(3.33)	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.2.4 Grazing

The overall results indicated that grazing of goats was done by men in 60.00 per cent household, while women and children in 28.06 and 11.94 per cent cases, respectively (Table 4.19). The men were involved in grazing of goats in Rajsamand at 82.22 per cent followed by of Bhilwara (71.11%) and Chittorgarh (60.0%) while women were involved in grazing mainly in Udaipur district (57.78%). The role of children in grazing of goats was very less (11.94%).

Table 4.19 Role of human resources for grazing operation

Districts	Men	Women	Children	Total
Udaipur	24	552	14	**90**
	(26.67)	(7.78)	(15.55)	**(100.00)**
Rajsamand	74	15	1	**90**
	(82.22)	(16.67)	(1.11)	**(100.00)**
Chittorgarh	54	17	19	**90**
	(60.00)	(18.89)	(21.11)	**(100.00)**
Bhilwara	64	17	9	**90**
	(71.11)	(18.89)	(10.00)	**(100.00)**
Overall	**216**	**101**	**43**	**360**
	(60.00)	**(28.06)**	**(11.94)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.2.5 Sale of Animals

Men play a significant role in sale of animals (92.50%) whereas, the role of women and children was very low (6.67 and 0.83 per cent households only). Among the districts surveyed, proportion of men was maximum in Bhilwara district (95.55%) while minimum in Udaipur district (88.89%) (Table 4.20).

Table 4.20 Role of human resources for sale of animals

Districts	Men	Women	Children	Total
Udaipur	80	8	2	90
	(88.89)	(8.89)	(2.22)	(100.00)
Rajsamand	84	6	0	90
	(93.33)	(6.67)	0	(100.00)
Chittorgarh	83	7	0	90
	(92.22)	(7.78)	0	(100.00)
Bhilwara	86	3	1	90
	(95.55)	(3.33)	(1.11)	(100.00)
Overall	**333**	**24**	**3**	**360**
	(92.50)	**(6.67)**	**(0.83)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.2.6 Sale of milk

The overall data indicated that sale of milk was performed by men in 92.22 per cent households. On the other hand women and children were not much involved in sale of milk (6.94 and 0.83 per cent, respectively). As in sale of animals, the proportion of males involved in sale of milk was highest in Bhilwara (95.55%) but lowest in Chittorgarh (88.89%). Among the four districts surveyed, women played maximum (10.00%) role in sale of milk in Udaipur district and minimum (4.44%) in Rajsamand and Bhilwara districts. The role of children in sale of milk in Udaipur and Bhilwara district was negligible (Table 4.21).

Table 4.21 Role of human resources for sale of milk

Districts	Men	Women	Children	Total
Udaipur	81	9	0	90
	(90.00)	(10.00)	0	(100.00)
Rajsamand	85	4	1	90
	(94.44)	(4.44)	(1.11)	(100.00)
Chittorgarh	80	8	2	90
	(88.89)	(8.89)	(2.22)	(100.00)
Bhilwara	86	4	0	90
	(95.55)	(4.44)	0	(100.00)
Overall	**332**	**25**	**3**	**360**
	(92.22)	**(6.94)**	**(0.83)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.2.7 Care of young stock

It was evident from the data that overall 53.33 per cent women played role in care of young stock of goats followed by 39.72 per cent men. Very few (6.94%) children played role in care of young stock of goats. The district wise data indicated that maximum proportion of men at 63.33 per cent played role in care of young stock in Rajsamand district, while minimum at 27.78 per cent in Udaipur district. The women of Bhilwara district were involved maximum in care of young stock (62.22%) whereas, that of Rajsamand district minimum (36.67%). Children's role in care of young stock was maximum in Udaipur (17.78%) and minimum in Bhilwara (2.22%) district. Children played negligible role in care of young stock in Rajsamand district (Table 4.22).

Table 4.22 Role of human resources for care of young stock

Districts	Men	Women	Children	Total
Udaipur	25	49	16	90
	(27.78)	(54.44)	(17.78)	**(100.00)**
Rajsamand	57	33	0	90
	(63.33)	(36.67)	0	**(100.00)**
Chittorgarh	29	54	7	90
	(32.22)	(60.00)	(7.78)	**(100.00)**
Bhilwara	32	56	2	90
	(35.55)	(62.22)	(2.22)	**(100.00)**
Overall	**143**	**192**	**25**	**360**
	(39.72)	**(53.33)**	**(6.94)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.2.8 Breeding operation

The overall data shows that men performed major role in breeding operations in 67.22 per cent households. The women played role in breeding at 25.83 per cent, while children at 6.94 per cent only in surveyed area. The district wise data indicated that the proportion of men in Rajsamand, Bhilwara and Chittorgarh districts was higher as compared to women and children but in Udaipur district the percentage of women involved in breeding of goats was slightly higher than men (Table 4.23).

Table 4.23 Role of human resources for breeding operation

Districts	Men	Women	Children	Total
Udaipur	38	39	13	90
	(42.22)	(43.33)	(14.44)	**(100.00)**
Rajsamand	87	3	0	90
	(96.67)	(3.33)	0	**(100.00)**
Chittorgarh	53	27	10	90
	(58.89)	(30.00)	(11.11)	**(100.00)**
Bhilwara	64	24	2	90
	(71.11)	(26.67)	(2.22)	**(100.00)**
Overall	**242**	**93**	**25**	**360**
	(67.22)	**(25.83)**	**(6.94)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.2.9 Care of sick animal

Overall 51.39 per cent care of sick animals was performed by men. The respective proportion of women and children was 43.89 and 4.72 per cent. The district wise results depicted that women of Udaipur (48.89%) and Bhilwara (51.11%) played major role in care of sick animals while at Rajsamand and Chittorgarh districts, men play prominent role in this activity (Table 4.24)

Table 4.24 Role of human resources for care of sick animal

Districts	Men	Women	Children	Total
Udaipur	36 (40.00)	44 (48.89)	10 (11.11)	90 (100.00)
Rajsamand	54 (60.00)	35 (38.89)	1 (1.11)	90 (100.00)
Chittorgarh	53 (58.89)	33 (36.67)	4 (4.44)	90 (100.00)
Bhilwara	42 (46.67)	46 (51.11)	2 (2.22)	90 (100.00)
Overall	**185 (51.39)**	**158 (43.89)**	**17 (4.72)**	**360 (100.00)**

Figures in parenthesis indicate district wise percentage

4.2.10 Ecto-parasites

The overall data irrespective of districts depicted that out of total, 60.83 per cent men played role in control of ectoparasites, followed by women at 31.39 per cent and children at 7.78 per cent. The district wise data showed that men play major role in prevention and control of ectoparasitic infestation (Table 4.25).

Table 4.25 Role of human resources for ecto-parasites

Districts	Men	Women	Children	Total
Udaipur	54 (60.00)	32 (35.55)	4 (4.44)	90 (100.00)
Rajsamand	64 (71.11)	24 (26.67)	2 (2.22)	90 (100.00)
Chittorgarh	56 (62.22)	20 (22.22)	14 (15.55)	90 (100.00)
Bhilwara	45 (50.00)	37 (41.11)	8 (8.89)	90 (100.00)
Overall	**219 (60.83)**	**113 (31.39)**	**28 (7.78)**	**360 (100.00)**

Figures in parenthesis indicate district wise percentage

4.2.11 Endo-parasites

Men played important role in controlling of endoparasites of goats in 77.78 per cent households, while women in 16.67 per cent and children 5.56 per cent cases. The major role of men in controlling endoparasites in goats was observed in all the four districts. It ranged from 67.78 per cent in Udaipur to 91.11 per cent in Rajsamand districts (Table 4.26).

Table 4.16 Role of human resources for feeding operation at home

Districts	Men	Women	Children	Total
Udaipur	26	49	15	90
	(28.89)	(54.44)	(16.67)	(100.00)
Rajsamand	20	68	2	90
	(22.22)	(75.55)	(2.22)	(100.00)
Chittorgarh	50	26	14	90
	(55.55)	(28.89)	(15.55)	(100.00)
Bhilwara	60	28	2	90
	(66.67)	(31.11)	(2.22)	(100.00)
Overall	**156**	**171**	**33**	**360**
	(43.33)	**(47.50)**	**(9.17)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.2.2 Cleaning

The data shows that women play major role in cleaning of sheds women, men and children at 83.33, 11.39 and 5.28 per cent, respectively did cleaning of goat sheds in the study

Table 4.17 Role of human resources for cleaning of shed

Districts	Men	Women	Children	Total
Udaipur	7	74	9	90
	(7.78)	(82.22)	(10.00)	(100.00)
Rajsamand	6	82	2	90
	(6.67)	(91.11)	(2.22)	(100.00)
Chittorgarh	17	68	5	90
	(18.89)	(75.55)	(5.55)	(100.00)
Bhilwara	11	76	3	90
	(12.22)	(84.44)	(3.33)	(100.00)
Overall	**41**	**300**	**19**	**360**
	(11.39)	**(83.33)**	**(5.28)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

area. The district wise data indicated that the role of women in cleaning was predominant in all the four districts as compared to men and children (Table 4.17).

4.2.3 Milking

It was evident from the data that participation of women in milking process was maximum at 63.33 per cent of total families. In 33.33 per cent house holds, the operation of milking of goats was done by man and very few (3.33%) by children in the surveyed area. The role of women in milking in all the four districts was dominant. Children did not play much role in milking of goats in the surveyed districts. Further, the role of children was almost negligible in milking in Rajsamand district (Table 4.18).

Table 4.26 **Role of human resources for endo-parasites**

Districts	Men	Women	Children	Total
Udaipur	61	24	5	90
	(67.78)	(26.67)	(5.55)	(100.00)
Rajsamand	82	5	3	90
	(91.11)	(5.55)	(3.33)	(100.00)
Chittorgarh	70	16	4	90
	(77.78)	(17.78)	(4.44)	(100.00)
Bhilwara	67	15	8	90
	(74.44)	(16.67)	(8.89)	(100.00)
Overall	**280**	**60**	**20**	**360**
	(77.78)	**(16.67)**	**(5.56)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.3 EFFECT OF FLOCK SIZE ON MANAGEMENT PRACTICES

4.3.1 HOUSING PRACTICES

The results obtained on different housing aspects of goats in experiment area from 360 respondents are summarized in the following sub heads and details information are presented in Table 4.27.

4.3.1.1 Site of housing

The site of housing was significantly affected by flock size (χ^2= 6.567*). Overall 86.39 per cent goat keepers housed their goats in shed attached to their residence and remaining 13.61 per cent farmers housed their animals away from their residence.

Among the goat rearers housing their goats attached to the residence maximum at 35.05 per cent had goat size between 1-10 (small flock size) and minimum at 30.87 per cent had above 20 goats. The proportion of goat rearers who housed their goats attached to the residence decreased with the increase in flock size and reverse trend was observed in housing their goats away from residence. Among the small flock size, 90.83 per cent goat rearers housed their goats attached to the residence. The respective values for medium and large flock size were 88.33 and 80.00 per cent, respectively.

4.3.1.2 Mode of housing

The results obtained indicated that the effect of goat flock size on mode of housing was non-significant (χ^2 = 1.519). Most of goat rearers (66.39%) have practiced to house all categories of goats in one shed whereas, 33.61 per cent goat rearers have adopted the practice

Plate 4 : HOUSING OF GOATS

Plate 5 : BREEDING BUCK

to house according to age and sex in separate sheds. Among the farmers of small holding size maximum at 70.00 per cent housed their goats of all categories in one shed. The proportion of goat rearers who practices to house all goats in one shed decreases with increase in flock size. However, reverse trend was observed for goat keepers who housed their goats according to age and sex separately in sheds.

4.3.1.3 Housing time

The association between housing time and flock size was non-significant (χ^2= 1.638). The results show that almost all the goat keepers of medium and large flock size more than 99.00 per cent housed their goats only during night. Although the trend was same in small goat keepers but very few (2.50%) farmers housed their goats during day.

4.3.1.4 Type of shed

The type of shed was not dependent on flock size (χ^2=2.815). Overall 78.89 per cent goat rearers had Kaccha, 15.28 per cent had mixed i.e. Kaccha+Pucca and only 5.83 per cent had Pucca shed to house their goats in the study area. Among the goat rearers maximum (34.51%) had Kaccha shed and the number of goats were between 1 to 10 (Small flock size) whereas, minimum at 32.75 and 32.75 per cent had goats between 11-20 (Medium flock size) and above 20 goats (Large flock size), respectively. The proportion of goat rearers who had Kaccha shed decreased with the increase in flock size and reverse trend was observed in Kaccha + Pucca shed. Among the small flock size 81.67 per cent goat rearers had Kaccha shed, while minimum at 6.67 per cent had Pucca type shed. Similarly among medium and large flock size maximum at 77.50 and 77.50 per cent, respectively had Kaccha type shed

4.3.1.5 Boundary wall

The association between flock size and type of boundary wall was significant (χ^2=12.133*) indicating that flock size of goat had effect on type of boundary wall. Overall 53.89 per cent goat rearers had Kaccha type boundary wall followed by 29.17 per cent biological type. The proportion of farmers having both Kaccha and Pucca boundary wall increased with increase in flock size. However, reverse trend was observed for goat keepers having biological fencing.

4.3.1.6 Type of Floor

The type of floor was significantly (P<0.01) affected by flock size of goats (χ^2 = 20.345**). Overall 65.83 per cent goat rearers had Kaccha floor, 29.44 per cent had mixed (Pucca+Kaccha) while only 4.72 per cent farmers had pucca floor in the study area.

Among the farmers of small holding size maximum at 51.67 per cent had Kaccha floor in the shed. The respective values for farmers having medium and large flock size were 66.67 and 79.17 per cent. The proportion of goat rearers having Kaccha floor, increased with increase in flock size of goats.

4.3.1.7 Type of Roof

The results show that type of roof was not dependent on flock size of goats (χ^2 = 2.286). Maximum goat rearers had thatch type roof (92.78%) followed by cement concrete (5.0%), asbestos (1.11%) and iron sheet (1.11%). Among all categories majority of farmers (>90%) had goat shed with thatch type of roof.

4.3.1.8 Water Trough

Provision of drinking water in sheds through water trough was not affected by flock size (χ^2 = 0.841). The overall results show that maximum goat rearers (85.28%) have no water trough in shed. Only 14.72 per cent goat rearers had troughs for drinking water to their goats. The provision of water trough increased slightly with increase in flock size. Among the goat rearers having water trough in shed were maximum at 37.73 per cent had goat size above 20 goats and among who have no water trough in shed were maximum at 34.20 per cent had goat holding size between 1-10 goats.

4.3.1.9 Source of drinking water

The association between flock size of goat and source of drinking water in the surveyed area were independent of each other (χ^2 = 8.920). The common water trough was major source of drinking water in the study area for all the categories of farmers irrespective of holding size. The troughs on the personal wells located near by the village were another major source of drinking water for goats.

4.3.1.10 Feeding manger

The association between goat flock size and manger in shed was non-significant (χ^2 =3.282). The data indicated that most goat rearers (87.50%) had no manger in their goat sheds for feeding. Among the goat rearers which had manger in shed maximum belong to medium flock size followed by large flock size. Among the available mangers, majority were kaccha (11.39%) and only 1.11 per cent goat rearers in surveyed area have the Pucca manger.

4.3.1.11 Urine drainage

Provision of the urine drainage in goat shed was not affected by flock size (χ^2 = 0.770). The results show that overall 83.61 per cent goat rearers have no drainage, whereas only 16.39 per cent have urine drainage in their goat sheds. The provision of urine drainage in goat shed is more or less similar in all the three categories of farmers based on flock size i.e. small, medium and large.

4.3.1.12 Ventilation

The chi-square value indicated that the effect of goat flock size on provision of ventilation in goat shed was non-significant (χ^2 =3.539). Most of the goat rearers (98.89%) have ventilated type of goat shed.

4.3.1.13 Housing of breeding buck

The housing of breeding buck was significantly (P<0.01) affected by the goat flock size (χ^2=57.206**). Survey results indicated that maximum at 81.67 per cent goat rearers of small flock size do not have breeding buck for their flock. However, proportion of such goat rearers decreases with increase in flock size. Among goat keepers who had flock size of above 20 goats, maximum at 50.0 per cent housed their buck with all goats. The proportion of goat rearers housing breeding buck increases with increase in flock size in separate as well as with all animals. Similarly among the total goat rearers, the large flock size holders house their breeding buck maximum at 57.14 and 43.33 per cent with all animals and in separate shed, respectively.

4.3.1.14 Winter Bedding

The association between winter bedding and goat flock size was non-significant (χ^2=4.164). The survey indicated that overall 93.89 per cent goat farmers did not use bedding during winter, while only 6.11 per cent used bedding material in sheds for their goats. Maximum at 45.45 per cent goat rearers, having large flock size and minimum at 13.64 per cent among medium flock size used to provide bedding material to their goats during winter season.

4.3.1.15 Protection against cold

The effect of flock size on management practices, regarding protection against cold was non-significant (χ^2=3.319). The overall result indicated that 97.78 per cent goat rearers provided protection against cold through different methods while only 2.22 per cent goat rearers of surveyed population had not protected their flock against cold. The proportion of goat rearers who protects flock against cold increased with increase in flock size.

Table 4.27 Housing practices of respondents across flock size

Practices	House holds (Flock size)			Overall	χ^2 Value
	Small (1-10)	Medium (11-20)	Large (>20)		
1. Site of housing					
a. Attached with residence	109 (35.05)# (90.83)*	106 (34.08) (88.33)	96 (30.87) (80.00)	311 (86.39)	6.567*
b. Away from residence	11 (22.45) (9.16)	14 (28.57) (11.67)	24 (48.98) (20.00)	49 (13.61)	
2. Mode of housing					
a. Mixed all	24 (35.15) (70.00)	80 (33.47) (66.67)	75 (31.38) (62.50)	239 (66.39)	1.519
b. Separately	36 (29.75) (30.00)	40 (33.06) (33.33)	45 (37.19) (37.50)	121 (33.61)	
3. Housing time					
a. Day	3 (60.00) (2.50)	1 (20.00) (0.83)	1 (20.00) (0.83)	5 (1.39)	1.638
b. Night	117 (32.96) (97.50)	119 (33.52) (99.17)	119 (33.52) (99.17)	355 (98.61)	
4. Type of shed					
a. Kaccha	98 (34.51) (81.67)	93 (32.75) (77.50)	93 (32.75) (77.50)	284 (78.89)	2.815
b. Pucca	8 (38.09) (6.67	8 (38.09) (6.67)	5 (23.81) (4.17)	21 (5.83)	
c. Kaccha+Pucca	14 (25.45) (11.67)	19 (34.54) (15.83)	22 (40.00) (18.33)	55 (15.28)	
5. Boundary wall					
a. Kaccha	58 (29.90) (48.33)	62 (31.96) (51.67)	74 (38.14) (61.67)	194 (53.89)	12.133*
b. Pucca	16 (26.23) (13.33)	21 (34.43) (17.50)	24 (39.34) (20.00)	61 (16.94)	
c. Biological	46 (43.81) (38.33)	37 (35.24) (30.83)	22 (20.95) (18.33)	105 (29.17)	
6. Type of floor					
a. Kaccha	62 (26.16) (51.67)	80 (33.75) (66.67)	95 (40.08) (79.17)	237 (65.83)	20.345**
b. Pucca	8 (47.06) (6.67)	5 (29.41) (4.17)	4 (23.53) (3.33)	17 (4.72)	
c. Kaccha+Pucca	50 (47.17) (41.67)	35 (33.02) (29.17)	21 (19.81) (17.5)	106 (29.44)	

Practices	House holds (Flock size)			Overall	χ^2 Value
	Small (1-10)	Medium (11-20)	Large (>20)		
7. Type of Roof					
a. Thatch	109 (32.63)	111 (33.23)	114 (34.13)	334	
	(90.83)	(92.50)	(95.00)	(92.78)	
b. Asbestos	1 (25.00)	1 (25.00)	2 (50.00)	4	
	(0.83)	(0.83)	(1.67)	(1.11)	2.286
c. Cement concrete	8 (44.44)	6 (33.33)	4 (22.22)	18	
	(6.67)	(5.00)	(3.33)	(5.00)	
d. Iron sheets	2 (50.00)	2 (50.00)	0	4	
	(1.67)	(1.67)	0	(1.11)	
8. Water trough					
a. Yes	15 (28.30)	18 (33.96)	20 (37.73)	53	
	(12.50)	(15.00)	(16.67)	(14.72)	0.841
b. No	105 (34.20)	102 (33.22)	100 (32.57)	307	
	(87.50)	(85.00)	(83.33)	(85.28)	
9. Source of drinking water					
a. Pond	4 (16.00)	10 (40.00)	11 (44.00)	25	
	(3.33)	(8.33)	(9.17)	(6.94)	
b. Well	31 (26.72)	41 (35.34)	44 (37.93)	116	8.920
	(25.83)	(34.17)	(36.67)	(32.22)	
c. Common water trough	85 (38.81)	69 (31.51)	65 (29.68)	219	
	(70.83)	(57.50)	(54.17)	(60.83)	
10. Feeding manger					
a. Kaccha	9 (21.95)	17 (41.46)	15 (36.58)	41	
	(7.50)	(14.17)	(12.50)	(11.39)	
b. Pucca	2 (50.00)	1 (25.00)	1 (25.00)	4	3.282
	(1.67)	(0.83)	(0.83)	(1.11)	
c. Not available	109 (34.60)	102 (32.38)	104 (33.02)	315	
	(90.83)	(85.00)	(86.67)	(87.5)	
11. Urine drainage					
a. Yes	20 (33.90)	17 (28.81)	22 (37.29)	59	
	(16.67)	(14.17)	(18.33)	(16.39)	0.770
b. No	100 (33.22)	103 (34.22)	98 (32.56)	301	
	(83.33)	(85.83)	(81.67)	(83.61)	
12. Ventilation					
a. Yes	119 (33.43)	120 (33.71)	117 (32.86)	356	
	(99.17)	(100.00)	(97.50)	(98.89)	3.539
b. No	1 (25.00)	0	3 (75.00)	4	
	(0.83)	0	(2.50)	(1.11)	

Practices	House holds (Flock size)			Overall	χ^2 Value
	Small (1-10)	Medium (11-20)	Large (>20)		
13. Housing of breeding buck					
a. Separately	8 (26.67) (6.67)	9 (30.00) (7.50)	13 (43.33) (10.83)	30 (8.33)	57.206**
b. With all animal	14 (13.33) (11.67)	31 (29.52) (25.83)	60 (57.14) (50.00)	105 (29.17)	
c. Not available	98 (43.55) (81.67)	80 (35.55) (66.67)	47 (20.89) (39.17)	225 (62.50)	
14. Winter bedding					
a. Yes	9 (40.91) (7.50)	3 (13.64) (2.50)	10 (45.45) (8.33)	22 (6.11)	4.164
b. No	111 (32.84) (92.50)	117 (34.61) (97.50)	110 (32.54) (91.67)	338 (93.89)	
15. Protection against cold					
a. Yes	115 (32.67) (95.83)	118 (33.52) (98.33)	119 (33.81) (99.17)	352 (97.78)	3.319
b. No	5 (62.50) (4.17)	2 (25.00) (1.67)	1 (12.50) (0.83)	8 (2.22)	

*# Figure in parenthesis indicate vertical and * horizontal percentage*
** Significant (P< 0.05), ** significant (P< 0.01)*

4.3.2 FEEDING PRACTICES

The data on different aspects of feeding were collected from 360 goat rearers and analyzed. The results are presented in Table 4.28.

4.3.2.1 Mode of feeding

The effect of flock size on mode of feeding was non-significant (χ^2=4.191). The overall values indicated that maximum goat rearers (87.78%) adopted semi stall feeding system followed by complete grazing (11.39%) and complete stall feeding system (0.83%). The per cent small, medium and large flock size farmers followed semi-stall feeding were 31.96, 34.81 and 33.23 per cent, respectively.

4.3.2.2 Grazing site

The effect of flock size on grazing site was significant (χ^2=6.969*). The results indicated that mostly grazing was done on community land (96.94%). On the other hand, only

Plate 6 : GRAZING FLOCK

Plate 7 : TREES FOR LOPPING FOR GOATS

3.06 per cent goat rearers used their own land for grazing of their goats. Among the goat rearers of small flock size, 94 17 per cent goat rearers were using community land and only 5.83 per cent used their own land. The respective values for farmers of large flock sized were 96.67 and 3.33 per cent. All the farmers of medium flock size used community land for grazing their goats.

4.3.2.3 Grazing hours

The effect of flock size on grazing hours was non-significant ($\chi^2 = 0.778$). On overall basis maximum (94.72%) goat rearers sent their goats for grazing for more than 5 hours daily. The proportion of goat rearers grazing goats for less than 5 hours were very few (5.28%) in the study area. The proportion of goat rearers who sent their animals for more than 5 hours were almost similar among small, medium and large farmers.

4.3.2.4 Protection of pasture land

The effect of flock size on protection of pasture land was significant (χ^2=6.164*). The results depicted that majority of goat rearers (79.17%) did not protect the pasture land by fencing or boundary wall. Whereas only small number of goats rearers (20.83%) protect their pasture land. The protection of grazing land was higher among farmers of large flock size (28.33%) as compared to small (17.50%) and medium (16.67%).

4.3.2.5 Preservation of tree leaves

The practice of preservation of tree leaves in the form of loom and pala was practiced maximum at 8.33 per cent only by small flock holders while, among medium flock size at 96.67 per cent and overall 94.17 per cent goat rearers of different flock size did not practice to preserve the tree leaves. The effect of flock size on the practice of preservation of tree leaves was non significant (χ^2=2.731).

4.3.2.6 Green fodder provided to different category

The results shows that a total of 60.28 per cent goat rearers of surveyed area provide green fodder to their goats. The proportion of goat rearers feeding green fodder to their whole flock, only milking, and for only kids, respectively decreases with goat flock size. Overall 39.72 per cent goat rearers did not provide green fodder and trend was in increasing order with increase in flock size. Maximum at 50.00 per cent among small flock size and minimum at 0.83 per cent among large flock size goat rearers provides green fodder to the whole flock and only kids while, among large flock holder maximum at 62.50 per cent did not fed green fodder to their goats. The association of feeding of green fodder with different flock size was highly significant (χ^2=59.697**).

Table 4.28 **Feeding practices of respondents across flock size**

Practices	House holds (Flock size) Small (1-10)	Medium (11-20)	Large (>20)	Overall	χ^2 Value
1. Mode of feeding					
a. Complete stall feeding	2 (66.67)#	0	1 (33.33)	3	
	(1.67)*	0	(0.83)	(0.83)	
b. Semi stall feeding	101 (31.96)	110 (34.81)	105 (33.23)	316	4.191
	(84.17)	(91.67)	(87.50)	(87.78)	
c. Complete grazing	17 (41.46)	10 (24.39)	14 (34.15)	41	
	(14.17)	(8.33)	(11.67)	(11.39)	
2. Grazing site					
a. Own land	7 (63.64)	0	4 (36.36)	11	
	(5.83)	0	(3.33)	(3.06)	6.969*
b. Community land	113 (32.38)	120 (34.88)	116 (33.24)	349	
	(94.17)	(100.00)	(96.67)	(96.94)	
3. Grazing hours					
a. < 5 hrs	8 (42.11)	5 (26.32)	6 (31.58)	19	
	(6.67)	(4.17)	(5.00)	(5.28)	0.778
b. > 5 hrs	112 (32.84)	115 (33.72)	114 (33.43)	341	
	(94.17)	(95.83)	(95.00)	(94.72)	
4. Protection of pasture land					
a. Yes	21 (28.00)	20 (26.67)	34 (45.33)	75	
	(17.50)	(16.67)	(28.33)	(20.83)	6.164*
b. No	99 (34.73)	100 (35.09)	86 (30.18)	285	
	(82.50)	(83.33)	(71.67)	(79.17)	
5. Preservation of tree leaves					
a. Yes	10 (47.62)	4 (19.05)	7 (33.33)	21	
	(8.33)	(3.33)	(5.83)	(5.83)	2.731
b. No	110 (32.45)	116 (34.22)	113 (33.33)	339	
	(91.67)	(96.67)	(94.17)	(94.17)	
6. Green fodder provide to different category					
a. Whole flock	60 (39.22)	53 (34.64)	40 (26.14)	153	59.697*
	(50.00)	(44.17)	(33.33)	(42.50)	
b. Only milking	19 (57.57)	10 (30.31)	4 (44.44)	33	
	(15.83)	(8.33)	(3.33)	(9.17)	

Practices	House holds (Flock size) Small (1-10)	Medium (11-20)	Large (>20)	Overall	χ^2 Value
c. Only kid	19 (61.29)	11 (35.48)	1 (14.29)	31	
	(15.83)	(9.17)	(0.83)	(8.61)	
d No.	22 (15.38)	46 (32.17)	75 (52.45)	143	
	(18.33)	(38.33)	(62.50)	(39.72)	
7. Type of green fodder used for feeding					
a. Lucern	27 (42.86)	17 (26.98)	19 (30.16)	63	
	(22.50)	(14.17)	(15.83)	(17.50)	
b. Berseem	3 (27.27)	5 (45.45)	3 (27.27)	11	
	(2.50)	(4.17)	(2.50)	(3.06)	83.170**
c. Weeds	36 (37.11)	43 (44.33)	18 (18.56)	97	
	(30.00)	(35.83)	(15.00)	(26.94)	
d. Monsoon grass	32 (69.56)	9 (19.56)	5 (10.87)	46	
	(26.61)	(7.50)	(4.17)	(12.78)	
e. None of above	22 (15.38)	46 (32.17)	75 (52.45)	146	
	(18.33)	(38.33)	(62.50)	(39.72)	
8. Lopping of the tree					
a. Yes	107 (34.19)	101 (32.27)	105 (33.55)	313	
	(89.17)	(84.17)	(87.50)	(86.94)	1.370
b. No	13 (27.66)	19 (40.43)	15 (31.91)	47	
	(10.83)	(15.83)	(12.50)	(13.06)	
9. Feeding of dry fodder					
a. Yes	20 (27.78)	26 (36.11)	26 (36.11)	72	
	(16.67)	(21.67)	(21.67)	(20.00)	1.250
b. No	100 (34.72)	94 (32.64)	94 (32.64)	288	
	(83.33)	(78.33)	(78.33)	(80.00)	
10. Concentrate feeding					
a. Yes	102 (32.08)	108 (33.96)	108 (33.96)	318	
	(85.00)	(90.00)	(90.00)	(88.33)	1.941
b. No	18 (42.86)	12 (28.57)	12 (28.57)	42	
	(15.00)	(10.00)	(10.00)	(11.67)	
11 Type of concentrate use					
a. Home prepared	13 (28.89)	16 (35.56)	16 (35.56)	45	7.317
	(10.83)	(13.33)	(13.33)	(12.50)	

Practices	House holds (Flock size) Small (1-10)	Medium (11-20)	Large (>20)	Overall	χ^2 Value
b. Single ingredient	103 (35.89	94 (32.25)	90 (31.36)	287	
	(85.83)	(78.33)	(75.00)	(79.72)	
c. Readymade	85 (34.69)	82 (33.47)	78 (31.84)	245	
	(70.83)	(68.33)	(65.00)	(68.05)	
d. None of above	18 (42.86)	12 (28.57)	12 (28.57)	42	
	(15.00)	(10.00)	(10.00)	(11.67)	
12. Time of concentrate feeding					
a. No.	18 (42.86)	12 (28.27)	12 (28.51)	42	
	(15.00)	(10.00)	(10.00)	(11.67)	
b. Prior	47 (28.66)	55 (33.54)	62 (37.80)	164	4.645
	(39.17)	(45.83)	(51.67)	(45.55)	
c. During milking	55 (35.71)	53 (34.41)	46 (29.87)	154	
	(45.83)	(44.17)	(38.33)	(42.78)	
13. Fatening ration					
a. Yes	89 (34.63)	86 (33.46)	82 (31.91)	257	
	(74.17)	(71.67)	(68.33)	(71.39)	1.006
b. No	31 (30.10)	34 (33.00)	38 (36.89)	103	
	(25.83)	(28.33)	(31.67)	(28.61)	
14. Feeding of mineral mixture					
a. Yes	8 (61.54)	3 (43.33)	2 (15.38)	13	
	(6.67)	(2.50)	(1.67)	(3.61)	4.848
b No	112 (32.28)	117 (33.72)	118 (34.01)	347	
	(93.33)	(97.50)	(98.33)	(96.39)	
15. Feeding of common salt					
a. Yes	72 (28.69)	83 (33.07)	96 (38.25)	251	
	(60.00)	(69.17)	(80.00)	(69.72)	11.395**
b. No	48 (44.03)	37 (33.94)	24 (22.01)	109	
	(40.00)	(30.83)	(20.00)	(30.28)	

*# Figure in parenthesis indicate vertical and * horizontal percentage*
** Significant (P< 0.05), ** significant (P< 0.01)*

4.3.2.7 Type of green fodder used for feeding

The association between flock size and type of green fodder used for feeding was highly significant (χ^2=83.170**). It was observed that maximum 26.94 per cent goat rearers

offered weeds followed by 17.50, 12.78 and 3.06 per cent lucern, monsoon grass and berseem, respectively. Out of total surveyed goat rearers, 39.72 per cent did not provide any type of green fodder to their goats. The proportion of feeding monsoon grass to goats decreased as the flock size of goat increased.

4.3.2.8 Lopping of the tree

The information collected on lopping of tree for feeding revealed that maximum (86.94%) goat rearers practiced lopping of the tree and out of which maximum were small flock holders, while 13.06 per cent surveyed population, did not practices lopping of trees. The association of lopping of the tree was non-significant with flock size of goats (χ^2=1.370).

4.3.2.9 Feeding of dry fodder

On overall basis 80.00 per cent goat rearers did not practice feeding of dry fodder to their goats in the surveyed area. The result shows that 83.33 per cent of small flock holders and 78.33 per cent of medium and large flock size did not practice feeding dry fodder to their goats

The proportion of goat rearers equally at 21.67 per cent, among medium and large flock size practiced feeding dry fodder to their goats. The effect of flock size on feeding of dry fodder was non-significant (χ^2=1.250).

4.3.2.10 Concentrate feeding

The results indicated non-significant effect of flock size on concentrate feeding (χ^2=1.941). The data shows that overall 88.33 per cent goat owners fed concentrate to goats. Among goat rearers of medium and large flock size 33.96 per cent of each practiced feeding concentrate while, 32.08 per cent of small flock holders, also fed concentrate. Among the goat rearers of different flock size, not providing concentrate to goat, are maximum in small flock holders (42.86%) and at equal numbers (28.57%) among medium and large flock size.

The overall data revealed that average concentrate fed per goat in surveyed area was 138.33.11±7.22 gm per day and it was maximum in Chittorgarh districts (181.11±23.39 gm) and minimum in Udaipur district (109.44±5.46 gm) . The maximum proportion of goat rearers (78.89%) fed 100-200 gm concentrate per goat per day, while few goat rearers (2.22%) fed above 300 gm concentrate per goat per day. Total 11.67 per cent goat rearers did not fed concentrate to goats in the study area (Table 4.29).

4.3.2.11 Type of concentrate used

The information collected on type of concentrate indicates that maximum goat rearers (79.72%) use the concentrate having single ingredient 68.05 and 12.50 per cent farmers uses readymade and home prepared concentrate, respectively in the experimental area. Among small flock size holders maximum at 85.83 per cent, used single ingredient only and 70.83 per cent farmers used readymade concentrate available in the market. Total, 11.67 per cent farmers of different flock size of surveyed population have not used any type of concentrate for feeding. The proportion of goat rearers used single ingredient and readymade concentrate decreased with increasing flock size. The association between goat flock size and type of concentrate used was non-significant (χ^2=7.317).

Table 4.29 Average quantity of concentrate fed to goats

Concentrate quantity /day/goat		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
No	Mean ±SE	0	0	0	0	**0**
	No. of respondents	10	8	14	10	**42**
		(11.11)	(8.89)	(15.56)	(11.11)	**(11.67)**
100-200 gm	Mean ±SE	121.52±4.12	133.33±7.32	139.71±4.86	118.83±6.19	**127.45±2.74**
	No. of respondents	79	60	68	77	**284**
		(87.78)	(66.67)	(75.56)	(85.55)	**(78.89)**
200-300 gm	Mean ±SE	250.0±0.0	250.0±0.0	0	266.67±16.68	**251.92±1.92**
	No. of respondents	1	22	0	3	**26**
		(1.11)	(24.44)	0	(3.33)	**(7.22)**
> 300 gm	Mean ±SE	0	0	850.0±46.26	0	**850.0±46.26**
	No. of respondents	0	0	8	0	**8**
		0	0	(8.89)	0	**(2.22)**
Overall	**Mean ±SE**	**109.44±5.46**	**150.11±11.34**	**181.11±23.39**	**110.56±8.40**	**138.33±7.22**
	No. of respondents	**90**	**90**	**90**	**90**	**360**
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.3.2.12 Time of concentrate feeding

Time of concentrate feeding was not significantly affected by the flock size (χ^2=4.645). The maximum goat rearers (45.55%) of surveyed population provided concentrate to their goats prior to milking. The proportion of goat rearers who used to provide concentrate prior to milking gradually increased with increasing flock size while, reverse trend was observed for those providing concentrate during milking.

4.3.2.13 Fatening ration

The effect of flock size on this practice was non-significant (χ^2=1.006). In the study area, 71.39 per cent goat rearers practiced feeding extra concentrate to attain early maturity but 28.61 per cent goat rearers did not adopted this practice.

4.3.2.14 Feeding of mineral mixture

The results shows that awareness of about feeding of mineral mixture was observed only in 3.61 per cent goat rearers. Among the small flock size only 6.67 per cent farmers fed the mineral mixture while, in large flock goat holders 98.33 per cent do not fed mineral mixture to their goats. The effect of flock size on feeding of mineral mixture was non-significant (χ^2=4.848).

4.3.2.15 Feeding of common salt

As expected association between flock size and common salt feeding practice was highly significant (χ^2=11.395**). The results indicated that maximum goat rearers at 69.72 per cent used salt rather than mineral mixture feeding. While 30.28 per cent goat rearers were not aware about feeding of salt with the concentrate. Among the small flock holder maximum at 40.00 per cent were not aware to fed salt whereas, 80.00 per cent of large flock holders were aware to feed salt to their animals with concentrate or in water.

4.3.3 BREEDING PRACTICES

The results pertaining to the breeding practices followed by the goat rearers as under:

The perusal of data revealed that the most common symptom of heat detection on overall basis was bellowing (94.17%) followed by tail vibration free (82.78%), frequent urination (76.39%), mounting on other goats (71.67%), mucous discharge (66.67%) and reduction in milk yield (49.72%). The district wise results obtained indicates that maximum goat rearers of Udaipur district used bellowing while, minimum at 28.89 per cent goat rearers of Bhilwara district used reduction in milk yield as a detection of heat symptoms (Table 4.30).

Table 4.30 Signs of oestrus observed by respondents

Symptoms	Districts				Overall
	Udaipur	Rajsamand	Chittorgarh	Bhilwara	
Bellowing	88 (97.78)	85 (94.44)	82 (91.11)	84 (93.33)	**339 (94.17)**
Frequent urination	68 (75.56)	61 (67.78)	71 (78.89)	75 (83.33)	**275 (76.39)**
Mounting	73 (81.11)	62 (68.89)	51 (56.67)	72 (80.00)	**258 (71.67)**
Mucous Discharge	61 (67.78)	61 (67.78)	60 (66.67)	58 (64.44)	**240 (66.67)**
Reduction in milk yield	63 (70.00)	35 (38.89)	55 (61.11)	26 (28.89)	**179 (49.72)**
Vibrate the tail free	87 (96.67)	85 (94.44)	68 (75.56)	58 (64.44)	**298 (82.78)**

Figures in parenthesis indicate district wise percentage

Natural service was practiced for breeding in goats by all the goat rearers and artificial insemination was not practiced in the study area due to lack of trained person and non-availability of buck semen in areas.

The average age at first matting of goats in area was 16.05±0.22 months. The lowest age (12.32±0.11 months) was in Chittorgarh district, while the highest age at matting (18.91±0.39 months) was in Rajsamand district. 45.83 per cent of goat had age at first matting between 12-18 months followed by 37.50 per cent below 12 months while only 16.67 per cent had first matting age above 18 months in the surveyed area. The district wise information indicated that maximum age at first matting was recorded (24 months) in Udaipur and Bhilwara, with overall mean as of 16.09± 0.40 and 16.87± 0.47 months, respectively. The overall mean as at first matting for Chittorgarh district goat keepers were recorded minimum at 12.32±0.11 months (Table 4.31).

Table 4.31 Average age at first matting of goats under study area

Age groups (Months)		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
<12	Mean ±SE	11.86±0.14	12.00±0.0	11.96±0.04	11.79±0.12	**11.90±0.04**
	No. of respondents	28 (31.11)	1 (1.11)	78 (86.67)	28 (31.11)	**135 (37.50)**
12-18	Mean ±SE	16.98±0.24	16.46±0.20	14.67±0.40	17.18±0.25	**16.69±0.13**
	No. of respondents	53 (58.89)	56 (62.22)	12 (13.33)	44 (48.89)	**165 (45.83)**
> 18	Mean ±SE	24.00±0.00	15.00±0.00	0	24.00±0.00	**23.6±0.16**
	No. of respondents	9 (10.00)	33 (36.67)	0	18 (20.00)	**60 (16.67)**
Overall	**Mean ±SE**	**16.09±0.40**	**18.91±0.39**	**12.32±0.11**	**16.87±0.47**	**16.05±0.22**
	No. of respondents	**90 (100.00)**	**90 (100.00)**	**90 (100.00)**	**90 (100.00)**	**360 (100.00)**

Figures in parenthesis indicate district wise percentage

The effect of flock size on different breeding practices adopted by goat rearers of study area are presented in Table 4.32.

Table 4.32 Breeding practices of respondents across flock size

Practices	House holds (Flock size)			Overall	χ^2 Value
	Small (1-10)	Medium (11-20)	Large (> 20)		
1. Breeding buck					
a. Own	22 (16.30)#	40 (29.63)	73 (54.07)	**135**	
	(18.33)*	(33.33)	(60.83)	**(37.50)**	47.573**
b. Other	98 (43.55)	80 (35.55)	47 (20.89)	**225**	
	(81.67)	(66.67)	(39.17)	**(62.50)**	
2. Selection of breeding buck					
a. Own flock	15 (14.42)	34 (32.69)	55 (52.88)	**104**	
	(12.50)	(28.33)	(45.83)	**(28.89)**	32.479**
b. Out site	105 (41.01)	86 (33.59)	65 (25.39)	**256**	
	(87.50)	(71.67)	(54.17)	**(71.11)**	
3. Breeding season					
a. Summer	38 (39.17)	29 (29.90)	30 (30.93)	**97**	
	(31.67)	(24.17)	(25.00)	**(26.94)**	
b. Rainy	75 (32.19)	78 (33.48)	80 (34.33)	**233**	3.468
	(62.50)	(65.00)	(66.67)	**(64.72)**	
c. Winter	7 (23.33)	13 (43.33)	10 (33.33)	**30**	
	(5.83)	(10.83)	(8.33)	**(8.33)**	
4. Pregnancy confirmation					
a. Non return	4 (25.0)	6 (37.5)	6 (37.5)	**16**	
	(3.33)	(5.00)	(5.00)	**(4.44)**	
b. Scientific	6 (42.86)	5 (35.71)	3 (21.43)	**14**	1.517
	(5.00)	(4.17)	(2.50)	**(3.89)**	
c. Enlargement of abdomen	110 (33.33)	109 (33.03)	111 (33.64)	**330**	
	(91.67)	(90.83)	(92.50)	**(91.67)**	
5. Management of pregnant doe:					
(i) Housing					
a Separate	1 (25.00)	1 (25.00)	2 (50.00)	**4**	
	(0.83)	(0.83)	(1.67)	**(1.11)**	0.507
b. Group	119 (33.43)	119 (33.43)	118 (33.15)	**356**	
	(99.17)	(99.17)	(98.33)	**(98.89)**	
(ii) Grazing					
a. Not allowed	1 (8.33)	7 (58.33)	4 (33.33)	**12**	
	(0.83)	(5.83)	(3.33)	**(3.33)**	4.654
b. Allowed	119 (34.19)	113 (32.47)	116 (33.33)	**348**	
	(99.17)	(94.17)	(96.67)	**(96.67)**	

Practices	House holds (Flock size)			Overall	χ^2 Value
	Small (1-10)	Medium (11-20)	Large (> 20)		
(iii) Prepartum ration					
a. Yes	21 (38.18)	15 (27.27)	19 (34.54)	**55**	
	(17.50)	(12.50)	(15.83)	**(15.28)**	1.626
b. No	99 (32.46)	105 (34.43)	101 (33.11)	**305**	
	(82.50)	(87.50)	(84.17)	**(84.72)**	
(iv) Veterinary aid during kidding					
a. Required	16 (34.04)	15 (31.91)	16 (34.04)	**47**	
	(13.33)	(12.50)	(13.33)	**(13.05)**	0.253
b. Not required	104 (33.23)	105 (33.55)	104 (33.23)	**313**	
	(86.67)	(87.50)	(86.67)	**(86.94)**	
6. Castration					
a. Yes	29 (21.97)	43 (32.57)	60 (45.45)	**132**	
	(24.17)	(35.83)	(50.00)	**(36.67)**	17.286**
b. No	91 (39.91)	77 (33.77)	60 (26.31)	**228**	
	(75.83)	(64.17)	(50.00)	**(63.33)**	
7. Selection criteria of breeding buck					
a. Body weight/Health	16 (26.23)	20 (32.79)	25 (40.98)	**61**	
	(13.33)	(16.67)	(20.83)	**(16.94)**	
b. Milk yield of doe	8 (24.24)	10 (30.30)	15 (45.45)	**33**	
	(6.67)	(8.33)	(12.50)	(9.17)	4.402
c. Physical appearance/ breed characteristics	96 (36.09)	90 (33.83)	80 (30.07)	**266**	
	(80.00)	(75.00)	(66.67)	**(73.89)**	
8. Treatment of anoestrus					
a. Yes	24 (36.36)	20 (30.30)	22 (33.33)	**66**	
	(20.00)	(16.67)	(18.33)	**(18.33)**	0.445
b. No	96 (32.65)	100 (34.01)	98 (33.33)	**294**	
	(80.00)	(83.33)	(81.67)	**(81.67)**	
9. Treatment of repeaters					
a. Yes	26 (38.23)	20 (29.41)	22 (32.35)	**68**	
	(21.67)	(16.67)	(18.33)	**(18.89)**	1.015
b. No	94 (32.19)	100 (34.25)	98 (33.56)	**292**	
	(78.33)	(83.33)	(81.67)	**(81.11)**	

*# Figure in parenthesis indicate vertical and * horizontal percentage*
** Significant (P 0.05), ** significant (P 0.01)*

4.3.3.1 Breeding Buck

The association between flock size and breeding buck kept by goat rearers was highly significant (χ^2=47.573**). Majority of goat rearers (62.50%) did not possess their own buck

for breeding whereas, 37.50 per cent goat rearers used own breeding buck for matting The proportion of goat rearers having own breeding buck was higher among goat rearers of large flock size (54.07%) as compared to medium (29.63%) and small (16.30%) flock size.

The results also indicates that keeping of own breeding buck in the flock increased with the increase in goat flock size. The use of breeding buck other than their own buck in flock decreased with increase in the flock size. The maximum use of other buck was observed for small flock size.

The survey result also shows that overall number of breedable goats per bucks was observed as 43.06±0.46 goats in experiment area. Breedable goats per buck were recorded maximum at 48.83±0.79 in Udaipur and minimum at 35.89±0.53 goats in Rajsamand districts. Goat rearers at 45.56 per cent of study area used their breeding buck in above 40 breedable females while, few goat rearers at 10.56 per cent used their breeding buck for less than 30 breedable goats (Table 4.33).

Table 4.33 Average breedable goats per breeding buck of respondents

Breedable goats/buck		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
< 30 Goats	Mean ±SE	28.33±1.67	29.55±0.31	26.67±0.71	25.00±0.0	**28.42±0.38**
	No. of respondents	3	22	12	1	38
		(3.33)	(24.44)	(13.33)	(1.11)	**(10.56)**
30-40 Goats	Mean ±SE	39.69±0.31	37.06±0.31	37.82±0.40	39.63±0.21	**38.16±0.19**
	No. of respondents	16	63	39	40	158
		(17.78)	(70 00)	(43.33)	(44.44)	**(43.89)**
> 40 Goats	Mean ±SE	51.34±0.42	49.0±1.0	48.08±0.39	52.96±0.84	**50.98±0.35**
	No. of respondents	71	5	39	49	164
		(78.89)	(5.56)	(43.33)	(54.44)	**(45.56)**
Overall	**Mean ±SE**	**48.83±0.79**	**35.89±0.53**	**40.78±0.82**	**46.72±0.87**	**43.06±0.46**
	No. of respondents	**90**	**90**	**90**	**90**	**360**
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

The overall average period, for which a buck was used for breeding purpose in a flock, was 2.42±0.08 years observed in surveyed area. Maximum at 48.61 per cent goat rearers used a breeding buck for a period of 1-2 years while, at 18.61 per cent goat rearers used a breeding buck for more than 3 years. The goat keepers at maximum at 66.67 per cent

in Chittorgarh district used breeding buck for the period of 1 to 2 years while, in Udaipur 8.89 per cent goat keepers used breeding buck 2 to 3 years (Table 4.34).

Table 4.34 Average duration of breeding buck used in respondents flock

Age groups		Districts				Overall
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
No breeding buck	Mean ±SE	0	0	0	0	**0**
	No. of respondents	17	11	0	6	**34**
		(18.89)	(12.22)	0	(6.67)	**9.44**
1-2 Years	Mean ±SE	2.00±0.0	1.45±0.07	1.55±0.06	1.85±0.05	**1.65±0.04**
	No. of respondents	15	47	60	53	**175**
		(16.67)	(52.22)	(66.67)	(58.89)	**(48.61)**
2-3 Years	Mean ±SE	3.00±0.0	3.00±0.0	3.00±0.0	3.00±0.0	**3.00±0.0**
	No. of respondents	8	32	19	25	**84**
		(8.89)	(35.55)	(21.11)	(27.78)	**(23.33)**
> 3 Years	Mean ±SE	5.14±0.12	0	4.18±0.12	4.33±0.21	**4.91±0.11**
	No. of respondents	50	0	11	6	**67**
		(55.55)	0	(12.22)	(6.67)	**(18.61)**
Overall	**Mean ±SE**	**3.46±0.11**	**1.82±0.11**	**2.17±0.11**	**2.21±0.10**	**2.42±0.08**
	No. of respondents	**90**	**90**	**90**	**90**	**360**
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.3.3.2 Selection of Breeding Buck

The selection of breeding buck was significantly affected by the flock size (χ^2=32.479**). Information pertaining to selection of breeding buck shows that maximum goat rearers (70.11%) in the study area practiced to select breeding buck from outside of their flock. The proportion of goat rearers who practiced to select the breeding buck from outside decreased with increase in flock size, whereas, the proportion of goat rearers who select breeding buck from their own flock increased with increase in flock size. The goat rearers among small flock size selected maximum at 87.50 per cent breeding buck from out site, while among the goat keepers who select breeding buck from own flock are maximum at 52.88 per cent were from large flock size.

4.3.3.3 Breeding Season

Results obtained indicates that maximum at 64.72 per cent goat rearers observed their goat in heat during rainy or with the onset of monsoon while, only 8.33 per cent goat rearers observed their goats in heat during winter season. The association between goat flock size and breeding season was non-significant (χ^2=3.468). Large flock size goat exhibits heat maximum at 66.67 per cent during rainy season while goats under small flock size exhibits heat minimum at 5.83 per cent during winter season.

4.3.3.4 Pregnancy Confirmation

The effect of flock size on pregnancy confirmation was non-significant (χ^2=1.517). The overall results shows that majority of goat rearers (91.67%) confirm their goat pregnancy by enlargement of abdomen followed by non return of animal in heat (4.44%) and few goat rearers confirm through scientific method (3.89%). The proportion of goat rearers who use scientific method for pregnancy confirmation are decreased with increased in flock size.

4.3.3.5 Management of Pregnant Doe

The information relevant to management of pregnant doe are presented in following sub-heads:-

4.3.3.5.1 Housing

The effect of flock size on housing of pregnant doe was also non-significant (χ^2=0.507). Result shows that maximum goat rearers (98.89%) in the study area practiced to house their pregnant doe with their other goats, in group housing while, only 1.11 per cent goat rearers were aware to house pregnant doe in a separate house. The proportion of goat rearers who housed pregnant doe in group are almost equal (33.00%) in different flock size whereas, proportion who housed separate were maximum at 1.67 per cent among large flock size.

4.3.3.5.2 Grazing

The association between grazing of doe during pregnancy and goat flock size was non-significant (χ^2=4.654). Only few farmer at 3.33 per cent of survey population have not allowed pregnant doe to go for grazing while, maximum proportion of goat rearers at 96.67 per cent allowed doe for grazing during pregnancy period. The proportion of goat keepers who take their pregnant doe for grazing were maximum at 99.17 per cent for small flock size.

Among the goat rearers who did not allowed their pregnant doe for grazing were maximum at 5.83 per cent among medium flock size.

4.3.3.5.3 Prepartum Ration

The effect of flock size on providing prepartum ration to pregnant doe was non-significant (χ^2=1.626). Survey results indicate that maximum (84.72%) number of goat rearers of experiment area do not provide any special ration for their pregnant doe. While, only few goat rearers at 15.28 per cent provide prepartum ration to their pregnant doe. 17.50 per cent goat rearers among small flock size were well aware to provide prepartum ration, whereas, maximum at 87.50 per cent of medium flock size goat rearers were not aware of providing prepartum ration to their pregnant doe. The result also shows that goat keepers who provide prepartum ration were maximum (38.18%) among small flock holders while, those who do not provide prepartum ration were maximum (34.43%) of medium flock holders.

4.3.3.5.4 Veterinary Aid during Kidding

The results shows that overall 86.94 per cent goat rearers do not require any veterinary aid, while 13.05 per cent goat rearers required veterinary aid during kidding. The proportion of goat rearers who required or not required veterinary aid during kidding were almost similar in different flock size. The association between flock size and veterinary aid during kidding was non-significant (χ^2=0.253).

4.3.3.6 Castration

The association between different flock size and castration was highly significant (χ^2=17.286**). It was observed that proportion of goat rearers under small flock size who followed castration was 24.17 per cent which increase to 35.83 per cent among medium and 50.00 per cent among large flock size goat rearers. It shows increasing trend with increased flock size. The overall results irrespective of holding size indicates that 36.67 per cent goat rearers followed castration, while 63.33 goat rearers did not followed castration practices for their male kids. The information pertaining to the average age of castration indicates that 33.89 per cent goat rearers castrate male kids at the age of above 3 months followed by 3.89 per cent at 1-2 months age. The overall mean age at castration of male kid in experimental area was observed at 1.35±0.10 months. The goat keepers of Bhilwara district maximum at 71.11 per cent castrate their male kids at the age of above 3 months with the average age at 3.2±0.14 months while, goat keepers of Udaipur and Rajsamand districts do not castrate male kids up to age of 2 months (Table 4.35).

Table 4.35 Average age at castration of male kids under study area

Age groups		Districts				Overall (Months)
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
No	Mean ±SE	0.0	0.0	0.0	0.0	**0.0**
	No. of respondents	78	41	44	65	**228**
		(86.67)	(45.55)	(48.89)	(72.22)	**(63.33)**
0-2 Months	Mean ±SE	0.0	0.0	2.00±0.0	2.00±0.0	**2.00±0.0**
	No. of respondents	0	0	5	5	**10**
		0	0	(5.55)	(5.55)	**(2.78)**
> 3 Months	Mean ±SE	3.33±0.19	3.22±0.09	4.78±0.27	3.2±0.14	**3.75±0.12**
	No. of respondents	12	49	41	20	**122**
		(13.33)	(54.44)	(45.55)	(71.11)	**(33.89)**
Overall	**Mean ±SE**	**0.44±0.12**	**1.76±0.18**	**2.29±0.27**	**0.91±0.15**	**1.35±0.10**
(Months)	**No. of respondents**	**90**	**90**	**90**	**90**	**360**
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	**(100.00)**

Figures in parenthesis indicate district wise percentage

4.3.3.7 Selection Criteria of Breeding Buck

The physical appearance or breed characteristics as a criteria to select breeding buck was practiced maximum at 73.89 per cent, while only 9.17 per cent goat rearers used milk yield and 16.94 per cent body weight or health as criteria for selection of breeding buck. The proportion of goat rearers among different flock size who used body weight/health and milk yield of doe as selection criteria increased with increase in flock size, while physical appearance /breed characteristic as a criteria for selecting breeding buck was found in decreasing order with decreasing flock size. The association among flock size and selection criteria of breeding buck (χ^2=4.402) was non-significant.

4.3.3.8 Treatment of Anoestrus

Only 20.00 per cent goat rearers of small flock size provided treatment for anoestrus followed by large (18.33%) and medium (16.67%) flock size holders. The effect of flock size

on treatment of anoestrus was non-significant (χ^2=0.445). Maximum 83.33 per cent goat rearers of medium flock size did not provide treatment to their goats for anoestrus.

4.3.3.9 Treatment of Repeaters

Only 18.89 per cent goat rearers of surveyed population were well aware to provide treatment to their repeater doe. Almost equal number of goat rearers was recorded among different flock size who did not take any treatment for the goat not conceived and proportion of such goat rearers were observed at 81.11 per cent of total surveyed population. The association between treatment of repeaters and flock size was non-significant (χ^2=1.015). The proportion of goat rearers who were well aware to provide treatment was maximum at 38.23 per cent among small flock size.

4.3.4 HEALTH CARE PRACTICES

The surveyed goat rearers mostly used Albendazole, Nilzone and Piprazine for deworming their goat for internal parasites. Dirrhoea, Dog bitting, blot, Enterotoxima and FMD were the major common diseases occurring in the surveyed area. The goat rearers of surveyed area generally do not practice treatment but practice only, deshi treatment like drenching oil, dam (burning by iron rod) etc. All the goat rearers of study area practiced disposed of carcass by throwing out of the village premises.

The results obtained on different aspects of health care practices in experimental area are summarized in Table 4.36.

4.3.4.1 Use of Veterinary Facilities

The analysis of data showed that effect of flock size on use of veterinary facilities by goat rearers of surveyed area was non significant (χ^2= 0.308). Overall results revealed that 68.33 per cent goat keepers did not use veterinary facilities for the treatment of their sick animals. Among the goat rearers who utilizes available veterinary facilities maximum at 35.09 per cent possess more than 20 goats in the flock (large) whereas minimum at 31.58 per cent possess 11 to 20 goats (medium).

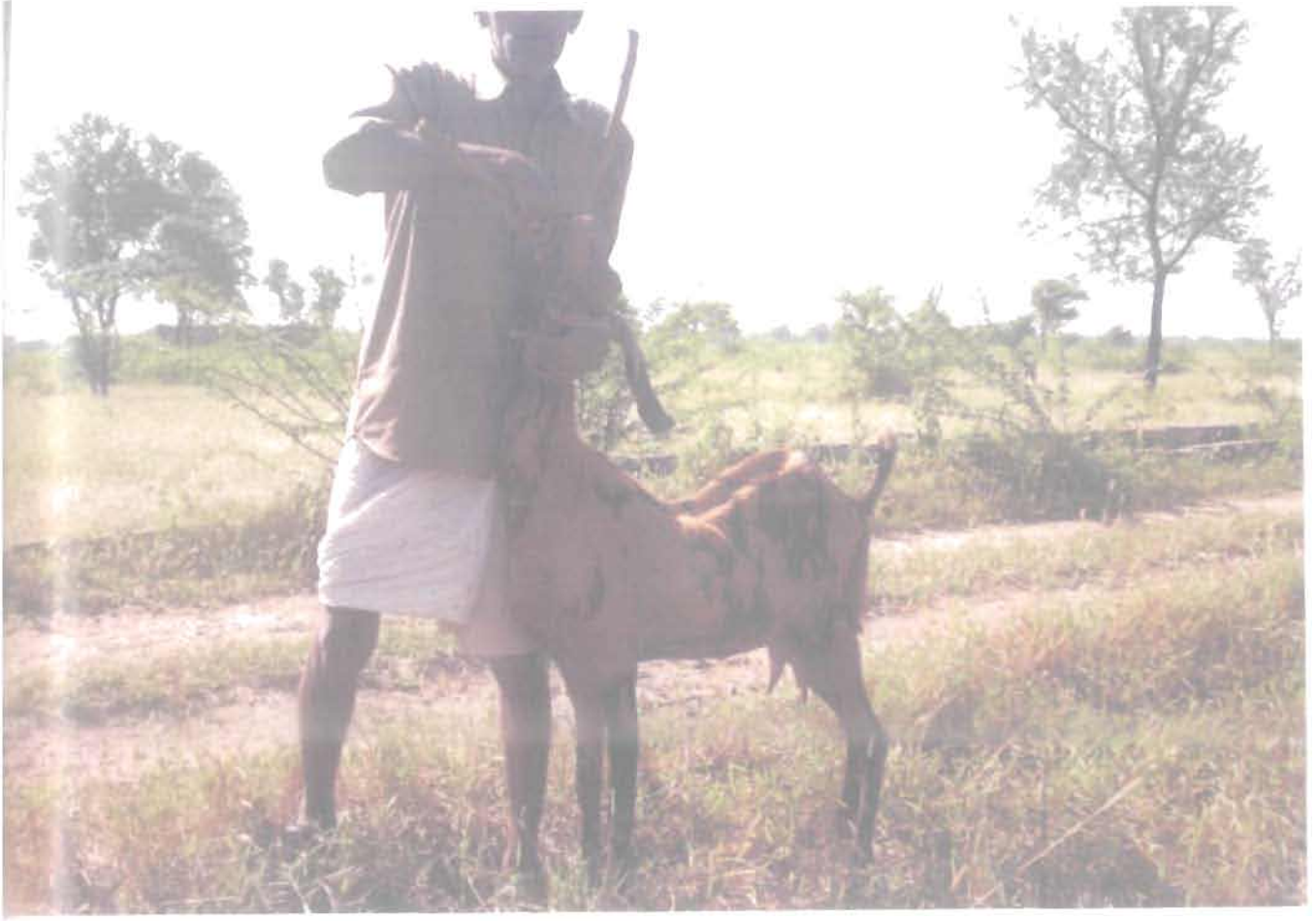

Plate 8 : DEWORMING PRACTICES

Plate 9 : KID FEEDING TREE LEAVES

Table 4.36 Health care practices of respondents across flock size

Practices	House holds (Flock size)			Overall	χ^2 Value
	Small (1-10)	Medium (11-20)	Large (> 20)		
1. Use of Veterinary facilities					
a. Yes	38 (33.33)#	36 (31.58)	40 (35.09)	**114**	
	(31.67)*	(30.00)	(33.33)	**(31.67)**	0.308
b. No	82 (33.33)	84 (34.15)	80 (32.52)	**246**	
	(68.33)	(70.00)	(66.69)	**(68.33)**	
2. Isolate of sick animals					
a. Yes	19 (27.94)	18 (26.47)	31 (45.59)	**68**	
	(15.83)	(15.00)	(25.83)	**(18.89)**	5.693
b. No	101 (34.59)	102 (34.93)	89 (30.48)	**292**	
	(84.17)	(85.00)	(74.17)	**(81.11)**	
3. Deworming					
a. Once	28 (50.91)	11 (20.00)	16 (29.09)	**55**	
	(23.33)	(9.17)	(13.33)	**(15.28)**	19.573**
b. Twice	36 (20.45)	64 (36.36)	76 (43.18)	**176**	
	(30.00)	(53.33)	(63.33)	**(48.89)**	
c. No	56 (43.41)	45 (34.88)	28 (21.70)	**129**	
	(46.67)	(37.50)	(23.33)	**(35.83)**	
4. Vaccination					
a. Yes	21 (16.53)	45 (35.43)	61 (48.03)	**127**	
	(17.50)	(37.50)	(50.83)	**(35.28)**	2.052
b. No	99 (42.49)	75 (32.19)	59 (25.32)	**233**	
	(82.50)	(62.50)	(49.17)	**(62.72)**	
5. Sanitization of shed					
a. Yes	21 (27.27)	25 (32.47)	31 (40.26)	**77**	
	(17.50)	(20.83)	(25.83)	**(21.39)**	2.511
b. No	99 (34.98)	95 (33.57)	89 (31.45)	**283**	
	(82.50)	(79.17)	(74.17)	**(78.61)**	
6. Control of external parasites					
a. Dipping	1 (25.00)	2 (50.00)	1 (25.00)	**4**	
	(0.83)	(1.67)	(0.83)	**(1.11)**	
b. Dusting	51 (29.14)	59 (33.71)	65 (37.14)	**175**	3.861
	(42.50)	(49.17)	(54.17)	**(48.61)**	
c. None of above	68 (37.57)	59 (32.60)	54 (29.83)	**181**	
	(56.67)	(49.17)	(45.00)	**(50.28)**	

*# Figure in parenthesis indicate vertical and * horizontal percentage*
** Significant (P<0.05), ** significant (P<0.01)*

4.3.4.2 Isolation of sick animals

The practice of isolation of sick animals was not affected by goat flock size (χ^2=5.693). Total 81.11 per cent goat rearers did not isolated their sick animals from the rest of the flock whereas, 45.59 per cent goat rearers of large flock size follows this practice. Overall 18.89 per cent goat rearers of experimental area were fully aware about isolation of sick animal.

4.3.4.3 Deworming

The overall results indicates that 64.17 per cent goat rearers were well aware towards deworming practices, one or twice in a year, while 35.83 per cent were not aware about deworming. The proportion of goat holders who followed deworming twice in a year were found in increasing order with increase in flock size while, reverse trend was observed for those not adopted deworming practices. Among large flock holders, maximum at 63.33 per cent goat rearers of surveyed population practiced deworming twice in a year while minimum at 9.17 per cent of medium goat flock holders practiced deworming once in a year. The data collected on deworming were subjected for chi square analysis and observed highly significant association of deworming practice with goat flock size (χ^2= 19.573**).

4.3.4.4 Vaccination

The analysis of data showed that effect of flock size on vaccination practice was non-significant (χ^2= 2.052). The overall result indicates that only 35.28 per cent goat rearers followed vaccination practice in their goats. The proportion of goat holders who followed vaccination increased with increasing in flock size while, reverse trend was observed for those not adopting vaccination practices.

4.3.4.5 Sanitization of shed

The effect of flock size on sanitary operation of shed was found to be non- significant (χ^2=2.511). The overall results indicated that maximum goat rearers (78.61%) did not care about the sanitary operation of shed while, only 21.39 per cent goat rearers of surveyed population were aware about the sanitization of goat shed. Among total goat rearers maximum at 40.26 per cent of large flock holders, 32.47 per cent of medium flock holders and 27.27 per cent of small flock holders followed this practice. Small goat holders maximum at 82.50 per cent have not adopted the sanitary practices in the goat shed.

4.3.4.6 Control of external parasites

The association between flock size and control of external parasites was non-significant (χ^2= 3.861). It was observed that almost half of the surveyed population (50.28%) did not practice to control external parasite of goats. Overall 48.61 per cent goat rearers practiced dusting while only 1.11 per cent goat rearers used dipping method to control external parasites. The proportion of goat rearers who used dusting for controlling external parasites increased as the flock size of goat increased.

4.3.5 MARKETING PRACTICES

The survey results related to marketing practices adopted by goat rearers in surveyed area are presented in Table 4.37.

4.3.5.1 Marketing

The association between flock size and marketing practice was highly significant (χ^2=15.366**). Most of the goat rearers (93.06%) market their animals at own village to the butcher or middle man whereas, only 6.94 per cent goat rearers market their animals to nearest mandi. Among small goat flock size 100.00 per cent goat rearers sold their goats in their own village followed by medium (91.67%) and large (87.50%) flock holders.

4.3.5.2 Time to market the animal

The effect of flock size on time of market the animal was non significant (χ^2=0.212). Result shows that goat rearers retained their female kids as replacement stock and males were sold for meat purpose. Even the surplus females were also sold when need arise. It was observed that overall 88.33 per cent goat rearers sold their animals round the year whenever need arise while, only 11.67 per cent goat rearers sale their animals on special occasions to get high price. Among total goat rearers maximum at 33.96 per cent large flock holders and minimum at 32.70 per cent medium flock holders sale their animals on need base through out the year. The goat rearers of medium flock size sold their animals maximum at 38.09 per cent and large flock holders minimum at 28.57 per cent on special occasions.

The study indicate that highest number of goat rearers (46.94%) sold their kid at the mean age of 8.05±0.05 months followed by above 9 months (30.00%) with mean age as 12.43±0.23 months and below 6 months age group (23.05%) with mean age as 5.76±0.07 months (Table 4.38).

Table 4.37 Marketing practices of respondents across flock size

Practices	House holds (Flock size) Small (1-10)	Medium (11-20)	Large (> 20)	Overall	χ^2 Value
Marketing					
Own village	120 (35.82)#	110 (32.83)	105 (31.34)	335	
	(100.00)*	(91.67)	(87.50)	(93.06)	15.366**
Near mandi	0	10 (40.00)	15 (60.00)	25	
	0	(8.33)	(12.50)	(6.94)	
2. Time to market the animal					
Round the year	106 (33.33)	104 (32.70)	108 (33.96)	318	
	(83.33)	(86.67)	(90.00)	(88.33)	0.212
Special occasion	14 (33.33)	16 (38.09)	12 (28.57)	42	
	(11.67)	(13.33)	(10.00)	(11.67)	
3. Selling criteria					
Weight	25 (22.73)	46 (41.82)	39 (35.45)	110	
	(20.83)	(38.33)	(32.50)	(30.56)	4.497
Physical appearance	95 (38.00)	74 (29.60)	81 (32.40)	250	
	(79.17)	(61.67)	(67.50)	(69.44)	
Use of goat milk					
Home use	94 (33.69)	97 (34.77)	88 (31.54)	279	
	(78.33)	(80.83)	(73.33)	(77.50)	
Sale alone	8 (23.52)	7 (20.59)	19 (55.89)	34	9.969*
	(6.67)	(5.83)	(15.83)	(28.33)	
Mixing with other	18 (38.30)	16 (34.04)	13 (27.66)	47	
milk	(15.00)	(13.33)	(10.83)	(13.06)	

*# Figure in parenthesis indicate vertical and * horizontal percentage*
** Significant (P<0.05), ** significant (P<0.01)*

Maximum male kids at 37.78 per cent were sold below 6 months in Udaipur. Between 6-9 months age highest male kids were sold in Chittorgarh (66.67%). However, above 9 months age maximum male kids were sold by goat rearers of Rajsamand (50.00%) closely followed by Bhilwara district (46.67%).

The results indicate that overall average age of male kid sold was 8.83±0.15 months in the study area. Maximum age of male kid sold was 10.88±0.41 months in Rajsamand district, which was higher than other district.

Table 4.38 Average age of male kid sold by respondents

Particulars		Districts				Overall (Months)
		Udaipur	Rajsamand	Chittorgarh	Bhilwara	
< 6 Months	Mean ±SE	5.94±0.06	5.92±0.08	5.47±4.36	5.61±0.14	**5.76±0.07**
	No. of respondents	34	12	19	18	83
		(37.78)	(13.33)	(21.11)	(20.00)	(23.05)
6-9 Months	Mean ±SE	8.22±0.10	8.12±0.06	7.85±0.06	8.10±0.14	**8.05±0.05**
	No. of respondents	46	33	60	30	169
		(51.11)	(36.67)	(66.67)	(33.33)	(46.94)
>9Months	Mean ±SE	11.60±0.26	14.22±0.39	11.45±0.28	10.95±0.15	**12.43±0.23**
	No. of respondents	10	45	11	42	108
		(11.11)	(50.00)	(12.22)	(46.67)	(30.00)
Overall (Months)	**Mean ±SE**	**7.73±0.19**	**10.88±0.41**	**7.79±0.19**	**8.93±0.24**	**8.83±0.15**
	No. of respondents	**90**	**90**	**90**	**90**	360
		(100.00)	**(100.00)**	**(100.00)**	**(100.00)**	(100.00)

Figures in parenthesis indicate district wise percentage

4.3.5.3 Selling Criteria

The flock size did not affect the selling criteria of goats in the surveyed area (χ^2=4.497). It was observed that 69.44 per cent goat rearers use physical appearance as selling criteria whereas 30.56 per cent goat rearers sale their animals on weight basis. Among total goat rearers maximum at 41.82 per cent of medium flock holder's selling criteria was weight followed by 35.45 and 22.73 per cent of large and small flock holders, respectively. Physical appearance as selling criteria was adopted maximum at 79.17 per cent by small flock size goat keepers.

4.3.5.4 Use of Goat Milk

The effect of flock size on use of goat milk was significant (χ^2=9.969*). Majority of goat rearers (77.50%) used goat milk for home consumption followed by 28.33 and 13.06 per cent goat rearers selling alone and mixing goat milk, with other milk, respectively, in the Southern part of Rajasthan. Total 34.77 per cent medium flock holders followed by 33.69 per cent small flock size holders and 31.54 per cent large flock size holders used goat milk for home consumption. Maximum 55.89 per cent of large flock size keepers and minimum 20.59 per cent of medium flock size owners sale goat milk alone without mixing other milk.

4.3.6 KID REARING PRACTICES

The kid is the foundation stock of future and good kids are raised and not purchased. The quality of flock depends on raising the newly born kids from best doe. Kid rearing practices adopted by goat rearers are presented in Table 4.39.

Table 4.39 Kid rearing practices of respondents across flock size

Practices	House holds(Flock size)			Overall	χ^2 Value
	Small (1-10)	Medium (11-20)	Large (> 20)		
1. Cleaning of kid after birth					
a. Yes	49 (28.99)#	56 (33.14)	64 (37.87)	169	3.770
	(40.83)*	(46.67)	(53.33)	(46.94)	
b. No.	71 (37.17)	64 (33.51)	56 (29.32)	191 (53.06)	
	(52.17)	(53.33)	(46.67)		
2. Disinfection of naval cord					
a. Yes	24 (34.28)	22 (31.43)	24 (34.28)	70	0.142
	(20.00)	(18.33)	(20.00)	(19.44)	
b. No	96 (33.10)	98 (33.79)	96 (33.10)	290	
	(80.00)	(81.67)	(80.00)	(80.56)	
3. Colostrum feeding					
a. Yes	114 (32.57)	118 (33.71)	118 (33.71)	350	3.291
	(95.00)	(98.33)	(98.33)	(97.22)	
b. No	6 (60.00)	2 (20.00)	2 (20.00)	10	
	(5.00)	(1.67)	(1.67)	(2.78)	
4. Duration of kid suckling					
a. 3 months	55 (30.73)	58 (32.40)	66 (36.87)	179	2.424
	(45.83)	(48.33)	(55.00)	(49.72)	
b. > 3 months	65 (35.91)	62 (34.25)	54 (29.83)	181	
	(54.17)	(51.67)	(45.00)	(50.28)	
5. Solid feeding after birth					
a. With in 15 days	1 (25.00)	0	3 (75.00)	4	9.026
	(0.83)	0	(2.50)	(1.11)	
b. 15 to 30 days	18 (23.68)	33 (43.42)	25 (32.89)	76	
	(15.00)	(27.50)	(20.83)	(21.11)	
c. Above 30 days	101 (36.07)	87 (31.07)	92 (32.86)	280	
	(84.17)	(72.50)	(76.67)	(77.78)	

Practices	House holds(Flock size)			Overall	χ^2 Value
	Small (1-10)	Medium (11-20)	Large (> 20)		
6. Deworming					
a. Yes	33 (26.19) (27.50)	41 (32.54) (34.17)	52 (41.27) (43.33)	126 (35.00)	6.667*
b. No	87 (37.18) (72.50)	79 (33.76) (65.83)	68 (29.06) (56.67)	234 (65.00)	
7. Control of external parasite					
a. Manual	6 (17.14) (5.00)	12 (34.28) (10.00)	17 (48.57) (14.17)	35 (9.72)	7.862
b. Chemicals	33 (34.37) (27.50)	31 (32.29) (25.83)	32 (33.33) (26.67)	96 (26.67)	
c. Traditional	1 (20.00) (0.83)	1 (20.00) (0.83)	3 (60.00) (2.50)	5 (1.39)	
d. No practiced	80 (35.71) (66.67)	76 (33.93) (63.33)	68 (30.36) (56.67)	224 (62.22)	
8. Housing					
a. With doe	41 (32.54) (34.17)	41 (32.54) (34.17)	44 (34.92) (36.67)	126 (35.00)	0.220
b. Separate	79 (33.76) (65.83)	79 (33.76) (65.83)	76 (32.48) (63.33)	234 (65.00)	
9. Isolation					
a. Yes	1 (7.14) (0.83)	8 (57.14) (6.67)	5 (35.71) (4.17)	14 (3.89)	5.500
b. No	119 (34.39) (99.17)	112 (32.37) (93.33)	115 (33.24) (95.83)	346 (96.11)	
10. Stage of grazing					
a. Within 30 days age	3 (13.64) (2.50)	6 (27.27) (5.00)	13 (59.09) (10.83)	22 (6.11)	14.898**
b. 30-45 days age	15 (21.43) (12.50)	30 (42.86) (25.00)	25 (35.71) (20.83)	70 (19.44)	
c. Above 45 days age	102 (38.06) (85.00)	84 (31.34) (70.00)	82 (30.60) (68.33)	268 (74.44)	

*// Figure in parenthesis indicate vertical and * horizontal percentage*
** Significant (P<0.05), ** significant (P<0.01)*

4.3.6.1 Cleaning of kids after birth

The cleaning operation of kid after birth was not affected by flock size of goats. The overall result indicated that 53.06 per cent goat rearers did not clean the kid after birth. Among total goat rearers, maximum at 37.87 per cent goat keepers were from large flock size who used to clean the kids after birth followed by medium and small flock size goat rearers. The proportion of goat rearers cleaning the kid after birth increased as the number of goats increased in the flock. Out of total, maximum (37.17%) goat rearers of small flock size and minimum (29.32%) of large flock size goat rearers did not follow this practice.

4.3.6.2 Disinfection of naval cord

As expected, the effect of flock size on the practice of disinfection of naval cord was observed as non-significant (χ^2= 0.142). Majority of goat rearers (80.56%) of surveyed mass were not aware about disinfection of naval cord of new born kids of goats while. 19.44 per cent goat rearers followed this practice in the study area. Among total goat rearers maximum at 34.28 per cent of small as well as large flock size goat rearers were aware about disinfection of naval cord while equal number at 33.10 per cent of small and large flock holders did not adopted this practice.

4.3.6.3 Colostrum feeding

The association between flock size and colostrum feeding to the newly born kid was observed as non-significant (χ^2= 3.291). Maximum goat rearers (97.22%) were adopting this practice.

4.3.6.4 Duration of kid suckling

The information indicated that half of the surveyed population of area allowed suckling for 3 months, 49.72 per cent goat rearers allowed suckling for more than 3 months. The proportion of goat rearers who allowed suckling up to 3 months increased with the flock size, while the proportion was decreased with the flock size of goats, for those who allowed suckling for above 3 months. Chi square test among flock size and duration of kid suckling was found non-significant (χ^2=2.424).

4.3.6.5 Solid feeding after birth

Among small flock size holders, maximum at 84.17 per cent used to provide solid feeding to kids after 30 days of birth. Whereas, 27.50 per cent among medium flock size provides solid feed between 15 to 30 days of birth and only 1.11 per cent of overall surveyed

population provide solid feed with in 15 days of birth. Among the medium flock size holders no one was recorded to provide solid feeding with in 15 days of birth. Results indicated that out of total, goat rearers who allowed solid feed between 15 to 30 days were maximum (43.42%) among medium flock size holders and those who allow solid feed after 30 days were maximum at 36.07 per cent in small flock holders. The effect of flock size on solid feeding after birth was found to be non-significant (χ^2=9.026).

4.3.6.6 Deworming

The deworming practices for newly born kids was adopted by 35.00 per cent goat rearers. Among large flock goat rearers maximum at 43.33 per cent and among small flock size holders minimum at 27.50 per cent practiced deworming in the kids. The proportion of goat rearers deworming their kids increased with the increased flock size. The flock size had significant effect on deworming of kids (χ^2=6.667*).

4.3.6.7 Control of external parasite

The results indicate that 62. 22 per cent goat rearers did not practice to control external parasites. Total 26.67, 9.72 and 1.39 per cent goat rearers control the ecto-parasites by using chemical, manual and traditional methods, respectively. The proportion of goat rearers who did not practice to control ecto-parasites decreased with increase in flock size. Maximum (27.50%) goat rearers control the ecto-parasites, chemically while minimum (0.83%) by traditional method among small flock holders. Control of external parasite was not affected by different flock size (χ^2=7.862)

4.3.6.8 Housing

Maximum goat rearers (65.00%) of surveyed population housed their kids in separate space while, 35.00 per cent housed kids with doe. Equal number of goat rearers (34.17%) among small and medium flock holders were housing kids with the respective does while equally goat rearers (33.76%) of small and medium flock holders housed their kids in separate sheds. The effect of flock size on housing of kids was non-significant (χ^2=0.220).

4.3.6.9 Isolation

The practice of isolating male and female from their doe was adopted only by 3.89 per cent farmers, while 96.11 per cent goat rearers do not isolate the kids from their does. The association of this practice with the different flock size was found to be non-significant (χ^2=5.500).

4.3.6.10 Stage of grazing

The effect of flock size on stage of grazing of kids was highly significant ($\chi 2=14.898^{**}$). The maximum goat rearers at 74.44 per cent send their kids for grazing after 45 days of age whereas, 19.44 and 6.11 per cent send kids for grazing between 30 to 45 days and with in 30 days of age, respectively. A proportion of goat rearers who allow kids with in 30 days age has increased gradually with increase in flock size. Among small flock size holders, maximum at 85.00 per cent allowed kids for grazing after 45 days of birth, whereas, minimum 2.50 per cent farmers allowed grazing for kids with in 30 days after birth.

4.4 CONSTRAINTS BEING PERCEIVED BY THE RESPONDENTS

On rank based quotient (RBQ) values the researcher easily identified the most serious constraint at district level. The constraints having higher RBQ value may be indicated as more serious constraints. Pooled and District wise RBQ values for four districts are presented in Table 4.40 and 4.41.

Table 4.40 Pooled rank based quotient (RBQ) values of different constraints

Constraints	Constraint Code	Values	Rank
Lack of credit facility	1	74.18	3
High cost of concentrate feeding	2	23.13	13
High cost of veterinary aid	3	19.97	14
Illiteracy	4	63.45	5
Inbreeding	5	57.51	7
Lack of improved breeding buck	6	81.66	2
Lack of grazing area	7	82.55	1
Non-availability of green fodder	8	30.92	12
Lack of knowledge about scientific goat rearing	9	67.20	4
Higher kid mortality	10	13.17	15
Lack of vaccination	11	59.93	6
Lack of proper housing facilities	12	48.42	9
Non-availability of veterinary services and medicines at village level	13	12.32	16
Non existence of organized meat market	14	48.85	8
Inadequate price for the animals	15	38.19	10
High incidence of diseases	16	31.75	11

As evident from the results, the lack of grazing area was one of the main constraint faced by goat rearers on pooled RBQ basis. The RBQ value of this constraint was 82.55. The constraint of lack of grazing area was ranked first in Chittorgarh, Rajsamand and Bhilwara districts, while it was second most important constraint in Udaipur district. Lack of improved breeding buck was ranked as second most serious constraint, with a RBQ value of 81.65 on pooled RBQ basis. Based on distribution of RBQ values, this constraint was ranked first in Udaipur district while second in Rajsamand, Chittorgarh and Bhilwara districts. Lack of credit facility was the third most serious constraint in the area surveyed. It had the RBQ value of 74.18. This constraint ranked third in Udaipur and Bhilwara districts while forth in Rajsamand and Chittorgarh districts, respectively.

Table 4.41 District wise RBQ values of different constraints

Districts							
Udaipur		Rajsamand		Chittorgarh		Bhilwara	
Constriant	RBQ	Constriant	RBQ	Constriant	RBQ	Constriant	RBQ
6	81.53	7	81.81	7	84.72	7	82.22
7	81.46	6	81.74	6	81.39	6	81.94
1	78.33	11	78.40	9	80.28	1	78 40
11	74.24	1	73.61	11	72.99	11	74.03
4	64.79	4	64.31	1	66.39	9	66.60
9	59.24	9	62.71	4	59.72	4	65.00
5	58.96	5	56.94	5	58.82	5	56.11
12	48.40	14	51.53	12	48.68	14	51.25
14	45.97	12	48.26	14	46.67	12	48.33
15	38.19	15	38.13	15	38.47	15	37.99
16	32.01	16	31.25	16	31.88	16	31.88
8	30.76	8	31.04	8	30.49	8	31.39
2	23.96	2	23.68	3	24.31	2	23.75
3	20.97	3	17.50	2	21.11	3	17.08
10	15.83	10	16.04	10	17.50	10	16.46
13	15.49	13	14.24	13	16.88	13	15.00

Lack of knowledge about scientific goat rearing practices was the fourth serious constraint identified (Pooled RBQ value, 67.20) in the study area. Based on district wise RBQ

values, the constraint was ranked third in Chittorgarh while fifth in Bhilwara and sixth in Udaipur and Rajsamand districts.

Illiteracy was the fifth rank constraint in the surveyed area. Based on district wise RBQ values the constraint was ranked fifth in Udaipur and Rajsamand while sixth in Chittorgarh and Bhilwara districts. The pooled RBQ values for this constraint was 63.45.

The pooled RBQ values for the constraint lack of vaccination was obtained at 59.93 and ranked at sixth. This constraint ranked third in Rajsamand and fourth in Udaipur, Chittorgarh and Bhilwara districts.

Inbreeding constraint ranked seventh, overall as well as in each of the all four districts and pooled RBQ value was 57.71. RBQ values in fourth districts viz. Udaipur, Rajsamand, Chittorgarh and Bhilwara were 58.96, 56.94, 58.82 and 56.11, respectively.

For non existence of organized meat market, pooled RBQ value was 48.85 and ranked at eighth. On the basis of district wise RBQ values, ranked as eighth in Rajsamand and Bhilwara and ninth at Udaipur and Chittorgarh districts.

The pooled RBQ values for the constraints viz. lack of proper housing facilities, inadequate price for animals, high incidence of disease, non-availability of green fodder and high cost of concentrate feeding were 48.42, 38.19, 31.75, 30.92 and 23.13, respectively. Whereas, the pooled RBQ values for high cost of veterinary aid, higher kid mortality, non-availability of veterinary services and medicines at village level were 19.97, 13.17 and 12.32, respectively

5. DISCUSSION

The discussion of this investigation is presented under following sub-heads:

5. PREVALENT GOAT MANAGEMENT PRACTICES IN THE STUDY AREA

5.1 Family status

Mostly the goat rearers (94.44%) follows to Hindu religion while only 1.94 per cent goat rearers were Muslim in the surveyed area. This findings is in agreement with the reports of Lawar (2003) and Tailor et. al. (2005). It is due to higher population of Hindu living in study area. Fifty seven per cent goat respondents prefer to live in nuclear family while rest 43.06 per cent live in joint family in the surveyed districts. These observation are similar with the observations of Tailor et. al. (2005). The information collected in the survey area indicated that goat keepers family possess more than 5 members. A finding in consonance with that Jangam *et al.*, (2001) and Joshi (2002) higher number of members in the family is because of illiteracy and no knowledge about family planning programme for small size family.

The literacy rate among the goat rearers was 35.28 per cent, while 64.72 per cent goat rearers were illiterate resulting in poor adoption of goat rearing technology in surveyed area. These findings are in consonance with the observations of Kumar *et al.*, (2001), Deshpande (2005) and Sharma (2005). In contrast higher literacy rate (Jangam *et al.*, 2001 and Gokhale *et al.*, 2002) and lower literacy rate Tailor et. al. (2005) and Pathodiya *et al.*, (2004) than the present study has also been reported. Level of education of goat keepers plays an important role in goat rearing. The educated farmers will grasp the depth of innovative technologies quickly. Therefore, a mission for improving literacy in the area is urgently needed to improve the adoption level of goat rearers.

The open well was the main source of irrigation in the surveyed area. The canal irrigation was maximum in Bhilwara district. The tube well were higher in Chittorgarh as compared to other districts. Most of the goat rearers (62.72%) of the study area did not have any media for their knowledge. Some goat rearers (32.78%) used media like Radio, T.V. and newspaper for knowledge. These findings are supported by the report of Raghvan (2005) of Kerala state.

A total of 360 goat rearing families having 2298 family members were surveyed. Out of these men, women and child-male and child –female were 24.32, 24.80, 25.55 and 23.33 per cent, respectively in the surveyed area of four districts. These data shows that male and female sex ratio was almost equal in study area. The overall contribution of 35-60 years age group was maximum at 67.22 per cent than other age group. The participation of above 60 years age group respondents in the goat keeping was found to be very less at 10.28 per cent. The reasons behind this might be due to difficulties faced by old people in the rainy and cold climate, which hinders their involvement in goatry, a findings in consonance with Singh (2002) and Sharma (2005).

The majority of goat rearers (58.61%) belonged to other backward caste followed by schedule tribe. This clearly indicated that goats are predominantly owned by OBC category, a findings in agreement to the reports of Pathodiya (2003), and Sharma (2005). It was observed that 64.44 per cent of respondents followed Agriculture and Animal Husbandry as main occupation. Similar results were also reported by Pathodiya (2003), Tailor *et al.*, (2005) and Sharma (2005). In contrast results 30.23 per cent goat rearers engaged in Agriculture and Animal Husbandry was reported by Kumar *et al.*, (2001).

The average land holding of goat rearers of surveyed area was 1.26 ± 0.44 ha. The land distributed under unirrigated (0.51 ± 0.17 ha.), irrigated (0.54 ± 0.21 ha.) and pasture land (0.34 ± 0.22 ha.). The area under pasture land for grazing was very low and 4.44 per cent goat rearers were landless in the surveyed area. These findings are in lines with the findings of Tailor et. al. (2005), Pathodiya et. al. (2004) and Sharma (2005).

The maximum (53.33%) goat keepers earned less than 5000 Rs. per annum from goats. Very few goat rearers (17.22%) earned more than 10000 Rs, per annum per family. The average annual income per family was Rs. 6973.33, 9744.49 and 16737.22 from goats, other sources and total income, respectively. Maximum respondents (78.05%) earned up to Rs. 10000 per annum per family through other sources and 21.94 per cent earned more than Rs. 10000 per annum per family. The overall annual income of maximum respondents was (51.94%) between Rs. 10000 to 25000 in the study area and thirteen per cent respondents earned more than Rs. 25000 per year per family. These findings are supported by the reports of Kumar *et al.*, (2001) and Mishra *et al.*, (2004).

The survey shows that goat was mainly kept by poor men and they have maximum number of goats compared to other livestock which, shows that area selected for the study was goat rearing tract. The average goat holding was 17.46±1.18 goats per respondents and sixty per cent households possess only goats. The average holdings of sheep, buffalo and cattle was 7.68, 1.79 and 1.79, respectively in the surveyed area. The maximum goat holding

at 18.57±1.38 was found in Rajsamand district. These results are in agreement with the findings of Wani *et al.*, (1993), Gefu *et al.*, (1995), Roy (2001) and Sharma (2005). Contrary to this Gokhale *et al.*, (2002) and Pathodiya (2003), reported.

5.2 ROLE OF HUMAN RESOURCES IN GOAT REARING

The overall results indicated that women at 47.50 per cent were involved in feeding operation at home after grazing while men and children at 43.33 and 9.17 per cent, respectively. On the basis of district the data represent that women play a major role in feeding at Rajasamand and Udaipur while, man play a major role in feeding at Bhilwara and Chittorgarh districts. Similar findings were also reported by Choudhary and Barhat (2003) and Choudhary *et al.*, (2004),) under his study conducted on AICRP on Goat Improvement on Marwari goats at Bikaner.

On overall basis women play major role in cleaning of sheds (83.33%) in all four districts viz. Rajasamand (91.11%), Bhilwara (84.44%), Udaipur (82.22%) and Chittorgarh (75.55%). These observation were lower than the findings of Pathodiya (2003), Gurjar and Pathodiya (2004) and Bhardwaj and Chauhan (2004). It was evident from the data that participation of women in milking process was maximum at 63.33 per cent a finding similar with the findings of Rangnekar and Rangnekar (1992) and slightly lower than the findings of Pathodiya of (2003).

The overall results indicated that grazing of goats was done by man at 60.00 per cent, while women and children involved in grazing at 28.06 and 11.94 per cent, respectively. Similar results were also observed by Rangnekar and Rangnekar (1992), Samanta (2002), Pathodiya (2003) and Gurjar and Pathodiya (2004). Grazing is the most important operation of goat rearing because of browsing habit of goats. In most of the cases women were engaged for grazing when men were out for some other important household works.

Sale of animals was performed mainly by men (92.50%) whereas, role of women was only 6.67 per cent which is closely associated with the results of Pathodiya (2003) and Gurjar and Pathodiya (2004).

The role of men, women and children in milk sale operation was 92.22, 6.94 and 0.83 per cent, respectively. These findings are close agreement with the observation of Chaudhary and Barhat (2003) and in contradiction to the report of Kumar and Deoghare (2003) and Pathodiya (2003).

It was evident from the data that overall 53.33 and 39.72 per cent women and men played role in care of young stock while children played negligible role in care of young

stock. These results are in consonance to the findings of Rangnekar and Rangnekar (1992), Pathodiya (2003) and Gurjar and Pathodiya (2004).

Majority at 67.22 per cent men performing breeding operation and the proportion of men in Rajasamand, Bhilwara and Chittorgarh districts was higher as compared to women and children but in Udaipur district the percentage of women involved in breeding operation was slightly higher than men. Chaudhary and Barhat (2003) reported that the women do not have significant role with breeding operation of goats while in this study overall 25.83 per cent breeding operation performed by women. These findings are in accordance with the observations of Samanta (2002).

Care of sick animals at 51.39 per cent was performed by men. The respective proportion of women and children was 43.89 and 4.72 per cent. Men play prominent role in care of sick animals at Rajasamand and Chittorgarh while, women at Udaipur and Bhilwara districts. The overall data irrespective of districts shows that 60.83 per cent men played role in control of ecto-parasites, followed by women at 31.39 and children at 7.78 per cent. The role in controlling endo-parasites was at 77.78, 16.67 and 5.56 per cent by men, women and children, respectively in all four districts. These findings are in agreement with the observations of Gurjar and Pathodiya (2004) and Bhardwaj and Chauhan (2004) however, it contradicts with the findings of Pathodiya (2003).

5.3 EFFECT OF FLOCK SIZE ON MANAGEMENT PRACTICES

5.3.1 Housing Practices

Present results shows that majority of goat rearers (86.39%) house their animals in a shed attached to their residence. The findings are in agreement with the reports of Samanta (2002), Pathodiya (2003) and Sharma (2005). Goat rearers at 63.39 per cent to housed all categories of goats in one shed while 33.61 per cent goat rearers housed according to age and sex in separate sheds. Similar results were also reported by Tanwer (1994).

Ninety eight per cent goat rearers kept their goats in shed during night while 1.39 per cent housed their goats during day. Similar results were reported by Singh *et al.*, (2005). The animals were mostly housed in Kaccha type of shed (78.89%) by the goat owners. These findings are in agreement with the results of Tanwer (1994), Gokhale *et al.*, (2002), Rai and Singh (2004) and Singh *et al.*, (2005).

Half of the goat rearers had Kaccha type of boundary wall while, 29.17 per cent had biological type of fencing. The boundary wall was affected by flock size of goats. The proportion of farmers having both Kaccha and Pucca boundary wall increased with increase in flock size. Type of floor of goat shed in surveyed areas was Kaccha type (65.83%),

Kaccha+Pucca (29.44%) and Pucca (4.72%). Type of floor was highly significant (P<0.01) with by goat flock size. Maximum goat rearers had thatch type roof in the Mewar region. The roof of asbestos, cement, concrete and iron sheet were not common in this surveyed area. Much attention was not given for the preparation of shed. These observations are in close agreement with the observations of Rangnekar *et al.*, (1992), Roy (2001), Samanta (2002), Gokhale (2002), Pathodiya (2003), Kumar and Deoghare (2003), Rai and Singh (2004), Singh *et al.*, (2005) and Sharma (2005).

Only 14.72 per cent goat rearers had provision of water trough in their goat shed and goat rearers used common or Panchayati water trough. Feeding manger and urine drainage in goat shed were not common. Similar results were also reported by Tanwer (1994).

The ventilation of goat shed was not affected by flock size of goats while, housing of breeding buck was affected by goat flock size. Maximum goat owners were not keeping breeding buck while only 37.50 per cent were keeping breeding buck and housed along with all other goats. Tanwer (1994), Rai and Singh (2004), Singh *et al.*, (2005) and Sharma (2005) also reported similar findings.

Goat rearers at 93.89 per cent did not used winter bedding and bedding and protection against cold which was not affected by flock size of goats 97.78 per cent respondents provided protection against cold by different methods in the experimental area. The results of the present study were closely associated with the findings of Tanwer (1994).

5.3.2 Feeding Practices

The semi stall feeding system was adopted by 87.88 per cent goat rearers and allowed grazing on community land (96.94%). These findings are in agreement with results of Rangnekar *et al.*,(1992), Pathodiya (2003) and Rai and Singh (2004). Maximum goat rearers (94.72%) allowed grazing their goats during day light for more than 5 hours daily. Similar findings were also observed by Kumar and Deoghare (2003), Rai and Singh (2004) and Singh *et al.*, (2005).

Goat rearers at 28.33 per cent of large flock size were aware to protect pasture land. Similarly, loom or pala making practice was not common in the experimental area and only 8.33 per cent of small flock size holders adopted pala making techniques. These finding are in consonance with the report of Kaul (1991), Gokhale *et al.*, (2002) and Sharma (2005).

Goat rearers at 60.28 per cent in surveyed area provides green fodder in form of weeds, lucern and monsoon grass to whole flock and lopping was a main routine practice. Feeding of dry fodder was not practiced by 80.00 per cent goat rearers while, feeding of crop residues practiced by 20.00 per cent goat rearers. These findings are closely associated with

Kaul (1991), Rangrekar *et al.*, (1992), Rao (2002), Samanta (2002), Gokhale *et al.*, (2002), Kumar and Deoghare (2003), Rai and Singh (2004), Sharma (2005) and Singh *et al.*, (2005). This indicates that goat rearers in the experimental area were not aware about preservation of tree leaves for scarcity period. Goat rearers at 88.33 per cent to provided concentrate on an average at 138.33 gm per day per goat and used single ingredient. Provision to provide extra concentrate to male kids was observed by 71.39 per cent goat rearers of surveyed population. These findings are closely associated with the results obtained by Intodia (1988), Kumar *et al.*, (2001) and Rai and Singh (2004), respectively.

Only 3.61 per cent goat rearers fed mineral mixture, while 69.72 per cent used salt to fed their goats and concentrate feeding was practiced prior to milking. Sharma (2005) also reported that mineral mixture was fed by few goat rearers. The lack of knowledge about the importance of mineral mixture and non-availability of mineral mixture in the experimental area may be the reason for not adopting this practice. These findings are in close agreement with the survey report of Raghavan (2002) in Malabari goats at Kolkatta in West Bengal.

5.3.3 Breeding practices

The goat respondents were aware about few symptoms of heat detection. Bellowing (94.17%) is most common symptoms of heat detection followed by tail vibration free (82.78%) known to the goat owners. Similar observation reported by Handa and Gill (1986), Nitharwal (1999) and Sharma (2005).

The present investigation shows that artificial insemination as a tool for goat improvement was not adopted by the goat rearers due to lack of trained person and non-availability of buck semen in the area. The overall age at first mating recorded in the study area was 16.05±0.22 months which was observed to be high in Rajasamand and lowest in Chittorgarh district. Majority of goat rearers (62.50%) do not possess their own breeding buck and generally used local or non-descript buck for breeding. The present results shows that own breeding buck was used maximum by large flock holders and effect of flock size on keeping of breeding buck was highly significant ($P<0.01$). The results obtained in the present study shows that average breedable goats available per buck was recorded at 43.06±0.46 and the average period for which a buck was used for breeding purpose was 2.42±0.08 years. The selection of breeding buck was affected by flock size of goats. Maximum doe came in heat in rainy season or during onset of monsoon. These findings are in agreement with the findings of Tanwer (1994), Nitharwal (1999), Rao (2002), Gokhale *et al.*, (2002), Rai and Singh (2004) and Sharma (2005).

The majority of goat rearers (91.67%) confirm their goat pregnancy by enlargement of abdomen. The survey results shows that pregnancy diagnosis through scientific method

was not popular in the study area, whereas, enlargement of abdomen as a criteria to confirm pregnancy was equally popular in small, medium and large flock size goat rearers at 33.00 per cent each. Similar observation were reported by Sharma (2005) Most of the goat rearers in the study area practiced to house their pregnant doe with their other goats While only one goat keepers each from small and medium flock size and two from large flock size practiced to house the pregnant doe in separate house. Sharma (2005) reported more percentage of goat keepers housing pregnant doe separately than present study. Maximum proportion of goat rearers (96.67%) allowed doe for grazing during pregnancy period and do not provide special ration to their pregnant doe. The necessity of veterinary aid during kidding desired by only 13. 50 per cent goat rearers. These findings are similar to those Tanwer (1994) and Sharma (2005).

Castration of male kids was done by 36.67 per cent goat rearers. The results are close agreement with the results of Sharma (2005). The physical appearance or breed characteristics as a criteria to select breeding buck was practiced by 73.89 per cent, while only 9.17 per cent goat rearers used milk yield and 16.94 per cent body weight or health as criteria for selection of breeding buck. Contrary results were reported by Sharma (2005). It was observed that goat rearers of experimental area were not aware to provide treatment to their goats for anoestrus. These observations are in agreement with the findings of Krishnamurthy *et al.*, (1992) and Tanwer (1994).

This indicates that housing of pregnant doe was not in scientific manner. The results pertaining to management of pregnant doe indicates that goat rearers of study area among different flock size were not aware to care their pregnant animal indicating need for training programme on scientific goat management.

5.3.4 Health care practices

Maximum goat rearers used local therapy for treatment to their goats while 68 33 per cent goat rearers do not felt necessity of veterinary facilities. Most of the goat rearers did not isolate their sick animals from the healthy flock.

The results also depicted that maximum proportion of goat rearers among different flock size were not aware to isolate sick animals in the area taken for research. These observations are in agreement with the findings of Deoghare and Sagar (1999) and Rai and Singh (2004).

Once or twice deworming in a year was recorded by 64.17 per cent housed holds and deworming practice was highly significant Similar results were also observed by Sharma (2005). The effect of goat flock size on vaccination against contagious diseases were not observed in the experimental area, however, the results shows 35 28 per cent goat respondents

followed vaccination against Enterotoxima and FMD in their goats. Similar findings also reported by Gokhale *et al.*, (2002).

Sanitary operation of shed was not commonly practiced and it was not affected by flock size of goats whereas, control of external parasites in goat was practiced by 50.28 per cent goat rearers. The findings are in consonance with the results of Kulkarni *et al.*, (2000).

The results depicted that goat rearers of experimental area are still using the traditional methods for the treatment of their sick animals rather than using available veterinary facilities. The reason could be due to high incidence of diseases, high cost of veterinary aid and non availability of veterinary services and medicines at village level.

5.3.5 Marketing

The marketing of goat was highly associated with flock size of goats and most of the goat rearers market their animals at own village to the butcher or middleman while, only 6.94 per cent goat rearers market their animals to nearest mandi. Similar results were observed by Tanwer (1994), Deoghare and Kumar (2003). The overall 88.33 per cent goat rearers sold their animals round the year whenever, need arise, while 11.67 per cent goat rearers sale their animals on special occasions to get high price. The overall sale age of male kids recorded at 8.83±0.15 months. These findings are similar to Mittal and Ghosh (1985), Kumar and Deoghare (2003) and Raghavan *et. al.* (2004)

Most of the goat rearers use physical appearance as selling criteria whereas, 30.56 per cent goat rearers sale their animals on weight basis. Use of goat milk was affected by flock size of goats whereas, the maximum number of goat keepers (77.50%) used goat milk for home consumption and 13.06 per cent mixing goat milk with other milk. The goat rearers of all categories use to keep the milk for home consumption rather than sale. These observations were closely associated with the results of Rangnekar *et al.*, (1992), Pal and Agnihotri (1995) and Kumar and Deoghare (2003).

The results shows that majority of goat rearers sell goats in own village because few number of animals are available for sale, there is a lack of transportation facilities and better bargaining strength in village than near by city or mandi. The goat rearers of all categories use to keep the milk for home consumption rather than sale.

5.3.6 Kid rearing practices

The cleaning of kid after birth was practiced by 46.94 per cent and proportion of goat rearers increased as the number of goats increased in the flock. The disinfection of naval cord was not affected by flock size of goats and majority of goat rearers (80.56%) of surveyed mass were not aware about disinfections of naval cord of new born kids of goats. Feeding of

colostrum to their kids was recorded at 97.22 per cent of respondents. The results are in conformity with that of Bagga (1967), Malik and Sohal (1984) and Garg (2004).

The proportion of goat rearers who allowed suckling up to 3 months increased with the flock size, while the proportion was decreased with the flock size of goat for those who allowed suckling for above 3 months. The overall data shows that 77.78 per cent goat rearers practiced to provide solid feed after 30 days birth whereas, only 1.11 per cent practice solid feed to kids within 15 days of birth. The deworming practices for newly born kids was adopted by 35.00 per cent goat rearers. Similar results was also reported by Handa and Gill (1986) and proportion of goat rearers increased with the increased flock size. The effect of flock size on deworming of kids was significant. The data shows that most of the goat respondents were not familiar about importance of deworming practice in kids. The results indicate that 62.22 per cent goat rearers did not practice to control external parasite. Total 26.67, 9.72 and 1.39 per cent goat rearers control the ecto-parasites by using chemical, manual and traditional methods, respectively. Similar results were also reported by Raut *et al.*, (1977), Khuspe *et al.*, (1980) and Rao (2004).

Maximum goat rearers (65.00%) housed their kids in separate place while. 35.00 per cent housed kids with doe, a finding in agreement with the report of Sharma (2005) and isolation of kids during sickness was not a common practice. The association between stage of kid grazing and goat flock size was highly significant ($P<0.01$). However, maximum goat rearers at 74.44 per cent send their kids for grazing after 45 days of age. A proportion of goat rearers who allow kids with in 30 days age has increased gradually with increase in flock size of goats on the contradictory results were obtained by Rao (2004) that kids send for grazing along with adults after attaining three months of age.

The results obtained indicated that maximum goat rearers of surveyed area were not aware to clean the kids after birth which may be due to lack of knowledge. In the surveyed area maximum goat rearers were aware and knew the importance of colostrum feeding to new born kids.

5.4 CONSTRAINTS BEING PERCEIVED BY THE RESPONDENTS

It was observed that lack of grazing area was one of the main constraint faced by goat rearers. Similar findings were also reported by Roy (2001), Kulkarni *et al.*, (2000), Kumar (2003), whereas, Mohan and Singh (2004) faced limited feed resources in goat rearing at Mathura district in U.P. The severity of the constraint can be judged from the fact that most of the pastures and other barren land had been put under afforestation. The current trend of earmarking large grazing area for wildlife sanctuaries denies the right of grazing by goat in

these areas which has further exaggerate the seriousness of this constraint. It is clear that continuous reduction in grazing area emerged as most serious constraint in study area.

Lack of improved breeding buck was found second most serious constraint. Similar observation was also reported by Rangnekar *et al.*, (1992), Nitharwal (1999), Mohan and Singh (2004). Studies revealed that Majority of goat owners do not possess their own breeding buck and animals in heat get conceived by local non-descript buck in villages. Lack of credit facility was the third most serious constraint in the study area. These observations are in consonance with the observation of Kumar (2003) and Mohan and Singh (2004). Most of the goat rearers falls below poverty line and the goat is also called poor men's cow so they require credit facility long term loan on minimum interest rate from bank for proper goat rearing.

Lack of knowledge about scientific goat rearing, illiteracy, lack of vaccination, inbreeding, non-existence of organized meat market, lack of proper housing facilities, inadequate price for animals, high incidence of diseases, non-availability of green fodder, high cost of concentrate feeding, along with high cost of veterinary medicines, higher kid mortality and un-availability of veterinary services and medicines at village level. Among these last three constraints were the least serious for the goat rearers in the surveyed area due to coincidence of availability of veterinary services. On the basis of district wise RBQ values also higher kid mortality and non-availability of veterinary services and medicines at village level were the least affecting constraints for the goat rearing occupation in each of the all four districts. All these constraints faced by goat rearers were also reported by Kumar (2003), Kumar *et al.*, (2003), and Mohan and Singh (2004). These constraints areas required urgent attention of the planners and researchers in order to give a boost to the economy of the goat husbandry sector.

5.5 SUGGESTION FOR SUITABLE GOAT REARING PRACTICES

In light of constraints perceived by the respondents and on the basis of results obtained under the study an attempt has been made to chalk out a reasonable package of practices. The suggested practices if followed judiciously will definitely help the goat rearers of Mewar region to manage their goats within the available resources economically and efficiently.

1. Housing practices:

- Goat keepers be advocate for proper and separate housing of different goats with timely sanitization of sheds.
- Providing winter bedding and protection from cold air in goat shed.

2. Feeding practices

- Semi stall-feeding may prove to be beneficial from cost and nutrition point of view.
- Available grazing land should be protected and rotational grazing be advocated.
- Goat keepers are to be advised to provide some quantity of green fodder and concentrate to their kids, lactating and pregnant animal for better performance.
- Preservation of feed and fodder during surplus period to utilize in lean period be practiced.
- Afforts should be made to establish co-operatives of goat rearers for getting subsidized feed stuffs and scientific training.
- Construction of feeding manger to avoid wastage of feed.
- Provision of clean and fresh drinking water in the goat shed and grazing area.
- Incorporation of mineral mixture and common salt in the ration.

3. Breeding Practices

- Diffusion of knowledge about use of improved breeding buck and supply of improved breeding bucks in the area for every 25-30 does.
- Knowledge about losses incurred due to inbreeding and to advocate replacing breeding buck in every two years.
- Does be bred between 12-18 hrs of onset of estrus.
- The age at first matting should be 15-18 months.

4. Health Care Practices

- To acquaint goat rearers about the common diseases, their prevention and control.
- Farmers should be educated for disinfection of naval cord, cleaning of kid and adequate colostrum feeding just after kidding.
- Disinfection and sanitization of sheds.

5. Marketing Practices

- Goat rearers co-operatives should be established to organize the goat rearers community and support the goat rearers technically and financially.
- Easy loaning facilities on low interest rate should be provided to encourage the rural youth for scientific goat rearing.

- Establishment of organized meat market to avoid the involvement of middleman.
- Establishment of meat export zones on the line of agri export zone so that goat rearers can get adequate price for their animals.
- Awareness among the society about importance of goat milk and its by products.

6. Human Resource Practices

- Special education and literacy programmes for the children and adults of goat rearing community.
- Training programmes on various aspects of scientific goat rearing.
- Spread of knowledge about various programmes and schemes of the Govt. for the upliftment of goat rearing community.
- Information on media regarding goat rearing.
- Change of attitude of society towards goat keeping occupation.

For the existing management inadequacies, above mentioned suitable suggestions of goat rearing practices might prove successful and with these, productivity per animal will certainly go up. The implications of these suitable suggestions of goat rearing practices may face certain problems at the beginning. However, these are not impossible to implement.

6. SUMMARY AND CONCLUSION

The present investigation was conducted in goat rearing areas of Udaipur, Rajsamand, Chittorgarh and Bhilwara districts of Southern Rajasthan with following objectives:

1. To acquire information on the prevalent goat management practices in the study area.
2. To determine the role of human resources in goat rearing.
3. To study the effect of flock size on management practices.
4. To identify the constraints being perceived by the respondents in adoption of improved goat husbandry practices.
5. To suggest suitable goat rearing practices.

Two tehsils from each district and three villages from each tehsil were randomly selected. The fifteen goat rearers from each of villages selected, making a sample size of 360 goat rearers (90 from each district) were surveyed for present investigation.

An interview schedule was developed and pre-tested to collect relevant information on the different aspects of goat husbandry. The observations were collected through personal interview techniques. The collected data were tabulated and analyzed to draw meaningful inferences. The involvement of men, women and children in different goat husbandry activities was also studied. Based on the results suitable goat rearing practices were also suggested.

The majority (95.05%) of goat rearers belongs to Hindu religion while, only 1.94 per cent goat rearers were Muslims in the surveyed area. Respondents at 56.94 per cent prefers to live in nuclear family and maximum (53.06%) goat keepers possesses more than 5 members in a family. Overall literacy rate of family head was 35.28 per cent and respondents belongs to backward caste were 58.61 per cent. It was evident from the result that the majority of family head fall in the age group of 35-60 years. On an average 64.44 per cent goat rearers depends on Agriculture + Animal Husbandry being maximum in Bhilwara district. The average annual income recorded through goat rearing was Rs. 6973.33±290.01, per family and overall annual income recorded was Rs. 16737.22±674.03 per family in the study area. Survey results shows that 46.94 per cent respondents had less than 0.8 ha land and 4.44 per cent were landless. The maximum irrigated land was recorded at 0.67±0.50 ha in Chittorgarh district and majority of respondents had open well as a source of irrigation. The average pasture land in the study area was recorded as 0.34±0.22 ha.

Among the total livestock maintained by goat keepers maximum at 60.78 per cent were goat followed by sheep, cattle and buffalo. The overall average goat holding of respondents in surveyed area was 17.46±1.18 goats. The goat population was highest in Udaipur (74.55%) followed by Bhilwara (68.01%) district. Overall 67.22 per cent goat rearers of surveyed population were not aware to get information through any media, while 80.00 per cent goat rearers of Chittorgarh district gets scientific knowledge with respect to goat rearing from media.

Information collected on various operation of goat husbandry performed by family members in surveyed area depicted that maximum operations like cleaning, milking, care of young stock and feeding were carried out at 83.33, 63.33, 53.33 and 47.50 per cent, respectively by women whereas sale of animal, milk, control of endo-parasites. breeding, control of endo-parasites, grazing and care of sick animal, operations were performed (92.22, 92.50, 77.78, 67.22, 60.83, 60.00 and 51.39 per cent, respectively) by male members of family. The role of children in goat husbandry was observed to assist with men and women to complete the operations.

The results indicated that overall 86.39 per cent respondents housed their goats in a shed attached to their residence while maximum at 66.39 per cent house all categories of goats in one shed during night. The overall 78.89 per cent goat rearers had Kaccha, 15.28 per cent had mixed i.e. Kaccha + Pucca and only 5.83 per cent had Pucca shed to house their goats. Goat keepers at 53.89 per cent had Kaccha type and 29.17 per cent had biological type boundary wall. Maximum at 65.83 and 92.78 per cent respondents had Kaccha floor and thatched roof, respectively while 14.72 per cent goat rearers had water troughs in sheds as a major source of drinking water for all the categories of goats. Most of the goat rearers (87.50%) had no manger in shed. The overall 83.61 per cent goat rearers did not have provision of urine drainage, however 98.89 per cent respondents have provision of ventilation in goat shed. Respondents at 43.83 per cent possessing more than 20 goats housed their breeding buck in a separate place while, 57.14 per cent respondents housing their breeding buck with all animals in one shed. Majority of goat rearers at 93.98 per cent did no use bedding during winter season, however. 97.78 per cent respondents provided protection against cold through different methods. The effect of flock size on site of housing, boundary wall, type of floor and housing of breeding buck was significant while, its effect on rest of the housing practices was non-significant.

The results revealed that goat rearers at 87.78, 11.39 and 0.83 per cent adopted semi stall, complete grazing and complete stall feeding system, respectively and maximum respondents (96.94%) were using community land for grazing. Goat rearers at 3.06 per cent used their own land for grazing and maximum (94.72%) goat rearers sent their goat in pasture

for more than 5 hours daily. The results depicted that majority of goat rearers at 79.17 and 94.17 per cent, respectively, not practiced to protect pasture land and preservation of fodder, whereas, 20.83 and 8.30 per cent, respectively were well aware about the pasture protection and preservation of tree leaves.

Green fodder feeding was practiced by maximum goat rearers at 60.28 per cent while tendency to provide green fodder decreased with increased flock size. Overall 86.94 per cent goat rearers of small flock size practiced lopping of the tree. Small flock holder at 83.33 per cent were not practicing to provide dry fodder, whereas, 88.33 per cent respondents fed concentrate to goats and maximum were those who were having goats between 11-20 or more than 20. The average concentrate per goat per day was recorded as 138.33±7.22 gm and 78.89 per cent respondents were providing between 100-200 gm concentrate per goat per day prior to milking. 79.72 per cent respondents were using single ingredients while, 68.05 per cent used readymade concentrate. 71.39 per cent goat rearers practiced feeding extra concentrate to their male kids for attaining early maturity. Only 3.61 per cent respondents were aware about feeding of mineral mixture while, maximum at 69.72 per cent of large flock holders used salt rather than mineral mixture.

The association between flock size and grazing site, protection of pasture land, green fodder provide to different category, type of green fodder used for feeding and feeding of common salt were significant while its effect on remaining other feeding practices were non-significant.

The most common symptoms of heat detection adopted by respondents was bellowing, followed by tail vibration and overall average age at first matting was observed at 16.05±2.22 months. 62.25 per cent respondents do not possess own breeding buck and respondents at 70.11 per cent were using breeding buck from out side. Estrus during rainy season was observed by 64.70 per cent respondents and overall number of breedable goats per buck was recorded as 43.06 ± 0.46. Results revealed that 91.67 per cent respondents of surveyed population were detecting their pregnant animal through enlargement of abdomen and 99.89 per cent respondents housed their pregnant doe with whole flock. Tendency to send the pregnant doe to pasture was practiced by 96.67 per cent. The provision to provide prepartum ration was adopted by 50.28 per cent and veterinary aid was not required by 86.94 per cent respondents during kidding.

Castration of kids by small flock holders was not practiced by 75.83 per cent and overall 63.33 per cent of respondents of surveyed population were not aware about castration of male kids. The physical appearance /breed characteristic were used as a common criteria for selecting the breeding buck by 79.89 per cent while, 9.17 per cent respondents used milk

yield of doe for selecting breeding bucks. Treatment of anestrus was not common in different flock size respondents whereas, 18.33 per cent were well awared to provide anestrus treatment. The overall results depicted that effect of flock size on keeping, selection of breeding buck and on castration practices were highly significant whereas, remaining practices pertaining to breeding in the experimental area were non-significant with the flock size.

The health care practices followed in experimental area by the respondents viz. use of veterinary facility, isolate of sick animal, vaccination, sanitization of shed and control of external parasite was not affected whereas, deworming was significantly affected by flock size. The respondents at 68.33 and 81.11 per cent, respectively were not familiar with use of veterinary facility and did not isolate the animal during sickness. Awareness towards deworming by the respondents was 64.17 per cent while, 62.72 per cent respondents were not aware about vaccination against contagious diseases and sanitization of shed were not common. The control of external parasites was followed by almost half of the respondents surveyed either through dipping.

The effect of flock size on marketing of animal and use goat milk was significant while, time to market the animal and selling criteria uses by respondents were not affected by the flock size. The results indicated that maximum respondents at 93.06 per cent were marketing their animal in their own village and round the year marketing was practiced by 88.33 per cent goat rearers. Respondents at 69.94 per cent used physical appearance as criteria for sale and maximum respondents of surveyed area consumed goat milk for their own use at home. However, 28.33 and 13.06 per cent respondents, respectively sold it by mixing with other milk.

The results pertaining to kid rearing practices shows that cleaning of kid after birth was practiced by 46.94 per cent however, 19.44 per cent respondents were well aware about disinfection of naval cord and colostrum feeding to the kids was commonly practiced by different flock holders. The suckling up to 3 months was practiced by half of respondents. Suckling after 3 months decreased with flock size. The information shows that 77.78 per cent respondents were providing solid feed to their kids after 30 days of birth. Deworming of kids was practiced by 65.00 per cent while, 60.22 per cent respondents of study area were not aware about control of external parasites.

The kid housing in separate shed was practiced in equal proportion in different flock size. The kid isolation during sickness was not followed by 96.11 per cent respondents and kid grazing was allowed by 74.44 per cent respondents after 45 days of age. The overall results obtained indicated that deworming and grazing stage of kids were significantly

affected with the flock size while, association between flock size and remaining kid rearing practices was observed as non-significant.

On the basis of RBQ value the main constraints identified were lack of grazing area and lack of improved breeding buck with the RBQ values of 82.55 and 81.66, respectively. The lack of credit facility was the third most serious constraint perceived by respondents of Mewar region obtaining RBQ value at 74.18 per cent. Similarly, other constraints identified by respondents were ranked on the basis of the RBQ values.

The following conclusions were drawn:

- Majority of goat rearers in the Mewar region of Rajasthan belongs to Hindu community and lived in nuclear family with overall average annual income of Rs. 16737.22 per family.
- Among the livestock reared by the respondents more than 60 per cent were goats with average goat holding of 17.46 was per family and 42.00 per cent of total income generated through goat rearing.
- Women play a major role in cleaning, milking, care of young stock and feeding whereas men's play major role in practices like sale of animal and milk, grazing, breeding and care of sick animals.
- Flock size had significant effect on site of housing, boundary wall, type of floor housing of breeding buck, keeping of breeding buck, selection of breeding buck and castration of male kids.
- Enlargement of abdomen is the only criteria used for pregnancy confirmation while, care and management of pregnant doe was very poor.
- The association between flock size and deworming practices of goats and kids, marketing practice and use of goat milk was significant.
- Majority of the respondents sold their animals round the year to middle man in the village itself mainly on the basis of physical appearance.
- On the basis of RBQ values lack of grazing area (82.55) was most serious constraint perceived by the farmers followed by lack of improved breeding buck, credit facility and knowledge of scientific goat rearing.

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GOAT HUSBANDRY PRACTICES IN MEWAR REGION OF THE SOUTHERN RAJASTHAN

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ABSTRACT

The present investigation was conducted in goat rearing areas of Udaipur, Rajasamand, Chittorgarh and Bhilwara districts of Southern Rajasthan. Two tehsil from each district and three villages from each tehsil were selected randomly. Fifteen goat rearers from each of village were selected thus making a sample of 360 goat rearers.

The study revealed that majority of goat rearers (95.05%) belong to Hindu religion, further 58.61 per cent goat rearers belongs to backward caste and 56.94 per cent respondents live in nuclear families. The family size of surveyed respondents was mostly more than 5 members (53.06%). The overall literacy rate of family head was 35.28 per cent and were mostly (67.22%) in 35-60 years age group. Open well was used as an irrigation source by most of the goat rearers (60.28%). Overall 67.22 per cent goat rearers were did not get media information on scientific goat husbandry practices.

Majority of goat rearers (64.44%) depends on Agriculture + Animal Husbandry as an occupation. Survey results showed that 46.94 per cent respondents had less than 0.8 ha land and 4.44 per cent were landless. In the surveyed area maximum irrigated land was in Chittorgarh district. The average pasture land in the experimental area was recorded as 0.34±0.22 ha. The average goat holding size was observed as 17.46±1.18 goats and the average annual income from goat rearing occupation was recorded as Rs. 6973.33±290.01.

Women were found involved in many goat husbandry practices. Various practices like, cleaning, milking, care of young stock and feeding were carried out at 83.33, 63.33, 53.33 and 47.50, per cent by women, respectively whereas, sale of animals, sale of milk, control of endo-parasites breeding, control of ecto-parasites, grazing and care of sick animals were performed at 92.50, 92.22, 77.78, 67.22, 60.83, 60.00 and 51.39 per cent, by men, respectively. Children usually assist in these practices.

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Maximum respondents (86.39%) housed their goats in one shed attached to their residence and have Kaccha shed with Kaccha boundary wall and Kaccha floor with thatched roof. Most of the goat rearers did not had feeding manger (87.50%), urine drainage (83.61%) and ventilation in goat sheds. Majority of goat rearers (93.98%) did not use bedding material for goats but 97.78 per cent respondents provided protection against cold through different methods. Significant effect of flock size was observed on site of housing, boundary wall, type of floor and housing of breeding buck.

Eighty seven per cent goat keepers adopted semi stall feeding system and goats were usually grazed on community pasture land for more than 5 hours daily. Most of the goat rearers neither protected pasture land nor preserve the tree leaves. The green fodder was fed by 60.28 per cent goat rearers. Lopping of trees was a routine practice for grazing. Majority of goat keepers provided 100-200 gm. concentrate prior to milking to their goats and 79.72 per cent respondents used single ingredient concentrate, further, 71.93 per cent respondents used to provide concentrate to their male kids for early maturity. Sixty nine per cent goat rearers provided common salt while only 3.61 per cent provided mineral mixture to their goats. Significant effect of goat flock size was observed on grazing site, protection of pasture land, green fodder provided to different category of animals, type of green fodder and feeding of common salt.

The most common symptoms observed by goat rearers for heat detection were bellowing and tail vibration. The age at first matting was recorded as 16.05±2.22 months. Only natural service was used for breeding due to non-availability of artificial insemination services in goats 62.25 per cent goat rearers did not possess their own breeding buck. Maximum respondents (64.70%) reported heat during rainy season. The average number of breedable goats per buck was observed as 43.06±0.046.

Maximum goat rearers (91.67%) confirm the pregnancy in goats by enlargement of abdomen, pregnant goats were also housed with other animals and send for grazing in pasture with the flock. Castration of male kids was not practiced by 63.33 per cent respondents. Physical appearance was used as a criterion for selection of breeding buck by 79.29 per cent goat rearers.

The association of flock size with keeping own breeding buck, selection of breeding buck and castration of male kids was highly significant whereas, association with rest of the breeding was non-significant.

Majority of goat rearers practiced deworming (64.17), vaccination (35.28%) and control of ecto-parasites (49.72%) through scientific measures. The effect of flock size on health care

practices viz. use of veterinary facility, isolation of sick animals, vaccination, sanitization of shed and control of external parasites was non-significant whereas, flock size had significant affect on deworming.

Most of goat rearers preferred to sale their animals in own village round the year on the basis of physical appearance and maximum goat milk was used by owners for their home consumption. Significant effect of flock size was observed on marketing of animals and use of goat milk whereas, on time of sale and selling criteria used by respondents, it was non-significant.

Cleaning of kids after birth was practiced by 46.94 per cent goat rearers and 19.44 per cent were well aware about disinfection of naval cord. Colostrum feeding to kids and deworming of kids were practiced by 97.22 and 65.00 per cent goat rearers, respectively. 60.22 per cent respondents were not aware about control of external parasites. Isolation of kids was not followed by 96.11 per cent respondents. Flock size had significant effect on deworming and grazing stage of kids while, non-significant effect on rest of the kid rearing practices.

The most common constraints perceived by the goat rearers in the experimental area were lack of grazing area and lack of improved breeding buck, having RBQ values 82.55 and 81.66, respectively.

दक्षिण राजस्थान के मेवाड़ क्षेत्र में बकरी पालन पद्धतियां

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मुख्य सलाहकार

अनुक्षेपण

वर्तमान शोधकार्य दक्षिणी राजस्थान के बकरी पालन क्षेत्र के उदयपुर, राजसंमंद, चित्तौडगढ़ और भीलवाड़ा जिलो में किया गया है। प्रत्येक जिले से दो तहसील और प्रत्येक तहसील से तीन गांव यादृच्छित प्रतिचयन विधि से चयनित किये गये। प्रत्येक गांव से 15 बकरी पालकों को चयनित करते हुए 360 बकरी पालकों का समुह बनाया। सर्वेक्षण यह व्यक्त करता है कि मुख्यतयाः 95.05 प्रतिशत बकरी पालक हिन्दू धर्म से सम्बन्धित है, 58.61 प्रतिशत बकरी पालक अन्य पिछडी जाति के तथा 56.94 प्रतिशत बकरी पालक एकल परिवार में रहते हैं। 53.06 प्रतिशत सर्वेक्षित परिवार के आकार में 5 सदस्यों से ज्यादा थे और परिवार के मुखिया की औसत साक्षरता दर 35.28 प्रतिशत थी। परिवार का मुखिया (67.22 प्रतिशत) 35 से 60 वर्ष की आयु के समूह में थे। अनुसंधान क्षेत्र के 60.28 प्रतिशत बकरी पालकों के पास सिंचाई का स्रोत कुआं था। औसत 67.22 प्रतिशत बकरी पालक वैज्ञानिक बकरी पालन की पद्धतियां के बारे में संचार के साधनो से जानकारी लेने से अनभिज्ञ थे। 64.44 प्रतिशत बकरी पालक कृषि और पशु पालन पर आश्रित है। सर्वे परिणाम दर्शाते है कि 46.94 प्रतिशत बकरी पालकों के पास 0.8 हेक्टर से कम जमीन थी तथा 4.44 प्रतिशत भूमिहीन थे। अधिकतम सिंचित जमीन चित्तौड़गढ जिले में पाई गई और औसत चारागाह जमीन 0.34±0.22 हेक्टर अनुसंधान क्षेत्र में अंकित की गई। बकरी पालन से औसत वार्षिक आय 6973.33±290.01 रूपये अंकित की गई, बकरियों के रेवड़ का औसत आकार 17.46±1.18 बकरियां तथा 60.78 प्रतिशत किसान बकरी तथा इसके बाद भेंड, गायें और भैंसें पालते थे। सर्वेक्षित क्षेत्र के परिवार के सदस्यों द्वारा किये बकरी पालन के विभिन्न प्रबन्धन कियाओं पर संग्रहित सूचना बयान करती है कि अधिकतम कियायें जैस सफाई, दुआरी, नवजात बच्चों की देखभाल और खिलाई 83.33, 63.33, 53.33 और 47.50, प्रतिशत कमशः स्त्री पूर्ण करती थी जबकि जानवरों को बेचना, दूध बेचना, अंतः परजीवियों की रोकथाम, प्रजनन, बाह्य परजीवियों की रोकथाम, चराई और बीमार जानवरों की देखभाल की कियायें 92.50, 92.22, 77.78, 67.22, 60.83, 60.00 और 51.39 प्रतिशत कमशः परिवार के पुरूष सदस्यों द्वारा पूर्ण की जाती थी। बकरी पालन में यह देखा गया कि बच्चे हमेशा इन बकरी पालन कियाओं में मदद करते है।

1. विद्या वाचस्पति छात्र, पशु उत्पादन विभाग, राजस्थान कृषि महाविद्यालय, म.प्र.कृ.प्रौ. वि.वि., उदयपुर

2. सह आचार्य, पशु उत्पादन विभाग, राजस्थान कृषि महाविद्यालय, म.प्र.कृ.प्रौ. वि.वि., उदयपुर

सर्वे यह प्रदर्शित करता है कि 86.39 प्रतिशत बकरी पालक उनकी बकरियो को उसके आवास से जुड़े एक ही बाड़े में रखता है, मुख्यतयाः बकरी का आवास कच्चा और कच्ची दीवार, कच्चा फर्श और घास–फूस की छत वाला होता है।

हवादार बकरी के आवास में खाने की नांद (87.50 प्रतिशत) तथा मूत्र निकासी (83. 61प्रतिशत) प्रतिशत बकरी पालकों के पास नहीं होती है। मुख्यतयाः 93.98 प्रतिशत बकरी पालक बिछावन काम नहीं लेते तथा सर्दी के बचाव हेतु विभिन्न उपाय 97.78 प्रतिशत बकरी पालकों द्वारा प्रदान किया जाता था। बकरी के समूह का सार्थक प्रभाव आवास की जगह, सीमा–दीवार, फर्श का प्रकार और प्रजनन बकरे के आवास पर प्राप्त किया गया।

सितायसी प्रतिशत बकरी पालक जानवरों को बांधते और चराते तथा बकरियों को चराई हेतु सार्वजनिक चरनोट भूमि पर 5 घण्टे से ज्यादा समय के लिए हमेशा भेजते हैं। अधिकतम बकरी पालक न तो चारागाह की सुरक्षा करते और न ही पेड़ की पत्तियों को संरक्षित करते है। 60.28 प्रतिशत बकरी पालक हरा चारा खिलाते है। पेड़ की टहनियों को काटकर चराई में खिलाना अधिक प्रचलित है। अधिकांश बकरी पालक 100–200 ग्राम दाना उनकी बकरियों को दुआरी के पहले उपलब्ध कराते है। 79.72 प्रतिशत बकरी पालक अनाज का उपयोग और 71.93 प्रतिशत बकरी पालक दाना उनके नर बच्चों को जल्दी परिपक्व होने के लिए उपलब्ध कराते है। 69.00 प्रतिशत बकरी पालक अपनी बकरियों को साधारण नमक और केवल 3.61 प्रतिशत खनिज मिश्रण खिलाते है।

बकरी के झुण्ड के आकार का सार्थक प्रभाव चराई स्थान, चरनोट भूमि की सुरक्षा, विभिन्न उम्र के जानवरों को उपलब्ध कराया गया हरा चारा, हरे चारे का प्रकार और साधारण नमक खिलाने पर देखा गया।

अधिकतर बकरी पालक बकरी की आवाज करने व पूंछ हिलाने के लक्षणों के द्वारा गर्मी मे आने की पहचान करते तथा प्रथम बार मिलने की उम्र 16.05±2.22 महीने अंकित की गई। 62.25 प्रतिशत बकरी पालकों के पास अपना खूद का बीजू बकरा नहीं पाया गया। कृत्रिम गर्भाधान की सुविधा नहीं होने से अधिकांश बकरी पालक प्राकृतिक विधि से बकरियों को ग्याभिन कराते है। अधिकतम 64.70 प्रतिशत बकरी पालकों के अनुसार बकरियों का गर्मी में आने का समय वर्षा ऋतु पाया गया तथा औसत प्रति बीजू बकरे पर 43.06±0.046 प्रजनन बकरियां अनुसंधान क्षेत्र में पायी गयी।

अधिकांश 91.67 प्रतिशत बकरी पालक ग्याभिन जानवरों का परिक्षण उभरे हुये पेट के लक्षण से तथा सभी अन्य जानवरों के साथ आवास में रखते तथा ग्याभिन पशुओं को चरने के लिए

झुण्ड में चरनोट भूमि में भी भेजते है। अधिकतर (63.33 प्रतिशत) बकरी पालक नर जानवरो का बधियाकरण नही करते है। 79.29 प्रतिशत बकरी पालक व्यक्तिगत जानवरों की वाह्य शारीरिक संरचना के आधार पर बीजू बकरें का चयन करते है। बीजू बकरे को रखना, बीजू बकरा का चयन, नर बकरों का बधियाकरण पर झुण्ड के आकार का बहुत सार्थक प्रभाव जबकि अन्य बची हुई प्रजनन पद्धतियों पर सार्थक प्रभाव नहीं पाया गया।

सर्वे परिणाम यह भी प्रदर्शित करते कि अधिकतर बकरी पालकों द्वारा टीकाकरण (64.17 प्रतिशत), अंतः कृमि नाशक दवा (35.28 प्रतिशत), तथा बाह्य परजीवी नाशक दवा (49.72 प्रतिशत), वैज्ञानिक उपाय द्वारा करते है। अनुसंधान क्षेत्र में स्वास्थ्य रक्षा के उपाय अपनाये जाते है, चिकित्सा का उपयोग, बीमार जानवरों को अलग करना, टीकाकरण, आवास की सफाई और बाह्य परजीवियों की रोकथाम पर सार्थक प्रभाव नहीं पाया गया जबकि अंतः कृमि नाशक दवा पर झुण्ड के आकार का सार्थक प्रभाव पाया गया।

अधिकतर बकरी पालक पूरे वर्षभर अपने जानवरों को खुद के गांव में बाह्य शारीरिक संरचना के आधार पर बेचना पंसद करते तथा ज्यादातर बकरी पालक बकरी के दूध को उनके स्वयं के लिए घर में उपभोग करते थे। जानवरों का विपणन और बकरी के दूध के उपयोग पर झुण्ड का सार्थक प्रभाव देखा गया जबकि विपणन समय और बेचने के मापदण्ड पर झुण्ड के आकार का सार्थक प्रभाव नहीं पाया गया।

बच्चों की जन्म के बाद सफाई करने की प्रकिया 46.94 प्रतिशत बकरी पालक अपनाते तथा 19.44 प्रतिशत नाल को जीवाणु रहित करने के बारे में अच्छी तरह से जागरूक थे। बच्चों को खीस पिलाने और बच्चों को अन्तः कृमिनाशक दवा देने का अभ्यास 97.22 और 65.00 प्रतिशत कमशः जबकि 60.22 प्रतिशत बकरी पालक बाह्य परजीवी रोकथाम के बारे में अनभिज्ञ थे। 96.11 प्रतिशत बकरी पालक बीमारी के समय बच्चों को अलग नहीं करते थे। अन्तः कृमिनाशक और बच्चों की चराई अवस्था सार्थक रूप से बकरियों की संख्या से प्रभावित थी जबकि बची हुई मेमनों की पद्धतियौं पर झुण्ड आकार का सार्थक प्रभाव नहीं पाया गया। अनुसंधान क्षेत्र में चराई क्षेत्र की कमी (82.55) और उन्नत बीजू बकरे की कमी (81.66) की समस्या आर बी क्यू मान के आधार पर प्रथम एवं द्वितीय स्थान पर रहे।

Appendix 1.

Department of Animal Production
Rajasthan college of Agriculture, Udaipur
Maharana Pratap University of Agriculture & Technology, Udaipur (Raj.)

Interview Schedule

Interviewer : - **M.L. Gurjar**
Ph.D. Scholar (Animal Production)

" GOAT HUSBANDRY PRACTICES IN MEWAR REGION OF THE SOUTHERN RAJASTHAN"

[1] Family status of goat rearers:

(1) Name of Goat rearers _____ (2) Caste _____

(3) Category - SC/ ST/ OBC/ General _____ (4) Age _____

(5) Village _____ (6) Tehsil _____

(7) District _____ (8) Religion _____

(9) Main Occupation - Service/ Business/ Agri./ AH./ Agri.+AH. _____

(10) Education - (A) Illiterate (B) Primary (C) Middle (D) Metric and above

(11) No. of family members – (a) Man (b) Women (c) Male child (d) Female child Total ___

(12) Type of family - Joint/ Nuclear

(13) Family size - Small (up to 5) / Large (above 5)

(14) Annual income from Goat husbandry Rs. _____

(15) Annual income from other sources Rs. _____

(16) Annual Total Income Rs. _____

(17) Category of land holding in hactare:

(A) Landless (No land)

(B) Less than 0.8 ha (1-5 Bighas)

(C) 0.8-1.6 ha (6-10 Bighas)

(D) Above 1.6 ha (Above 10 Bighas)

(18) Type of land holding-

S. No.	Type of land	Land in ha
1.	Irrigated	
2.	Unirrigated	
3.	Pasture land	
Total		

(19) Irrigation source _____

(20) Media information: Yes/ No

(21) Herd structure of livestock:

Category	Young Male	Young Female	Adult Female	Breeding male	Total
Goat					
Sheep					
Buffalo					
Cattle					
Total					

[2]Goat Husbandry Practices:

[A] **HOUSING:**

(1) Site of housing
- (a) Attached with residence
- (b) Away from residence

(2) Mode of housing
- (a) Mixed all
- (b) Separately

(3) Housing time
- (a) Day
- (b) Night

(4) Type of shed:
- (a) Kaccha
- (b) Pucca
- (c) Kaccha + Pucca

(5) Boundary wall :
- (a) Kaccha
- (b) Pucca
- (c) Biological

(6) Type of floor:
- (a) Kaccha
- (b) Pucca
- (c) Kaccha + Pucca

(7) Type of roof:
- (a) Thatch
- (b) Asbestos
- (c) Cement Concrete
- (d) Iron sheet

(8) Water trough: Yes / No

(9) Source of drinking water : -
- (a) Pond
- (b) Well/ Tubewell
- (c) Common water trough (Panchayati)

(10) Feeding manger in the shed- (a) Kaccha (b) Pucca (c) Not available

(11) Urine drainage: Yes/ No

(12) Ventilation available : Yes/No

(13) Housing of Breeding Buck: (a) Separate (b) With all animals (c) Not available

(14) (A) Winter bedding material used : Yes / No

(B) Type of bedding material used: - Dry sand
- Crop waste products/ waste fodder

(15) Protection of animals from cold climate:
- Tying under closed house: Yes/No
- By artificial thatched house

[B] FEEDING

(1) Mode of Feeding of goats:
- (a) Complete stall feeding
- (b) Semi stall feeding
- (c) Complete grazing

(2) Grazing site:
- (a) Own land
- (b) Community land

(3) Grazing time in hours :
- (a) < 5 hrs
- (b) > 5 hrs

(4) Common grasses found in the area _____

(5) Protection of pasture land: Yes/ No

(6) Preservation of trees leaves (Pala): Yes/ No

(7) Green fodder provide to different category:
- (a) Whole flocks
- (b) Only milking goat
- (c) Only kid
- (d) No

(8) Type of green fodder offered used for feeding
- (a) Lucerne
- (b) Berseem
- (c) Weeds
- (d) Monsoon grass

(9) Lopping of the trees: Yes/ No

(10) Common top feed available in your area: _____

(11) Feeding of dry fodder to goat: Yes/ No

(12) Name of common grain crop cultivated in area: _____

(13) Concentrate feeding to the goats: Yes/ No

(14) Type of concentrate used for goat feeding
- (a) Home prepared
- (b) Single ingredient
- (c) Readymade from market

(15) Quantity of concentrate mixture fed per day to different category of goat:
- (a) Milking
- (b) Dry
- (c) Bucks
- (d) Kids
- (e) Advance pregnant

(16) Do you provide extra concentrate (fattening ration) to the kids reared for meat Purpose ? Yes/ No

(17) Feeding of mineral mixture: Yes/ No

(18) Feeding of common salt : Yes/ No

(19) Time of feeding concentrate to milking doe-
- (a) No
- (b) Prior to milking time
- (c) During milking

[C] BREEDING PRACTICES

(1) Symptoms of oestrus (heat) observed
- (a) Bellowing
- (b) Frequent urination

(c) Mounting on other goats
(d) Mucous discharge from vaginal
(e) Reduction in milk yield
(f) Vibrate the tail free
(g) All of the above

(2) Method of matting - Natural / AI
(3) Do you have own breeding buck: Yes /No
(4) How long a buck is used for breeding in a flock? _____
(5) How do you make it sure whether the animals has conceived or not?
(a) By observing signs of heat in the next cycle after 21 days
(b) By going in for pregnancy diagnosis
(c) Just by observing the enlargement of abdominal cavity
(d) Any other
(6) Maximum animals come in heat in which season of the year
(a) Summer
(b) Rainy
(c) Winter
(7) Selection of breeding male: Own flock / Out side

(8) What extra care/ precaution do you take of a pregnant animal :
(i) Housing : (a) Separate (b) Group
(ii) Grazing: (a) Not allowed (b) Allowed
(iii) Prepartum rations (a) Yes (b) No
(iv) Veterinary aid during kidding: (a) Required (b) Not required
(9) Do you castrate the male kids? Yes/ No
(10) Criteria of selection of breeding bucks
(a) Body weight/health
(b) Milk yield of dam
(c) Physical appearance / breed characteristic of bucks
(11) Age at first matting _____
(12) Treatment of anestrus? Yes / No
(13) Treatment of repeaters? Yes / No
(14) How many goats are covered by one buck in season? _____

[D] HEALTH CARE

(1) Use of Veterinary facilities : Yes / No
(2) Do you isolate sick animals : Yes / No
(3) Do you practice Deworming? Yes / No
(4) How many times do you practice deworming in animals per year?
(a) Once
(b) Twice
(c) Three times
(5) Name of medicine used for deworming: _____
(6) Practice of vaccination: Yes/No
(7) What are the important diseases of goat against which vaccination is done?
_____
(8) Name common disease occurring in your flock
(a) _____
(b) _____
(c) _____
(d) _____
(9) What measures are taken for treatment of animals
(a) _____
(b) _____

(c) _____
(d) _____

(10) Do you disinfectant goat shed? Yes / No

(11) How do you dispose a carcass?
- (a) By throwing out the village premises
- (b) By burning it
- (c) By deep burial
- (d) Leave it as such to decay

(12) How do you control external parasite of the animals?
- (a) By dipping
- (b) By dusting insecticides in powered form
- (c) None of above

[E] MARKETING

(1) Do you sale your animals? Yes / No

(2) If your answer is yes then where do you market the animals?
- (a) In the village itself
- (b) Taking them to near mandi or city

(3) When do you market your animals?
- (i) Round the year
- (ii) On special occasion

(4) What is the age when male kid sold? _____

(5) What are the criteria of fixing rate?
- (a) By weight basis
- (b) By physical appearance

(6) Use of goat milk: Home use/ sale alone / mixing with cattle, Buffalo milk

[F] KID REARING PRACTICES

(1) Do you clean kid after birth: Yes / No

(2) Disinfection of navel chord Yes / No

(3) Feeding of colostrum to kid: Yes / No

(4) Duration of kid suckling to doe: (a) 3 Months (b) Above 3 months

(5) When you start solid feeding to kid
- (a) Within 15 days
- (b) 15 to 30 days
- (c) Above 30 days

(6) Deworming of kid: Yes / No

(7) How you control external parasite of kid: Manual/ Chemicals/ Traditional / No Practiced

(8) Housing of kid: (a) With doe (b) Separate

(9) Isolated of male/ female kid: Yes / No

(10) When you send kid for grazing
- (a) Within 30 days age
- (b) 30-45 days age
- (c) Above 45 days age

[3] ROLE OF MAN/WOMEN/CHILDREN IN GOAT HUSBANDRY ACTIVITIES:

S. No.	Activitics	Man			Women			Children		
		Active	Partial	Negligible	Active	Partial	Negligible	Active	Partial	Negligible
1.	Feeding									
2.	Cleaning									
3.	Milking									
4.	Grazing									
5.	Sale of Animals									
6.	Sale of milk									
7.	Care of young stock									
8.	Breeding operation									
9	Care of sick animal									
10	Ecto-parasites									
11	Indo-parasites									

[4] CONSTRAINTS IN ADOPTION OF IMPROVED GOAT HUSBANDRY PRACTICES :

1. Lack of credit facility
2. Illiteracy
3. In Breeding
4. Lack of knowledge about scientific goat rearing
5. Lack of grazing area
6. Lack of improved breeding bucks.
7. Lack of vaccination
8. High cost of concentrate feeding
9. High cost of veterinary aid
10. Non-availability of green fodder
11. Higher kid mortality
12. Lack of proper housing facilities
13. Non- existence of organized meat market
14. Non-availability of veterinary services and medicines at village level
15. In adequate price for the animals
16. High incidence of diseases

Appendix 2. RBQ Values of different constraints perceived by farmers of Udaipur District

Rank	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		RBQ	N	Rank	Value
Code	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ				
1	15	16.67	15	15.63	18	17.50	10	9.03	8	6.67	5	3.82	5	3.47	2	1.25	2	1.11	2	0.97	2	0.83	2	0.69	1	0 28	1	0.21	1	0.14	1	0.07	78.33	90	3	81.53
2	0	0.00	0	0.00	0	0.00	0	0 00	0	0.00	0	0.00	0	0.00	1	0.63	2	1.11	1	0.49	2	0.83	10	3.47	41	11.39	25	5.21	4	0 56	4	0 28	23.96	90	13	81.46
3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	1.88	4	2.22	3	1.46	5	2.08	3	1.04	3	0.83	38	7.92	20	2 78	11	0.76	20.97	90	14	78 33
4	4	4.44	5	5.21	8	7.78	9	8.13	18	15 00	10	7.64	6	4.17	4	2.50	5	2.78	5	2.43	4	1.67	4	1.39	3	0.83	3	0.63	1	0.14	1	0.07	64.79	90	5	74.24
5	0	0.00	0	0.00	2	1.94	5	4.51	9	7.50	11	8.40	18	12.50	18	11.25	11	6.11	7	3.40	5	2.08	2	0.69	2	0.56	0	0.00	0	0 00	0	0.00	58.96	90	7	64.79
6	25	27.78	18	18.75	11	10.69	7	6.32	5	4.17	5	3.82	3	2.08	4	2.50	3	1.67	4	1.94	2	0.83	2	0.69	1	0.28	0	0.00	0	0.00	0	0.00	81.53	90	1	59.24
7	20	22 22	22	22.92	11	10.69	9	8.13	7	5.83	6	4.58	2	1.39	2	1.25	3	1.67	2	0.97	1	0.42	2	0.69	1	0.28	2	0.42	0	0.00	0	0.00	81.46	90	2	58.96
8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	1.39	1	0.63	1	0.56	7	3.40	10	4.17	39	13.54	15	4.17	13	2.71	1	0.14	1	0.07	30.76	90	12	48.40
9	0	0.00	0	0.00	0	0.00	8	7.22	10	8.33	13	9.93	20	13.89	14	8.75	11	6.11	4	1.94	2	0.83	3	1.04	3	0.83	1	0.21	1	0.14	0	0 00	59.24	90	6	45 97
10	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	1.11	3	1.46	5	2.08	6	2.08	6	1.67	7	1.46	25	3.47	36	2.50	15.83	90	15	38.19
11	10	11.11	10	10.42	13	12.64	15	13.54	6	5.00	7	5.35	7	4.86	8	5.00	4	2.22	5	2.43	1	0.42	2	0.69	2	0.56	0	0.00	0	0.00	0	0.00	74.24	90	4	32.01
12	0	0 00	0	0.00	0	0.00	0	0.00	4	3.33	6	4.58	11	7.64	20	12.50	13	7.22	8	3.89	10	4.17	8	2.78	6	1.67	1	0.21	3	0 42	0	0.00	48 40	90	8	30.76
13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0 00	0	0.00	0	0.00	0	0.00	5	2.43	5	2.08	6	2 08	8	2.22	10	2.08	10	1.39	46	3.19	15.49	90	16	23.96
14	0	0.00	1	1.04	0	0.00	0	0.00	0	0.00	2	1.53	1	0.69	15	9.38	29	16.11	18	8.75	14	5.83	5	1.74	1	0 28	2	0.42	1	0 14	1	0.07	45.97	90	9	20.97
15	0	0.00	0	0.00	1	0.97	0	0 00	0	0.00	0	0.00	1	0.69	2	1.25	6	3.33	31	15.07	18	7.50	20	6.94	5	1.39	4	0 83	1	0.14	1	0.07	38.19	90	10	15 83
16	0	0 00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0 69	1	0.63	1	0.56	7	3.40	36	15.00	20	6 94	10	2.78	5	1 04	5	0.69	4	0.28	32.01	90	11	15.49

Appendix 3. RBQ Values of different constraints perceived by farmers of Rajsamand District

Rank	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		RBQ	N	Rank	Value
Code	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ				
1	8	8.89	8	8.33	15	14.58	15	13.54	8	6.67	7	5.35	6	4.17	9	5 63	5	2.78	4	1.94	2	0.83	1	0.35	2	0.56	0	0.00	0	0.00	0	0.00	73 61	90	4	81 81
2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	1.67	1	0.49	2	0.83	11	3 82	39	10.83	24	5 00	5	0 69	5	0 35	23.68	90	13	81 74
3	0	0.00	0	0.00	0	0.00	0	0.00	0	0 00	0	0.00	0	0 00	0	0.00	5	2.78	4	1.94	3	1.25	6	2 08	5	1 39	4	0.83	41	5 69	22	1.53	17.50	90	14	78 40
4	3	3.33	5	5.21	9	8.75	9	8.13	17	14.17	11	8.40	5	3.47	4	2.50	6	3.33	4	1.94	5	2.08	4	1.39	3	0.83	2	0.42	2	0 28	1	0.07	64.31	90	5	73 61
5	0	0.00	0	0.00	1	0.97	3	2.71	8	6.67	12	9.17	18	12.50	18	11.25	9	5.00	9	4.38	5	2 08	5	1.74	1	0.28	1	0.21	0	0.00	0	0.00	56 94	90	7	64.31
6	21	23.33	23	23.96	10	9.72	8	7.22	7	5.83	6	4.58	3	2.08	2	1.25	2	1 11	2	0.97	1	0.42	1	0.35	2	0.56	1	0.21	1	0.14	0	0.00	81.74	90	2	62 71
7	26	28.89	17	17.71	13	12.64	7	6.32	4	3.33	4	3.06	3	2.08	3	1.88	4	2.22	3	1.46	3	1.25	2	0.69	1	0.28	0	0.00	0	0.00	0	0.00	81.81	90	1	56.94
8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.76	2	1.39	1	0.63	1	0.56	6	2.92	11	4.58	38	13.19	14	3.89	14	2.92	1	0.14	1	0.07	31.04	90	12	51.53
9	0	0.00	0	0 00	7	6.81	7	6.32	9	7.50	13	9.93	22	15.28	13	8.13	10	5.56	3	1.46	1	0.42	2	0.69	1	0.28	1	0.21	1	0.14	0	0 00	62 71	90	6	48.26
10	0	0.00	0	0 00	0	0.00	0	0.00	0	0 00	0	0.00	0	0.00	0	0.00	3	1.67	2	0.97	6	2.50	5	1.74	6	1.67	7	1.46	26	3.61	35	2.43	16.04	90	15	38.13
11	14	15.56	14	14.58	19	18.47	11	9.93	9	7.50	6	4.58	4	2.78	2	1.25	1	0.56	2	0.97	2	0.83	2	0.69	1	0.28	1	0.21	1	0 14	1	0.07	78 40	90	3	31 25
12	0	0.00	0	0.00	0	0.00	1	0.90	3	2.50	6	4.58	10	6.94	21	13.13	13	7.22	7	3.40	11	4.58	8	2.78	6	1.67	1	0.21	2	0 28	1	0 07	48 26	90	9	31 04
13	0	0 00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0 00	3	1.46	3	1.25	5	1.74	10	2.78	11	2.29	10	1.39	48	3 33	14.24	90	16	23.68
14	0	0.00	0	0.00	0	0.00	0	0.00	1	0.83	2	1.53	16	11.11	28	17.50	19	10.56	13	6.32	5	2.08	2	0.69	2	0.56	1	0 21	1	0 14	0	0.00	51 53	90	8	17.50
15	0	0 00	0	0.00	0	0.00	0	0.00	1	0.83	0	0.00	1	0.69	2	1 25	6	3.33	32	15.56	17	7.08	21	7 29	4	1.11	3	0 63	2	0.28	1	0.07	38.13	90	10	16 04
16	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0 00	0	0.00	7	3.40	34	14.17	17	5.90	20	5.56	8	1.67	4	0.56	0	0 00	31 25	90	11	14.24

Appendix 4. RBQ Values of different constraints perceived by farmers of Chittorgarh District

Rank	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		RBQ	N	Rank	Value
Code	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ				
1	4	4.44	4	4.17	9	8.75	8	7.22	21	17.50	12	9.17	5	3.47	4	2 50	4	2.22	5	2.43	5	2.08	3	1.04	3	0 83	2	0.42	1	0.14	0	0.00	66.39	90	5	84 72
2	0	0 00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	1.25	3	1.67	3	1.46	6	2.50	6	2.08	3	0 83	35	7 29	26	3.61	6	0 42	21.11	90	14	81.39
3	0	0.00	0	0 00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	1.25	1	0.56	2	0.97	2	0.83	11	3.82	38	10 56	26	5.42	5	0.69	3	0 21	24.31	90	13	80.28
4	0	0.00	0	0.00	0	0.00	8	7.22	10	8.33	20	15.28	14	9.72	13	8.13	10	5.56	5	2.43	3	1.25	2	0.69	2	0.56	2	0.42	1	0.14	0	0 00	59.72	90	6	72 99
5	0	0.00	0	0.00	1	0.97	6	5.42	8	6.67	12	9.17	19	13.19	17	10.63	12	6.67	6	2.92	5	2.08	1	0.35	2	0.56	1	0.21	0	0.00	0	0.00	58 82	90	7	66.39
6	19	21 11	23	23.96	10	9.72	10	9.03	6	5.00	7	5.35	3	2.08	2	1.25	2	1.11	1	0.49	2	0.83	2	0.69	2	0.56	1	0.21	0	0 00	0	0 00	81.39	90	2	59 72
7	28	31 11	20	20.83	12	11.67	7	6.32	6	5.00	4	3.06	2	1.39	3	1.88	2	1.11	2	0.97	1	0 42	2	0.69	1	0 28	0	0.00	0	0.00	0	0 00	84.72	90	1	58 82
8	0	0 00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0 69	2	1.25	2	1.11	7	3.40	13	5.42	32	11.11	16	4.44	12	2.50	3	0 42	2	0.14	30 49	90	12	48.68
9	16	17.78	17	17.71	18	17.50	9	8.13	7	5.83	6	4.58	5	3 47	3	1.88	1	0.56	2	0.97	1	0.42	2	0.69	2	0.56	1	0.21	0	0.00	0	0.00	80.28	90	3	46 67
10	0	0 00	0	0 00	0	0.00	0	0.00	0	0.00	0	0 00	0	0.00	0	0.00	5	2.78	4	1.94	3	1.25	6	2.08	10	2.78	12	2 50	10	1 39	40	2.78	17.50	90	15	38.47
11	9	10 00	9	9.38	15	14.58	14	12.64	7	5.83	6	4.58	6	4.17	7	4.38	5	2.78	5	2.43	2	0.83	1	0.35	3	0.83	1	0.21	0	0 00	0	0 00	72.99	90	4	31 88
12	0	0.00	0	0.00	0	0.00	3	2.71	3	2.50	6	4.58	10	6.94	18	11.25	14	7.78	8	3.89	9	3.75	7	2.43	7	1.94	3	0.63	2	0.28	0	0 00	48.68	90	8	30.49
13	0	0.00	0	0.00	0	0.00	0	0.00	0	0 00	0	0.00	0	0.00	0	0.00	3	1.67	2	0.97	6	2.50	5	1.74	7	1.94	6	1.25	37	5 14	24	1 67	16 88	90	16	24.31
14	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	2.29	2	1.39	16	10.00	25	13.89	20	9.72	16	6.67	7	2.43	1	0.28	0	0.00	0	0.00	0	0.00	46.67	90	9	21 11
15	0	0.00	0	0.00	0	0.00	0	0 00	0	0 00	0	0.00	0	0.00	3	1.88	12	6.67	27	13.13	20	8.33	17	5.90	6	1.67	3	0.63	2	0.28	0	0 00	38.47	90	10	17 50
16	0	0 00	0	0.00	0	0.00	0	0.00	0	0.00	1	0 76	0	0.00	2	1 25	0	0 00	8	3.89	33	13.75	20	6 94	11	3 06	6	1.25	5	0 69	4	0 28	31.88	90	11	16 88

Appendix 5. RBQ Values of different constraints perceived by farmers of Bhilwara District

Rank	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		RBQ	N	Rank	Value
Code	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ	fi	RBQ				
1	13	14.44	13	13.54	21	20.42	10	9.03	10	8.33	5	3.82	5	3.47	3	1.88	0	0.00	2	0.97	3	1.25	2	0.69	1	0.28	1	0.21	0	0.00	1	0.07	78.40	90	3	82.22
2	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.63	2	1.11	1	0.49	2	0.83	12	4.17	37	10.28	25	5.21	5	0.69	5	0.35	23.75	90	13	81.94
3	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	5	2.78	4	1.94	3	1.25	5	1.74	3	0.83	5	1.04	43	5.97	22	1.53	17.08	90	14	78.40
4	2	2.22	5	5.21	10	9.72	11	9.93	17	14.17	11	8.40	6	4.17	4	2.50	4	2.22	3	1.46	4	1.67	5	1.74	3	0.83	2	0.42	2	0.28	1	0.07	65.00	90	6	74.03
5	0	0.00	0	0.00	0	0.00	3	2.71	5	4.17	12	9.17	20	13.89	20	12.50	9	5.00	8	3.89	6	2.50	5	1.74	2	0.56	0	0.00	0	0.00	0	0.00	56.11	90	7	66.60
6	28	31.11	15	15.63	13	12.64	8	7.22	3	2.50	3	2.29	4	2.78	4	2.50	3	1.67	3	1.46	3	1.25	1	0.35	2	0.56	0	0.00	0	0.00	0	0.00	81.94	90	2	65.00
7	22	24.44	24	25.00	8	7.78	8	7.22	6	5.00	7	5.35	2	1.39	3	1.88	2	1.11	2	0.97	2	0.83	3	1.04	0	0.00	1	0.21	0	0.00	0	0.00	82.22	90	1	56.11
8	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	1.53	1	0.69	1	0.63	1	0.56	11	5.35	6	2.50	40	13.89	12	3.33	12	2.50	2	0.28	2	0.14	31.39	90	12	51.25
9	0	0.00	0	0.00	8	7.78	14	12.64	8	6.67	21	16.04	12	8.33	13	8.13	9	5.00	2	0.97	1	0.42	1	0.35	1	0.28	0	0.00	0	0.00	0	0.00	66.60	90	5	48.33
10	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	1.25	3	1.67	1	0.49	5	2.08	5	1.74	6	1.67	8	1.67	25	3.47	35	2.43	16.46	90	15	37.99
11	8	8.89	8	8.33	16	15.56	16	14.44	7	5.83	6	4.58	9	6.25	6	3.75	5	2.78	4	1.94	1	0.42	2	0.69	2	0.56	0	0.00	0	0.00	0	0.00	74.03	90	4	31.88
12	0	0.00	0	0.00	0	0.00	3	2.71	1	0.83	6	4.58	11	7.64	19	11.88	14	7.78	8	3.89	10	4.17	6	2.08	8	2.22	1	0.21	2	0.28	1	0.07	48.33	90	9	31.39
13	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	5	2.43	5	2.08	4	1.39	9	2.50	9	1.88	10	1.39	48	3.33	15.00	90	16	23.75
14	0	0.00	0	0.00	0	0.00	0	0.00	2	1.67	1	0.76	16	11.11	30	18.75	17	9.44	13	6.32	2	0.83	4	1.39	2	0.56	1	0.21	1	0.14	1	0.07	51.25	90	8	17.08
15	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.76	1	0.69	2	1.25	5	2.78	33	16.04	18	7.50	20	6.94	3	0.83	4	0.83	2	0.28	1	0.07	37.99	90	10	16.46
[illegible]	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.63	0	0.00	8	3.89	35	14.58	16	5.56	18	5.00	8	1.67	4	0.56	0	0.00	31.88	90	11	15.00