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yield but it is not advisable to supply nitrogen only, especially on soils as of Tanjore delta which are very deficient in phosphoric acid.

(e) For the second crop, application of ammonium sulphate to supply 30 lb. nitrogen per acre alone seems to be profitable but it is preferable to add 20 lb. of P_2O_5 to keep the soil well stocked with this valuable plant food.

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Economies in Feeding Cattle

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The prices of commodities have risen considerably of late, particularly during the last twelve months. In certain cases the rise is phenomenal, so phenomenal as to be almost incredible. The rise in prices is also general and all classes of commodities are affected to a greater or lesser degree. Neither the rise in prices nor the factors conducive to such rises are in the control of individuals, but wise and judicious spending is in the hands of the discriminating people. It is becoming increasingly important to be extremely circumspect in choosing the right type and quantity of the various commodities for purchase. This choice is the problem today that confronts people with limited incomes, including agriculturists.

Cattle feeds are registering unprecedentedly high price levels, in common with other articles. Many of the common and usual feeds are getting scarce and costly. These may be the result of restricted transport facilities or of diversion of productive activity to more profitable fields or diversion of commodities for other and new uses. Early in 1940, the market for groundnut was cut off by the war and the farmers had in their hands large stocks of groundnut. Other crops could not satisfactorily replace groundnut in the prevailing system of cultivation. The same war has since come to the rescue. The conditions created by it found new uses for groundnut—kernels, oil and cake. The high prices of agricultural produce stimulated the use of manures for paddy and other crops. The import of fertilisers dwindled and people turned to groundnut cake for manuring the fields to a greater degree. The high prices of produce made manuring, even with costly manures, an economic proposition and certainly not uncertain as heretofore. Groundnut cake was selling at about Rs. 30 a ton early in 1940, at Rs. 60 in 1942 and is now at about Rs. 150 a ton. The peasants who maintain cattle find it increasingly difficult to feed the animals with concentrated feeds at the present high prices. The prices of other feeding stuffs also are on the upward trend. Cotton seed, sold at about Rs. 60 a ton early in 1942, is now selling at Rs. 240 a ton. One of the problems of the day for the cultivator is the feeding of his animals with concentrates. Is he to continue to feed his animals with concentrates priced so high and would it pay? Or alternatively is he to stop feeding

concentrates and allow his animals to lose condition, fall down in draught capacity and give a diminshed milk supply from cows? Obviously he cannot afford the one or the other. The solution that naturally suggests itself is that the peasant substitues the purchased feedstuffs by home grown material, as far as possible and they are not so costly. The feeding stuffs grown in the farm will automatically reduce the area under other crops, apparently more remunerative. But the area that is required for the growing of the feed stuffs is only limited and the loss of other produce from this area is not likely to be greater than the cost of the concentrates that have to be purchased in the open market.

Concentrated feeds aim at supplying animals with fats and proteins. The fats and carbohydrates in feed are interconvertible in the animal system and a deficiency of one can be made up by the other within limits. At the same time it must be remembered that the composite feed must have a certain amount of fat. Normally provision has to be made for an average supply of 4 per cent of fat in the composite feed for the milch animals.

Proteins supply nitrogen for the metabolism in the animal system and proteins have necessarily to be supplied to the fullest extent. The deficiency of proteins in the feed could not be made up by other ingredients in the feed and there are no short cuts as far as protein feeding is concerned. Protein also happens to be the costliest nutrient in animal feed. Attempts have therefore to be made to grow protein-rich feed in the farm itself with the object of cutting out the purchase of protein feed. There are a number of crops that give protein-rich produce and the leguminous plants take priority among them, with the capacity to assimilate atmospheric nitrogen and fix it in their tissues—capacity not usually possessed by other plants. The crop chosen should preferably be capable of growing luxuriantly and giving a large produce.

Lucerne and sweet potato crops are suggested as being suitable for this country, for supplying protein feed for the farm animals. Both are rank growers giving a good tonnage of fodder and contain good quantities of protein.

Lucerne is a leguminous crop that stands repeated cuttings throughout the year. It makes rapid growth, particularly during the cold weather and is capable of giving upto 60,000 lb. of green fodder per acre annually. A moderate crop would give 40,000 lb. of green feed, equal to 10,000 lb. of hay, having a protein equivalent of 4,000 lb. of groundnut cake or of 12,000 lb. of cotton seed; $2\frac{1}{2}$ lb. of lucerne hay supplies as much protein as 1 lb. of groundnut cake. Lucerne hay can largely replace groundnut cake, but it is not desirable to cut out the cake altogether. Lucerne hay can be safely given to cattle upto a maximum of 10 lb. a day. As a precautionary measure, lucerne hay may be fed however at 2 lb. per day per animal to start with and increased gradually. Green lucerne may also be given to animals, but large quantities are apt to promote tympanny and the hay is comparatively a safer feed, especially at the higher levels, where lucerne meets the major part of the protein requirements of animals.

Sweet potato is a common tuber crop. It makes vigorous growth. The young vines are succulent and contain 2·58 % of proteins, equivalent to 19 % on a dry basis. 20 lb. of green vines a day would supply as much protein as one lb. of groundnut cake or 3 lb. of cotton seed. The vines have a tendency to loosen the bowels of animals, when fed in large quantities and could not therefore replace the concentrates entirely. The vines are good green feed, apart from the protein value, and the inclusion of sweet potato vine in the dietary of cattle is an advantage.

Dairy animals at the Agricultural College, Coimbatore are fed with sweet potato vines up to 50 lb. a day especially in summer, when other green feeds are scarce. Even such large quantities do not produce any ill effects on the animals. The vines are relished by cattle and are eaten greedily.

Sweet potato vines could be cut two months after planting and three cuttings could be had by the time the crop is six months old. Fifty to sixty thousand pounds of green vines could be had during this period, from an acre, i. e., the protein equivalent of 2,500 to 3,000 lb. of groundnut cake or 8,000 lb. of cotton seed. The crop would also give 6000 to 8,000 lb. of poor quality tubers, which may be boiled and fed to cattle. Two crops could be grown in an year, one following the other.

Lucerne and sweet potato are only two of the possible substitutes for the concentrates. Most of the leguminous hays are valuable cattle feed. It may be possible to introduce a short duration legume hay crop as an addition in the existing system of cultivation. The Circars ryot is growing a hay crop of Sunhemp in summer in the wetlands, utilising the moisture in the soil. Something similar may be possible in the other localities. A little preliminary planning and suitable modifications in the existing system of cultivation is all that is necessary for solving the problem for the individuals. The analysis of some of the common feeding stuffs given under might possibly be suggestive.

Name of material	Analysis on original moisture basis				Analysis on a dry basis		
	Original moisture	Crude protein	Fat	Carbo-hydrates	Crude protein	Fat	Carbo-hydrates
Cotton seed	10·00	16·22	18·53	27·88	18 02	20·60	30·98
Groundnut cake	12·50	46·31	7·19	23·57	51·75	8 22	26·94
Gingelly cake	12·50	40·51	8 67	24 37	46·30	9 91	27·85
Babul pods	10 00	14·19	0 79	58·97	15 77	0·88	65·52
Lucerne hay	10·00	19·13	1·27	31 66	21·26	1·41	35·18
Green lucerne	80·00	4 46	0·30	10·06	22·30	1·50	50·31
Sweet potato vines	86·42	2 58	0 32	4·65	19 00	2·36	33 93
Sunhemp hay	10·00	13 39	1·04	29 89	14·88	1·16	33·21
Groundnut haulms	10·00	9 66	0·79	29·17	10·73	0·88	32·41
Agathi leaves	75·00	8·89	0·56	11·75	33·56	2·23	47·00

Would the progressive farmers try these suggestions and induce their neighbours to do likewise? This will effectively meet the challenge of the present high prices of feeding materials.