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Rajasthan Zone III Dairy animal feeding scenario

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Abstract: Animal feed is food given to domestic animals, especially livestock, in the course of animal husbandry. There are two basic types: fodder and forage. Used alone, the word feed more often refers to fodder. Animal feed is an important input to animal agriculture, and is frequently the main cost of the raising or keeping of animals. Farms typically try to reduce cost for this food, by growing their own, grazing animals, or supplementing expensive feeds with substitutes, such as food waste like spent grain from beer brewing.

Animal wellbeing is highly dependent on feed that reflects a well balanced nutrition. Some modern agricultural practices, such as fattening cows on grains or in feed lots, have detrimental effects on the environment and animals. For example, increased corn or other grain in feed for cows, makes their microbiomes more acidic weakening their immune systems and making cows a more likely vector while other feeding practices can improve animal impacts. For example, feeding cows certain kinds of seaweed, reduces their production of methane, reducing the greenhouse gases from meat production.

Keywords: Feeding , animal husbandry , live stock , nutrition

Introduction

Feeding Practices

It is general practice to provide dry fodder and concentrate to the milch animals and depending upon the availability, the green fodder is being provided in variable quantities. It was largely observed that animal owners engaged in agriculture farming do produce green fodder along with the routine farm products, where as animal owners do not have enough land or facing problem of water scarcity usually either do not provide the green fodder or are dependent on wild grass availability. The dry fodder which is locally available in the market is being provided in sufficient quantity to all type of animals.The concentrate is mainly given to animals in milch and almost equal quantity of concentrate is given irrespective of quantum of production. The concentrate composition varies from place to place depending upon the market availability and the cost factor. The ypung calves and heifers were either not provided with concentrate or very rarely be given in Ajmer and Tonk districts, less frequently in Dausa district and commonly given in Jaipur district. The pregnant and dried animals though very much needy for proper and balanced diet were usually devoid of the concentrate feed whereas at each place the breeding bulls were fed with concentrate in variable quantities lesser than the actual requirement.

Type of concentrate used

The livestock owners either prepare their own concentrate mixture by purchasing the ingredients from the local market or utilizing part of it from their own farm produce. On analysis of these concentrate feed it could be well observed that these concentrate mixture were ground to fulfill the nutritive requirements of lactating animals but these don't include all type of nutrients required and of all nutrient are incorporated the required quantity is not being provide and hence in no way it can be termed as balanced feed for the animals. In some parts of all the four surveyed districts it was observed that the animals are using readymade concentrate feed which is balanced in all respect but the required quantity is not being fed due to cost factor.

Feeding of different categories of the animals

a. **Feeding if animals less than six months**

The basic requirement of young animals below six months of age is dam's milk it had been invariably observed that the young female calves were being offered sufficient quantity of dam's milk where as male calves were found deprived off. The green fodder is being fed to these animals as per availability and in almost none of the case animals of this category were being provided concentrate or mineral mixture.

b. **Feeding if animals from six months to one year of age**

The animal of this age group are being usually provided with dry fodder only and in case green is available it is given. Mostly no dam's milk or concentrate or mineral mixture is given. At some places female calves below one year were found to be allowed to share concentrate with the dam.

c. **Feeding of heifers**

The feeding of heifers is no way differing from other categories as no special diet is being provided as per the requirement of the body. At few places particularly in the area of Jaipur & Dausa districts, in negligible amount of concentrate is being offered and this is the main reason of delayed puberty in heifers.

d. **Feeding at gestation**

Animals in milch are being provided with dry and green fodder in sufficient quantity. Concentrate usually below the requirement level and the pregnant animals are not being provided special diet. It is pity on the part of animals in our system of animals husbandry practices that when the animal require maximum nourishment for its own health and for the development of fetus, the concentrate diet is being withdrawn after drying of animal. This type of practice leads to either still birth or poor health of neonate and less production after parturition. It is always advisable to provide balanced diet to pregnant animal though, dried as it is required for replenishment.

e. **Feed at parturition**

During the survey work it had been invariably observed that the animal were not being fed with any special diet till parturition but after parturition specific diet including gur, ajwain and ghee or edible oil for three to four days followed by grains and concentrate mixture is being provided. Abrupt change of diet just after parturition from fodder to highly nourished nutrient, invariably leads to gastric/indigestion problems, hence it is always advised to start with concentrate mixture in increasing order at least one month before parturition.

f. **Feeding of milch animals**

In each and every district under survey it was found that animals of this category were being offered dry fodder, concentrate mixture and green fodder as per availability, feed additives like mineral mixture and vitamins are being very rarely provided to the animals and it has been observed that mineral mixture is being used as medicine in cases if deficiency diseases. The animals in mulch are being provides with concentrate in variable quantities irrespective of production states. This concentrate mixture is sufficient to provide nutrient required for minimal production status. This concentrate mixture is sufficient to provide nutrient required for minimal production but to get maximum production as per efficiency the balanced diet is required, This is the main factor due to which the same animal when kept in areas like Choumu yield 12-14 litres of milk per day when shifted to other places of scarcity give 6-8 litres of milk.

g. **Feeding of breeding animals**

Breeding animals though kept in very limited number were being provided sufficient quantity of dry fodder limited quantity of concentrate and green is offered as per availability and usually feed additives like mineral mixture or vitamins are not being offered.

Nutritional status of animals of agroclimatic zone III A

Consequent upon the survey undertaken to study the productivity of the animals in relation to socioeconomic, animal husbandry practices and health, nutritional aspects were also studied in four districts of Agro climatic zone III A i.e. Ajmer, Dausa, Jaipur and Tonk, on all covering 540 farmers from randomly selected

villages. In addition to the information obtained regarding nutritional practices adopted for the rearing of various categories of animals in the region through questionnaire, the samples of feeds used by the farmers for the deeding of animals were collected Table for their chemical analysis, regarding availability of protein energy and other gross nutrients and important micro minerals.

Nutritional status of animals on Jaipur district

In Jaipur district from two tehsils i.e. Choumu and Shahpura in all 10 villages namely; Kaladera, Vhoumu, Bhutera, Hadouta, Chimanpura, Amaurapura, Shahpura, Manoharour and Nathawala were included in study. The feed ingredients identified as major feed resources for animal were wheat straw, bajra kadbi as dry roughage source and cotton seed cake and cotton seed as main concentrate source, in Kaladera, Hadouta, Amarpura and Nathawala, ground nut cake was also in practice for its use in animal feeding. As sporadic cases guarfalgati as dry roughage source and de oiled rice bran, mustard cake, guarkorma, mothchuri and methi seeds as concentrates have also been in use for feeding of animals. The chemical analysis of feed ingredient samples were at par with the standard composition of these ingredients but when intake of protein and energy by the animals were calculated on the basis of contents in feed and total intake and compared with the feeding standards for livestock (ICAR 1985), it was observed that neither protein intake nor energy intake was adequate and as such there was imbalanced/under nutrition in animals which can be immediately taken care of be the feeding of balanced ration to the animals to improve productivity.

Nutritional status of animals in Ajmer district-

In Ajmar district from Ajmer and Kishangarh tehsils Genahera, pushkar, Tabiji, Saradhana, Ramner ki dhani, Barna, Rupangarh, Sarganwa Ralawata and Kishangarh villages were included in study. As a roughage source in Ajmer district in addition to wheat straw and bajra kadbi, moongphali chara has also been identified as important feed resource that has certainly facilitated better nutrient supply to the animals, otherwise the concentrate ingredients were same i.e. cotton seed cake, groundnut cake and cotton seed. Chemical analysis of feed ingredients and then calculation of intake of nutrients particularly protein and energy by the animals again showed imbalanced nutrition in animals. The additional supplementation of protein has been observed as a practice in the form of mothchuri, guarkorma etc. but the supplementation of energy in the ration which is equally important nutrient has not been considered in the existing farmer's practice of feeding of animals. A need for preparation of package of package of practice for the farmers for the provision of adequate balanced nutrition is imperative.

Nutritional status of animals in Dausa district

In Dausa district from two trhsils Sikrai and Baswa, Theekaria, Reta, Sikrai, Eentaka, Bhojpura, Baswa, Peenchipadalala, Radawata, Bandikuijageer and Gulana villages were included in study. The wheat straw and bajara kadbi which are poor quality crop residues and are considered as inadequate source of nutrients for livestock were the main roughages and among concentrates the groundnut cake, cottonseed cake and cotton seed were main feed ingredients. The intake of feed by the animal and the chemical composition of ingredients revealed that animals are not feed to requirement as per feeding standards but are given imbalanced /under nutrition .Simple provision of balanced ration adequate in protein, energy and minerals has been observed to be basic used to improve the productivity of animals. A preparation of package of practice appears to be imperative to educate farmers regarding provision of adequate balanced nutrition to animal for optimum productivity. The package must include guideline and formulation applicable locally.

Nutritional status of animal in Tonk district

As observed in Jaipur , Ajmer and Duasa districts, the nutritional status if animal of Tonk

district is also not adequate to meet the requirement of optimum production. The poor quality crop residues wheat straw and bajra kadbi are the major roughages sources and cotton seed cake, cotton seed and guar korma are the major concentrate ingredients used for feeding of animals, the ingredients are if good nutritive value and quality but are not fed to the animals as a part of balanced concentrate mixture, which can be given with the roughages source in quality adequate to meet the nutritional needs as per the requirement for maintenance and production in term of protein energy and minerals. Simple provision of balance ration to the animals can improve milk production manifold. From the results of the study conducted it is concluded that package of practices may be formulated suggesting balanced ration combination using locally available ingredients to the farmers for balanced adequate feeding of animals. The overall result of study in four districts reveled that in entire zone IIIA the animals are not fed to scientific plan as per the nutrient requirements particularly in terms of protein and energy. Instead of using balanced concentrate mixture one or two concentrate ingredients are included in diet. This practice not only increases the cost of feeding but also does not support optimum production by the animals. It has been observed many a times that low productivity of animals kept on single ingredients i.e. cakes or churries or churi Can be increased many fold simply by providing adequate balanced nutrition. The chemical analysis of samples collected was conducted for the determination of protein and energy content and the average values have been presented in table-13. the nutrient composition of ingredients revealed that ingredients used are of good quality as far as nutrient availability from respective ingredients is concerned and it is not the imbalanced nutrition of ingredients that can be reason for low productivity but it is the malnutrition the results in low productivity of animals in the region. Simply by combining various ingredients in proportions in concentrate mixture that may meet with protein, energy and other nutrients requirements of animals may not only improve the milk production of the animals but may come up as a yard stick for sustainable animal production system in zone IIIA. It is also very important to discuss that the use of green fodder in animals is more economical than feeding of straws and concentrates. The high producing milch animals need leguminous green fodder (Berseem,Cowpea etc.) and concentrates to meet the requirements. Where as feeding of green to the animals is not given proper attention and concentrates to meet the requirements, where as, feeding of green to the animals is not given proper attention and if at all it is given to the animals it is not given as a part of balanced ration for the economical animal rearing in the area.

Mineral status of feed ingredients:-

The availability of Zinc, Copper, Iron, Manganese and Molybdenum in the feed ingredients have been studied and presented in Table 14 & Appendix-2. the availability of Zink, Copper, Iron, Manganese and molybdenum to the animals of all four districts of Zone IIIA can be appreciated from this table. As such there are wide variations regarding availability of micro-minerals from the feed samples collected from various districts. In general minerals have been identified as major constraints regarding reproductive failures and low productivity of animals, thus as a recommendation 2% Mineral mixture along with 1% iodized salts should also be incorporated in the balanced concentrate mixture. In case of high producing animals (15 kg or above milk per day) the level of mineral supplementation can further be increased to be increased to 3%. A recommendation of incorporation of good quality (BIS approved) mineral mixture at the level of 2% along with 1% salt in the balanced concentrate mixture will be given due emphasis while formulating package of practice for the farmers for the provision of adequate balanced nutrition, to the animals. On account of the variations in the availability of the minerals included in the study from various feed and its verification by the low availability of these minerals in soil a need for preparation

of area specific mineral mixture has also come out to be a thrust area for the future research i.e. instead of using standard mineral mixture available from companies for use in same composition through out the country we can prepare mineral mixture specific to the area by studying and considering excess and deficiencies of various minerals from available feed resources in the diet. Zinc is one of the minerals that has been identified as diet in the area and is selected in performance of animals that cannot be dealt with normal supplementation of minerals but demand modification in composition of mineral mixture.

MAL NUTRITION DUE TO IMBALANCED FEED

On the basis of result of survey study and analysis of feed resources following shortcoming have been observed from nutrition point of view:-

- Low production of animals is on account of imbalanced / under feeding of protein, energy and mineral nutrients to the animals.
- Provision of green is very low in the diet of animals.
- Poor quality crop residue fed like wheat straw, bajra straw form the principle roughage4 portion of the diet of animals are fed as such in spite of the fact that these practically contain 0% digestible crude protein and very low about 2.5 Kcal/g digestible energy.
- Mineral supplementation is not in practice at any physiological stage of life and can be attributed as one of the major causes of low reproduction and production performance of animals. Infect productive animals are required to supplement minerals over and above dietary availability.
- Formulation of balanced concentrate mixture and ration is not at all in practice.

Corrective measures:-

- Awareness regarding adequate balanced nutrition to the various categories of animals based on physiological needs. For this, package of practices, ensure adequate balanced feeding of various categories of animals as per their physiological need will be prepared and disseminated to farmers for its use to enhance productivity of animals (Appendix -3)
- Awareness regarding importance and provision pf green to the animals in the diet will be attempted as rearing of animals on green is more economical and practical then rearing on straw and concentrate ration.
- Improvement of poor quality crop residues wheat straw and bajra straw prior to its feeding to the animals. For this, a package of practice regarding improvement of poor quality what straw and bajra kadbi using physical and chemical treatment suitable at farmers level will be prepared and disseminated.
- Preparation of various combinations of balanced concentrate mixtures using locally available ingredients and their use in the balanced feeding of animals. Incorporation of mineral mixture @ 2% and iodized salt @ 1% in diet of animals and increase in mineral mixture supplementation @ 3% in high (15 kg or above milk / day) producing animals.

Districts	Tehsils	Places	Ingredients
JAIPUR	Choumu		
		Kaladera	Wheat straw, Bajra kadbi, cotton seed cake, cotton & compound feed, GNC, methi seed
		Bhutera	Cotton seed & Compound feed, Wheat straw, Cotton seed cake, Chaffed wheat straw

		Hadouta & hathnoda	Cottonseed, GNC, Compound feed,Bajra kadbi
	Shahpura		
		Amarpura	Cotton seed, GNC & Bbajra kadbi
		Manoharpur	Guar falgati, chaffed wheat straw, DORB, Mmustard cake
		Nathawala	GNC, Cotton seed, Guar korma, Bajra kadbi
	Jaipur	Tilawala	Bajra kadbi, cotton seed & compound feed
		Renwal	Cotton seed, Methi seed, Methi seed, Cotton seed cake, Mothchuri, bajra kadbi, Guar falgati
		Balawala	Cotton seed & CSC, Chaffed wheat straw
AJMER	Ajmer		
		Pushkar	Wheat straw, CSC, Moongphali chara, cotton seed
		Tabiji	Bajra Kadbi, Moongphali Chara, CSC
		Ramner ki dhani	Cotton seed, Bajara kadbi
	Kishangarh	Barna	Bajra kadbi, Moth churi, Moongphali Chara
		Rupangarh	Chaffed wheat straw, mothchuri, GNC, Compound feed,Corron seed
		Sarganwa	Wheat bran, Bajra kadbi, CSC
	Kekari		
		Sawar	Cotton seed cake, Bajra kadbi
		Baghera	Bajra kadbi. GNC, Cotton seed, Compound feed, Moongphali chara,. Guar Korma
		Kadeda	Compound feed, GNC,DORB, Guar korma, Moongphali chara, Bajra kadbi
DAUSA	Sikrai		
		Reta	Bajra kadbi, Cotton seed, GNC
		Sikrai	Wheat bran, Chaffed wheat straw
		Bhojpura	Chaffed wheat straw, Compound feed, CS,GNC, DORB
	Baswa		
		Peechupada Kala	Bajra kadbi, GNC
		Ralawata	Wheat straw, GNC
		Gulana	Bajra kadbi, wheat straw, GNC
	Dausa	Biharipura	Compound feed, Bajra kadbi
		Aluda	Bajra kadbi, Cotton seed
		Baniyana	Bajra kadbi, Cotton seed, GNC, Guar Korma
Tonk	Malpura	Lawa	Wheat bran, Bajra kadbi, Cotton seed, Mothchuri
		Diggi	Bajra kacbi, GNC,cotton seed
		Lamba Hari singh	Compound feed, Chaffed wheat straw
		Kalmanda	
		Malpura	
	Niwai		
		Guda Anandpura	Bajra kadbi, Chaffed wheat straw, compound feed, CS, CSC
		Akodia	Bajra kadbi, Chaffed wheat straw, Guar lorma, Compound feed, CS,CSC
		Palai	Cotton seed, Bajra kadbi

	Deoli		
		Satwada	Chaffed wheat straw, Compound feed, Guar korma Bajra kadbi
		Negdia	Wheat straw, Compound feed, CSC
		Saroli	Moth churi, Chaffed wheat straw

Table1: Feed ingredients used by farmers for feeding of animals in Agro climatic zone IIIA

Districts	Ingredients	C.P (%)	E.E. (%)	C.F. (%)	N.F.E (%).	T.A. (%)	G.E. (Kcal/g)	D.E. (Kcal/g)
Jaipur	1.Bajra kadbi 2.cotton seed & Com. Feed	3.50 23.00	1.20 8.87	32.19 24.27	51.12 37.14	10.47 7.13	3.84 4.67	2.40 3.61
	1.Wheat straw 2.Methi seed	3.42 23.48	1.57 5.76	38.24 6.27	46.61 58.28	12.17 6.21	3.74 4.55	2.71 3.66
	GNC & Com. Feed	44.65	7.82	2.66	42.70	2.53	5.12	4.21
	1.Moth churi 2.Guar falgati	26.61 18.14	0.64 1.57	5.26 32.25	61.92 38.23	5.57 11.22	4.35 4.05	2.18 2.58
	Chaffed wheat straw	3.60	1.34	37.98	46.18	12.06	3.74	2.71
	1.DORB 2.Mustard cake	12.65 36.73	2.30 11.42	13.4 10.38	68.73 33.67	5.40 10.49	4.22 4.85	3.48 3.89
	Guar Korma	18.13	1.51	31.91	37.65	10.80	4.05	2.58
Ajmer	1.Wheat straw 2.CSC 3.Moongphali chara 4.Cotton seed	3.52 22.84 8.0 23.10	1.53 9.05 1.0 9.04	38.51 24.11 40.0 24.12	46.52 37.40 39.80 37.13	10.23 6.30 12.0 7.18	3.74 4.69 4.69	2.71 3.91 3.91
	1.Bajra kadbi 2.Moth Churi	3.45 26.61	1.80 0.70	30.50 5.15	50.05 60.50	10.50 5.00	3.50 4.50	2.50 2.50
	1.GNC& Com.Feed	44.45	7.90	3.50	40.50	2.55	5.10	4.20
	1.Wheat bran 2.DORB	13.00 12.50	2.60 2.00	13.00 13.50	65.50 69.50	7.50 4.20	4.50 4.20	3.45 3.50
	1.Guar korma	19.59	1.50	30.00	35.50	10.50	4.00	2.50
Dausa	1.Wheat bran 2.Chaffed wheat straw	13.46 3.20	2.50 1.37	13.24 37.56	64.50 46.43	7.52 11.45	4.18 3.74	3.44 2.71
	1.Chaffed wheat straw	3.20	1.37	37.56	46.43	11.45	3.74	2.71

	2.GNC 3.Cotton seed	44.50 22.53	7.50 8.57	2.54 23.62	42.37 37.69	2.42 6.84	5.12 4.67	4.21 3.61
	1.Chaffed wheat Straw 2.CSC 3.DORB 4.GNC	3.20 22.84 12.53 44.50	1.37 9.05 2.00 7.50	37.56 24.11 12.80 2.54	46.43 37.40 67.70 42.37	11.45 6.30 5.10 2.42	3.74 4.69 4.22 5.12	2.71 3.91 3.48 4.21
	1.Bajra kadbi 2.Cotton seed	3.39 22.53	1.23 8.57	32.30 23.62	51.23 37.69	11.22 6.84	3.84 4.67	2.40 3.61
	1.Bajra kadbi 2.GNC	3.39 44.50	1.23 7.50	32.30 2.54	51.23 42.37	11.22 2.42	3.84 5.12	2.40 4.21
	1.Bajra kadbi 2.Cotton seed 3.GNC 4.Guar korma	3.39 22.53 44.50 17.97	1.23 8.57 7.50 1.46	32.30 23.62 2.54 30.93	51.23 37.69 42.37 37.54	11.22 6.84 2.42 11.81	3.84 4.67 5.12 4.05	2.40 3.61 4.21 2.58
	1.Bajra kadbi 2.Wheat straw 3.CDC 4.GNC	13.39 3.09 22.84 25.80	2.50 1.23 8.69 0.65	13.59 32.21 23.00 5.10	64.50 51.06 37.06 60.05	7.37 11.98 7.07 8.40	4.18 3.84 4.67 4.35	3.44 2.40 3.61 2.18
Tonk	1.Wheat bran 2.Bajra kadbi 3.Cotton seed 4.Moth churu	13.39 3.09 22.84 25.80	2.50 1.23 8.69 0.65	13.59 32.21 23.00 5.10	64.50 51.06 37.06 60.05	7.37 11.98 7.07 8.40	4.18 3.84 4.67 4.35	3.44 2.40 3.61 2.18
	1.Cotton seed +CSC	22.84	8.69	23.00	37.06	7.07	4.67	3.61
	1.Bajra kadbi 2.GNC 3.Moth churi	3.3.09 43.94 26.73	1.23 7.46 0.69	32.21 2.73 5.30	51.06 41.74 60.05	11.98 4.96 6.91	3.84 5.12 4.35	2.40 4.21 2.18
	1.Chaffed wheat straw	3.31	1.29	38.16	46.32	11.48	3.74	2.71
	1.Moth churi 2.Chaffed wheat straw.	26.73 3.31	0.69 1.29	5.30 38.16	60.05 46.32	6.91 11.48	4.35 3.74	2.18 2.71
	1.Chaffed wheat straw 2.Com.feedgu	3.31 17.72	1.29 1.58	38.16 31.81	46.32 37.23	11.48 12.19	3.74 4.05	2.71 2.58

	ar korma 3.Bajra kadbi	3.09	1.23	32.21	51.06	11.98	3.84	2.40
	1.Wheat straw 2.Com.feed+ CSC	3.31	1.29	38.16	46.32	11.48	3.74	2.71
	1.Bajra kadbi 2.Chaffed wheat straw 3.com feed+CS+CS C	3.09 3.31 22.84	1.23 1.29 8.69	32.21 38.16 23.00	51.06 46.32 37.06	11.98 11.48 7.07	3.84 3.74 4.67	2.40 2.71 3.61
	1.Wheat straw 2.Com.feed	3.31	1.29	38.16	46.32	11.48	3.74	2.71
	1.Bajra kadbi 2.Chaffed wheat straw 3.Guar korma 4.Com.feed+ CS+CSC	3.09 3.31 18.39 22.84	1.23 1.29 1.63 8.69	32.21 38.16 31.47 23.00	51.06 46.32 37.22 37.06	11.98 11.48 11.78 7.07	3.84 3.74 4.05 4.67	2.40 2.71 2.58 3.67
	1.Cotton seed 2.Bajra kadbi	22.84 3.09	8.69 1.23	23.00 32.21	37.06 51.06	7.07 11.98	4.67 3.84	3.61 3.40

Table2: Chemical analysis of feed and fodder obtained from various districts if semi arid eastern plane zone (IIIA) of Rajasthan

Palace & Ingredients	C.P.(%)	E.E. (%)	C.F. (%)	N.F.E. (%)	T.A. (%)	G.E. (%)
TILAWALA						
1.Bajra kadbi	3.34	1.12	31.93	50.97	10.23	3.84
2.Cotton seed& Com. feed	23.19	8.68	23.24	36.67	6.88	4.67
Balawala						
1.Cotton seed	23.87	8.73	24.32	36.58	6.92	4.67
2.Methi seed	23.48	5.76	6.27	58.28	6.21	4.55
3.Cotton seed cake	22.84	9.05	24.11	37.40	6.30	4.69
4.Moth churi	26.61	0.64	5.26	61.92	5.57	4.35
5.Bajra kadbi	3.42	1.31	32.14	51.27	10.45	3.84
Guar falgati	17.84	1.68	32.67	37.93	11.48	4.05
Ranwal						
1.Cotton seed &cake	23.32	9.45	24.83	37.97	6.75	4.67
2.Chaffed wheat straw	3.34	1.26	38.74	46.93	11.85	3.74

BHUTERA						
1.cotton seed & com. feed	22.54	8.37	24.16	37.13	7.13	4.67
2.wheat straw	3.42	1.57	38.24	46.61	12.17	3.74
3.cotton seed cake	22.84	9.05	24.11	37.40	6.30	4.69
HADOUTA&HSTHANODA						
1.Cotton seed	22.17	8.54	24.57	37.69	7.67	4.67
2.GNC&Com.feed	44.38	7.73	2.54	42.13	2.39	5.12
3.Bajra kadbi	3.28	1.27	31.87	51.13	10.19	3.84
KALADERA						
1.Wheat straw	3.41	1.51	38.21	46.60	12.12	3.74
2.Bajra kadbi	3.70	1.35	32.62	51.42	10.50	3.84
3.Cotton seed cake & Cotton seed pellet	22.74	9.11	24.12	37.13	7.13	4.67
4.GNC	44.63	7.88	2.63	42.48	2.43	5.12
5.Methi seed	23.48	5.76	6.27	58.28	6.21	4.55
AMARPURA						
1.Cotton seed	22.72	9.12	23.87	37.24	7.24	4.67
2.GNC	44.76	7.78	2.82	43.31	2.69	5.12
3.Bajra kadbi	3.53	1.19	32.07	50.89	10.37	3.84
MANOHARPUR						
1.Guar falgati	18.45	1.47	31.83	38.54	10.97	4.05
2.Chaffed wheat Straw	3.87	1.43	37.23	45.43	12.27	3.74
3.DORB	12.65	2.30	13.40	68.73	5.40	4.22
4.Mustard cake	36.73	11.42	10.38	33.67	10.49	4.85
NATHAWALA						
1.GNC	44.83	7.97	2.63	42.68	2.53	5.12
2.Cotton seed	23.25	9.26	23.96	36.74	7.36	4.67
3.Guar korma	18.13	1.51	31.91	37.65	10.80	4.05
4.Bajra kadbi	3.67	1.24	32.63	51.67	10.84	3.84
SAWAR						
1.Cotton seed cake	22.84	9.05	24.11	37.40	6.30	4.69
2.Bajra kadbi	3.76	1.07	32.55	50.84	10.76	3.84
BAGHERA						
1.Bajrakadbi	2.98	1.14	31.97	51.27	10.94	3.84
2.GNC	44.65	7.67	2.43	42.73	2.16	5.12
3.Cotton seed pellet	23.12	9.23	24.88	37.86	7.74	4.67
4. Moongphali chara	8.28	1.23	41.28	38.43	13.46	
5.Guar korma	18.34	1.43	31.63	35.86	11.24	4.05
6.Cotton seed	23.73	9.68	24.56	37.92	7.26	4.67
KADEDA						
1. Bajra kadbi	3.21	1.22	32.12	48.92	11.12	3.85
2.Bajra kadbi	3.67	1.08	32.65	52.19	10.87	3.84
PUSKAR						
1.Wheat straw	3.52	1.53	38.51	46.37	10.23	3.74
2.CSC	22.84	9.05	24.11	37.40	6.30	4.69
3.Moongphali chara	8.44	0.89	40.63	39.57	10.86	
4.Cotton seed	22.23	8.37	24.37	37.24	7.16	4.67
TABIJI						
1.Bajra kadbi	3.31	1.32	32.12	49.78	11.13	3.84
2.Moongphali chara	7.72	1.00	39.37	40.64	10.99	
3.CSC	22.84	9.05	24.11	37.40	6.30	4.69
RAMNER KI DHANI						

1.Cotton seed	23.89	8.16	23.68	36.11	6.92	4.67
2.Bajra kadbi	3.14	1.53	32.24	50.13	11.27	3.84
BARNA						
1.Bajra kadbi	3.43	1.47	31.87	50.75	10.68	3.84
2.Moth churi	26.31	0.82	5.28	59.48	5.47	4.35
3.Moongphali chara	7.56	1.11	40.10	39.40	11.55	
RUPANGARH						
1.Chaffed wheat	3.50	1.23	38.54	46.50	11.57	3.74
2.Moth churi	25.82	0.64	5.17	61.23	5.39	4.35
3.GNC+Com. Feed	44.24	7.74	2.38	42.17	2.78	5.12
4.Cotton seed	22.54	9.79	23.15	36.54	6.85	4.67
BHOJPURA						
1.Chaffed wheat straw	2.84	1.42	37.67	45.97	11.39	3.74
2.CSC	22.84	9.05	24.11	37.40	6.30	4.69
3.DORB	12.53	2.00	12.80	67.70	5.10	4.22
4.GNC	44.19	7.63	2.53	42.54	2.86	5.12
SARGANWA						
1.Wheat bran	13.71	2.50	13.63	64.50	7.28	4.18
2.Bajra kadbi	3.26	1.69	32.73	50.64	10.75	3.84
3.CSC	22.84	9.05	24.11	37.40	6.30	4.69
RETA						
1.Bajra kadbi	3.67	1.23	31.96	50.34	11.09	3.84
2.cotton seed	23.28	8.34	23.87	37.77	7.12	4.67
3.GNC	44.23	7.52	2.31	42.14	2.12	5.12
SIKRAI						
1.Wheat bran	13.46	2.50	13.24	64.50	7.52	4.18
2.Chaffed wheat straw	3.19	1.13	37.33	47.13	11.42	3.74
ALUDA						
1.Chaffed wheat straw	3.56	1.37	37.24	46.76	12.13	3.74
2.GNC	44.78	7.29	2.62	42.39	2.97	5.12
3.Cotton seed	22.17	8.15	23.52	37.63	6.47	4.67
BANYANA						
1.Bajra kadbi	3.54	1.08	32.08	51.13	11.38	3.84
2.Cotton seed	22.54	8.93	23.14	37.45	6.84	4.67
BIHARIPURA						
1.Bajra kadbi	3.45	1.32	32.37	52.54	10.93	3.84
2.Cotton seed	22.13	8.87	23.95	37.92	6.93	4.67
3.GNC	44.57	7.31	2.84	42.55	2.23	5.12
4.Guar korma	17.97	1.46	30.93	37.54	11.81	4.05
PEECHUPADA KALA						
1.Bajra kadbi	3.26	1.19	32.43	51.79	11.57	3.84
2.GNC	44.64	7.14	2.47	42.18	2.31	5.12
RADAWATA						
1.Wheat straw	3.30	0.84	39.45	46.23	11.20	3.73
2.GNC	44.82	7.72	2.15	42.62	2.17	5.12
GULANA						

1.Bajra kadbi	3.31	1.45	32.85	51.63	11.27	3.84
2.Wheat straw	3.20	0.86	40.55	48.77	10.80	3.75
3.CSC	22.84	9.05	24.11	37.40	6.30	4.69
4.GNC	44.32	7.95	2.90	42.23	2.29	5.12
LAWA						
1.Wheat bran	13.39	2.50	13.59	64.50	7.37	4.18
2.Bajra kadbi	3.23	1.07	32.34	50.07	11.27	3.84
3.Cotton seed	23.07	8.62	23.12	36.88	7.27	4.67
4.Moth churi	26.54	0.68	5.27	59.95	6.28	4.35
DIGGI						
1.Bajra kadbi	3.19	1.19	31.73	51.14	11.69	3.84
2.GNC	43.94	7.46	2.73	41.74	4.96	5.12
3.Moth churi	26.93	0.70	5.33	60.15	7.54	4.35
LAMBA HARI SINGH						
1.Chaffed wheat straw	2.97	1.14	37.72	47.12	10.78	3.74
SATWADA						
1.Chaffed wheat straw	3.25	1.06	38.53	45.98	11.69	3.74
2.Pellets+Guar korma	17.72	1.58	31.81	37.23	12.19	4.05
3.Bajra kadbi	3.43	1.36	31.65	51.73	11.85	3.84
NEGDIA						
1.Wheat straw	3.75	0.80	39.20	45.70	10.55	3.74
2.Com.feed+CSC	22.86	8.54	23.25	37.12	7.52	4.67
SAROLI						
1.Bajra kadbi	2.88	1.21	32.69	50.26	12.15	3.84
2.Chaffed wheat straw	3.67	1.23	37.28	46.23	12.17	3.74
3.Com feed+CS+CSC	22.15	9.08	23.84	37.08	6.89	4.67
SUNARA						
1.Chaffed wheat straw Com.feed	3.51	1.38	39.02	45.54	10.93	3.74
AKODIA						
1.Bajra kadbi	2.76	1.42	32.28	51.32	12.54	3.84
2.Chaffed wheat straw	3.19	1.67	38.26	46.73	11.84	3.74
3.Guar korma	18.39	1.63	31.47	37.22	11.78	4.05
3.Com.feed+CS+CSC	22.23	9.12	22.36	37.23	6.92	4.67
PALAI						
1.Cotton seed	23.19	8.45	22.43	37.32	6.73	4.67
2.Bajra kadbi	3.08	1.13	32.57	51.85	12.43	3.84

Table3: Chemical analysis of feed and fodder obtained from selected villages of various districts of semi arid eastern plane zone (IIIA) of Rajasthan :-

Code No.	**SAMPLE**	**Fe(ppm)**	**Zn(ppm)**	**Cu(ppm)**	**Mn(ppm)**	**Mo(ppm)**
R-1	Jowar straw	30	31	14	84	1
R-2	Bajra straw	1140	33	11	127	2
R-3	Wheat straw	1820	12	10	96	5
R-4	Wheat straw	417	53	17	95	1
R-5	Wheat straw	1920	29	10	59	6
R-6	Wheat straw	1460	15	9	53	6

R-7	Wheat straw	502	22	10	62	7
R-8	Wheat straw	425	12	8	57	6
R-9	Wheat straw	146	15	8	72	3
R-10	Wheat straw	623	14	10	73	7
R-11	Wheat straw	556	23	11	79	12
R-12	Wheat straw	831	14	11	83	13
R-13	Wheat straw	1050	17	16	80	14
R-14	Wheat straw	540	32	17	74	15
R-15	Wheat straw	505	22	14	97	15
R-16	Wheat straw	508	16	15	109	14
R-17	Wheat straw	268	159	30	115	14
R-18	Wheat straw	69	20	13	90	18
R-19	Wheat straw	427	99	24	112	21
R-20	Wheat straw	227	17	12	75	15
R-21	Wheat straw	492	15	12	74	15
R-22	Wheat straw	296	16	15	86	23
R-23	Wheat straw	179	19	13	89	23
R-24	Wheat straw	389	23	12	73	19
R-25	Wheat straw	1060	8	15	70	24
R-26	Wheat straw	328	12	11	89	22
R-27	Wheat straw	644	10	13	98	20
R-28	Wheat straw	319	9	11	80	22
R-29	Wheat straw	325	16	12	106	20
R-30	Wheat straw	371	12	9	78	20
R-31	Wheat straw	421	7	8	91	21
R-32	Wheat straw	158	11	8	92	20
R-33	Wheat straw	468	8	9	85	24
R-34	Wheat straw	323	4	5	77	23
R-35	Wheat straw	328	14	10	73	26
R-36	Wheat straw	488	14	10	87	16
R-37	Wheat straw	418	16	11	74	24
R-38	Wheat straw	296	12	10	85	29
R- 39	Wheat straw	362	12	8	85	27
R- 40	Wheat straw	413	10	14	86	23
R-41	Wheat straw	240	14	11	90	27
R-42	Wheat straw	30	16	11	88	33
R-43	Wheat straw	373	13	12	87	28
R-44	Wheat straw	329	8	10	87	31
R-45	Wheat straw	401	21	11	91	33
R-46	Wheat straw	500	17	24	104	22
R-47	Wheat straw	364	25	23	93	29
R-48	Guar Phalgati	981	11	10	61	1
R-49	Jai straw	766	7	7	82	3
R-50	Jai straw	788	34	12	72	10
R-51	Jai straw	775	18	12	72	9
R-52	Jai straw	957	17	13	88	13
R-53	Jai straw	889	17	14	75	8
R-54	Jai straw	729	14	14	89	18

R-55	Jai straw	655	18	11	81	20
R-56	Jai straw	956	17	23	88	31
C-57	Mixed Feed	673	23	17	103	11
C-58	Mixed Feed	380	33	38	109	19
C-59	Moth chara	550	25	9	166	29
C-60	Compound Feed	335	53	23	119	31
C-61	Compound Feed	66	52	15	109	30
C-62	Compound Feed	600	75	19	94	25
C-63	Compound Feed	646	36	19	149	30
C-64	Compound Feed	443	14	13	157	31
C-65	Compound Feed	584	44	18	173	28
C-66	Wheat bran	781	19	14	131	30
C-67	Wheat bran	391	11	16	142	32
C-68	Wheat bran	141	17	16	130	30
C-69	Wheat bran	159	16	12	135	31
C-70	Wheat bran	30	27	12	127	33
C-71	Wheat bran	938	36	10	111	37
C-72	Oil cake	236	28	14	84	29
C-73	Oil cake	779	5	15	88	29
C-74	Oil cake	221	6	18	93	31
C-75	Oil cake	537	14	18	111	33
C-76	Oil cake	514	14	12	141	29
C-77	Oil cake	231	26	11	89	26
C-78	Oil cake	266	34	12	103	35
C-79	Oil cake	313	30	16	86	31
C-80	Oil cake	246	16	13	87	40
C-81	Oil cake	529	31	7	94	38
C-82	Oil cake	559	28	1	121	34
C-83	Oil cake	1010	30	13	105	36
C-84	Oil cake	789	21	12	97	34
C-85	Oil cake+cotton	875	11	41	96	31
C-86	Oil cake+cotton	225	69	24	126	31
C-87	Oil cake+cotton	480	14	11	98	39
C-88	Oil cake+cotton	381	25	13	88	36
C-89	Oil cake+cotton	405	25	12	101	36
C-90	Oil cake+cotton	862	15	13	105	39
C-91	Oil cake+cotton	769	18	8	100	33
C-92	Oil cake+cotton	710	21	9	88	37
C-93	Oil cake+cotton	305	25	9	104	37
C-94	Cotton	1310	16	14	112	30
C-95	Cotton	757	7	9	84	33
C-96	Churi	692	28	15	125	34
C-97	Churi	37	5	3	133	31
C-98	Churi	706	4	8	117	33
C-99	Churi	803	20	12	109	34
C-100	Churi	1320	7	5	122	37
C-101	Churi	933	19	8	121	39
C-102	Cotton+oilcake+Com.feed	759	26	12	105	31

C-103	Cotton+oilcake+Com.feed	290	27	11	99	27
C-104	Methi	580	10	17	94	30
C-105	Methi	1880	6	11	85	33
C-106	Com.feed+oilcake	472	39	17	138	33
C-107	Oilcake+com.feed	301	30	17	125	38
C-108	Methi+oilcake	231	16	10	123	27
C-109	Churi+cotton	334	10	9	89	30
C-110	Cotton+oilcake+gur	772	34	18	132	30
C-111	Oilcake+churi	798	20	16	130	26
C-112	Oilcake+churi	732	1	0	73	30
C-113	Cotton + Methi	257	32	12	85	33
C-114	Methi+cotton+guar	452	15	15	87	30
C-115	Cotton+Com.feed	957	31	16	85	36
C-116	Cotton+Com.feed	606	70	3	119	40
C-117	Methi+cotton+oilcake	441	9	10	88	33
C-118	Com.feed+churi	507	34	16	125	40
C-119	Cotton+oilcake+bran	187	44	18	143	27

Table4:AVAILABLITY OF MAJOR TRACE ELEMENTS IN COMMON FEED AND FODDER GIVEN TO LIVESTOCK IN ZONE

Appendix-1

RECOMMENDATIONS FOR BALANCED LIVESTOCK FEED

Protein sources : Legumes like guar, gram or channa, urad and khal

Carbohydrates sources : Nonleguminous crops like wheat, bajra, barley, jai, makka

Lipid / fat sources : groundnut, til, mustard, cotton seed

Vitamin sources : Green fodder

Mineral mixture sources : Calcium, Phosphorus, Magnesium, Manganese, Iron, Copper, Zink, Sulphur, Sodium, Potassium, Cobalt and Molybdenum

Balanced ration for livestock:

- Khal - 15 parts as groundnut/mustard/cotton/til/sunflower-15kg.
- Churri -20 parts as moong/gran/guar/arhar/urad-20kg.
- Dalia -18 parts as barley/jai/bajra/makka/wheat-18kg.
- Chapad -45 parts as wheat/rice -45kg.
- Salt -1kg
- Mineral mixture -1kg

Total - 100kg (It provides 12-15% DCP)

Daily diet (balanced) of live stocks

Status of animal		Dry fodder (kg)	Green fodder (kg)	Concentrate (kg)
Milch	cow			
	buffalo	5-10	5-10	For body maintenance 2-2.5 kg + for every 2 lits. of milk - 1kg
Pregnant milch				
		5-10	5-10	3-4 kg for body maintenance + for every 2 lits. of milk - 1kg.
Pregnant but dry	cow			
	buffalo	5-10	5-10	1.5-2.0
Breeding bull	cow			
	buffalo	5-10	5-10	1.5-2.0
Working bull	Cow			
	buffalo	8-12	8-12	1.5-2.0
Young calf below 3 months of age	Mother's milk only			
Calf aging 3-6 months	Mother's milk, fodder and green fodder as required			
Calf /heifers 6 months to 3 years		2-5	2-5	0.5-2.0

Mineral mixture requirement of live stocks

(Daily requirement : gms)

Calcium - 16
Phosphorus - 11
Magnesium - 0.02%
Sulphur - 0.02%
Sodium - 0.02%
Potassium - 0.09%

Copper - 10ppm
Zinc - 80ppm
Manganese - 40ppm
Iron - 50ppm
Iodine - 0.6ppm
cobalt - 0.6ppm

Additional in milch-
Additional :
Calcium : 3.21 gm/liter of milk
Phosphorus : 1.98 gm/liter of milk

PACKAGE OF PRACTICES SUGGESTED :-

Feeding Management:

1. Animal should be fed balanced ration which can be provide all the nutrients in proper quantities.
2. Animal should be fed ration in proportion to their production.
3. Milch animals should be essentially fed with adequate quantities of green fodder to exploit their milk production potential.

4. Side by side with the cultivation of routine crops places should be ear marked for growing fodder.
5. Intensive forage crop rotations incorporating high yielding fodder crops be undertaken.
6. Growing fodder trees such as 'Subabul' should be practicesed to meet the fodder requirements of animals especially in the area having limited or no irrigation facilities and uneven land.
7. Non convential feed like mango, seed kernel, tapical, babul pods, sl seed cake, Mahua cakes feed blocks enriched with urea, wheat straw and molasses should be used in paace of costly ingredients to be incorporated in the concentrate mixture.
8. To avoid nutritional deficiencies regular feeding of mineral mixture should be practiced.
9. Availability of clean and fresh water should be ensured.
10. Excess green fodder/grasses should be conserved or preserved in the form of hay or silage.
11. Wastage of fodder must be avoided by adopting chopping practices.

BREEDING MANAGEMENT:-

Following package shall improve the current status of breeding in dairy animals in Rajasthan.

1. Dairy cattle should be inseminated only with exotic bull semen or with semen of proven sires in this region semen of exotic cattle breeds like Jersey and Holrtein Frisien is recommended and in case of buffaloes. Semen can be used.
2. High producing animals of young age should be purchased and or retained so as to get milk production round the year.
3. Unproductive animals should be culled.
4. As soon as animals in heat are detected they should be inseminated within the required time of insemination for increasing the conception rate.
5. Animals should be diagnosed for pregnancy by rectal palpation 2 to 3 months after insemination.
6. Animals should be covered 60-80 days after calving to reduce the calving interval.

Housing management-

1. The animals should be kept in day. Clean and well ventilated sheds with paddock.
2. Shady trees should be planted around the premises where animals are housed.
3. Animals should be protected from harmful effects of summes,winter and rains.
4. Accumulation of dung water should not be allowed in and around the premises of the shed.
5. Animals of different species sex and age group should be housed separately.
6. Locally available cheap construction material like 'khelu", 'Bamboos" etc should be used for constructing animals hause.

Milking management-

1. Animals should be milked correctly with full hand method of milking.
2. Milking should be completed fast (within 7-8 minutes).
3. Utensils must be thoroughly cleaned before and after milking.
4. Completed milking should be practiced.
5. Milk collected should be filtered.

Conclusion

As soon as any symptom of sickness/disease is observed invariably a veterinary doctor should be immediately consulted.

a. Timely vaccination against common infectius & contagious disease should followed.
b. Regular deworming (before and after rains & winter) should be practiced and for the eradication of external parasites regular spraying should be practiced.
c. 4.Placenta aborted fetuses & dead animals should be burried or burnt.
d. Ditches low marshy areas; pits etc. in and around animals sheds should be leveled.
e. Regular scrubbing & cleaning of animals should be practiced.

f. Isolation of risk animals from health ones should be ensured.

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