SUMMARY AND CONCLUSIONS
CHAPTER 6

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6. SUMMARY AND CONCLUSIONS

6.1 While listing the final conclusions and results one has to list the limitations in adopting the model. The Linear programming model so evolved and applied for the present study was a simple one where there is objecting function i.e. minimize feeding cost function with constraints of nutritional plans and availability of resources. The optimization function used are linearly additive in nature. The model suffer from some limitations.

6.2 Limitations of the model

1) It is assumed that objective function in a linear function.

1. The input variables were depend on geography, climate and cropping pattern. Therefore, this model and results may be different for different regions. By assuming a fix cropping pattern and available resources for a particular region study was done.

2. The model presented optimizes over the entire feeding schedule, but this does not necessarily mean that it cover all individual farms. This is in consonance with the planers point of view, because planners try to optimize the aggregate feeding schedule.

3. There may be different opinion on the values of the parameters used in the model for comparison purpose
was remain valid. It is obvious that the results of the model depend crucially on the parameters used in optimizing the function and the size of resources. More work would have been necessary on estimating these parameters and checking them more thoroughly. However it could not be done to the limitations like time and the individual efforts etc. this in turn given the findings and revelations, which will go in a long way to solve the problems in the field of agricultural planning.

4. Time and monetary limitations on the part of the researcher, it was possible to collect data pertaining to secondary sources. It is in this context felt that considering the very complex nature of the present study, there is a need to undertake parallel study based on a fixed period along with Animal nutritionist, farm scientists etc. It will certainly help to go in depth to uncover those parts of present study. Because of limitations enumerated above the results of the model should be taken as indications and it can not be said that the results of the exercise give most ideal feeding schedule for a crossbred cattle breeding farm accurately. But certainly it reveals that the salient features and broad dimensions of the ideal optimum feeding schedule.
6.3 Findings of the study

The following are the important findings of the present study, keeping in view the limitations enumerated above:

1. The optimum feeding schedule for plan II, revealed that, it is possible to minimize feeding cost and increase productivity of cattle breeding farm.

2. The plan I, constraints that include nutritional norms as well as the quantitative restrictions of feeds and fodders as per available situation can not be optimized for minimum cost for all the months and seasons except March.

3. In plan I, constraints like availability of sufficient legumes and non leguminous fodders, are not available.

4. This shows that available feeds and fodders are not sufficient in quantity to follows the nutritional norms and can not be optimized for minimum cost.

5. If we drop these legumes and non legume quantitative restrictions then it can be optimized.

6. Plan II, in which only nutritional feeding pattern is included and the existing quantitative availability of feeds and fodders constraint dropped, then it can be optimized for minimum cost and optimum schedule for feeding in crossbred Gir cattle breeding farm can be obtained.
7. Optimum feeding schedule revealed that if we remove practical problems and make available the feeds and fodders as per optimum feeding schedule then productivity of cattle breeding farm can be improved.

8. Berseem 12.670 kg and Oat 6.330 kg combine satisfy the legumes and non legumes requirement respectively in optimum feeding does for January, February and March months.

9. In all the months dry fodder requirement was satisfied by hybrid Jowar alone because of its less cost and sufficient nutrient contents.

10. In optimum feeding schedule for every month and season, milk ration requirement ranges in between 3.256 to 3.848 kg as per nutritional standards.

11. Hybrid Jowar 5.140 kg, 4.943 kg and 4.745 kg satisfy the dry fodder requirement in January, February and March, respectively.

12. Concentrate 3.848, 3.700 and 3.552 kg satisfy the milk ration requirement in January, February and March, respectively.

13. The optimum minimum cost of feeding was Rs. 37.93, 37.00 and 36.08 per month for January, February and March, respectively.

15. 4.547 Kg hybrid Jowar and 3.256 kg concentrate satisfy the requirement of dry fodder and milk ration in April.

16. 12.670 kg Lucerne and 6.330 kg Maize satisfy the requirement of legume and non legumes in May, with dry fodder hybrid Jowar 4.350 kg and concentrate milk ration 3.256 kg.

17. Minimum optimum feeding cost was Rs. 36.77 in May.

18. In the month of June 14.881 kg Groundnut leaves and 6.330 kg green Bajra satisfy the requirement of legumes and non legumes with 4.152 kg hybrid Jowar as dry fodder and 3.108 concentrate as milk ration.

19. The minimum optimum cost of feeding was Rs. 27.12 in June which is minimum among all the month and season.

20. 14.748 kg Groundnut leaves with 6.330 kg green Jowar satisfy the requirement of legumes and non legumes along with 4.350 kg hybrid Jowar as dry fodder and 3.256 kg concentrate as milk ration, in optimum feeding schedule in July.

21. The minimum optimum cost of feeding was Rs. 27.99 in July.

23. Minimum cost of optimum feeding schedule was Rs. 36.23 for August.

24. 12.670 kg Lucerne with 6.330 kg green Jowar satisfy the requirement of legumes and non legumes with 4.547 kg hybrid Jowar and 3.404 kg concentrate forms optimum feeding schedule for September.

25. The minimum optimum cost of feeding for September was Rs. 36.43.

26. In the month of October 12.670 kg Lucerne, 6.330 kg green Jowar with 4.745 kg hybrid Jowar and 3.552 kg milk ration satisfy the optimum feeding schedule for October with minimum optimum cost Rs. 37.35.

27. 2.724 kg Lucerne and 9.945 kg Berseem satisfy the requirement of legume with 6.330 kg green Jowar on non legume and 4.943 kg hybrid Jowar as dry fodder, 3.700 kg concentrate forms optimum feeding schedule in November.

28. The minimum cost of feeding was Rs. 37.28 for November.

29. For December 2.633 kg Lucerne, 0.036 by Berseem with 6.330 kg green Jowar combines green fodder, 5.140 kg hybrid Jowar as dry fodder and 3.838 kg. by
concentrate as milk ration farms optimum feeding schedule.

30. The optimum minimum cost of feeding was Rs. 38.19 in December.

31. In Rainy season 12.870 kg Groundnut leaves, Lucerne, 0.831 kg. green Jowar, 5.498 kg. green grass, 4.399 kg. hybrid dry Jowar and 3.293 kg milk ration combines the optimum feeding schedule.

32. The feeding cost in rainy season was Rs. 27.22 which is minimum in all season.

33. In winter season 12.670 kg. Berseem, 2.602 kg Oat, 3.728 kg green grass with 4.992 kg. hybrid dry Jowar and 3.759 kg. by concentrate combines the optimum feeding schedule.

34. The minimum feeding cost in winter season was Rs. 37.17 and it is maximum in all the seasons.

35. 12.646 kg hybrid dry Jowar and 3.478 kg concentrate forms the optimum schedule of summer with feeding cost Rs. 35.62.

36. Berseem was major legume feeding crop in January, February, March, April, November and December i.e. winter and summer season.

37. Groundnut leaves when available in Rainy season due to its less cost and efficiency of nutritive value satisfy the requirement of legumes alone.
38. Lucerne was major legume fodder from August to October and May.
39. Oat, Green Jowar and Maize are dominant non-legume fodders.
40. Hybrid Jowar alone satisfy the requirement of dry fodder, because of its less cost, and sufficiency in nutrient contents.
41. There was no alternative for concentrate as to fulfill the minimum requirement of milk ration, as per nutritional standards.
42. The optimum feeding cost was minimum in Rainy season and in months in June. As a seasonal crop green grass and groundnut leaves are available with less costs among other fodders.
43. Maximum feeding cost was in winter and in December month.
44. To meet the requirement of DCP, there was excess consumption of TDN and DM and resulted in stability of solution.
45. The optimum feeding schedule was quite stable for prices of fodder and minimum cost.
46. For prices ranges of Lucerne Rs. 0.90 to None, Berseem Rs. 0 to 1.00, Maize Rs. 0.40 to None, Oat Rs. 1. to 0.60, hybrid dry Jowar Rs. 0.55 to None and concentrate Rs. 0 to None, the solution was stable.
47. Sensitivity Analysis reveals that the DCP requirement satisfies and does not exceed consumption from optimum feeding solution but TDN and DM becomes excess in consumption.

48. This results that if the requirement of TDN and DM becomes increase in herd still the obtained solution was stable for minimum price and feeding schedule.

49. The estimates of productivity ratio, income and cost using optimum feeding cost shows that the high genetic group has maximum productivity followed by average genetic group and then poor genetic group over all the season.

50. The maximum productivity was found in rainy season followed by summer season and then winter season in all genetic groups.

51. Keeping other productive traits fix if we increase service period or dry period or lactation length then it was observed that productivity decrease.

52. Keeping other productive traits fix if we increase lactation milk yield, it was observed that productivity was also increased.

53. It was observed that for highest level of lactation milk yield and lowest level of lactation length, dry period and service period, there was maximum productivity in all the genetic group and for all the season.
54. For lowest level of lactation milk yield and highest level of service period, dry period and lactation length there was minimum productivity ratio in all the genetic group and for all the season.

55. Therefore in high genetic group at highest level of lactation milk yield and at lowest level of service period, dry period and lactation length the productivity of animal was maximum than any other genetic group.

56. For poor genetic group at low level of lactation milk yield and high level of service period, dry period and lactation length the productivity of animal was minimum than any other genetic group.

57. The highest productivity was found in high genetic group at overall the month 1.8747, rainy season 2.2046, summer season 1.8685 and winter season 1.8175.

58. The lowest productivity ratio was found in poor genetic group at overall the month 1.6002 and winter season 1.5561.

59. The average genetic group had productivity ratio at overall the month 1.7280, in rainy season 2.0321, in summer season 1.7221 and in winter season 1.6753.

60. The number of green fodders suggested in plan II under optimal feeding plans are less than those in existing green fodders similarly hybrid jowar alone
satisfy the requirement of dry fodder in optimal plan. It implies that Dairy Farm Manager should tend towards partial specialization rather than diversification.

61. Sensitivity analysis of plan II revealed in general for cost vector and for constraints revealed in general, that for majority of fodders and feeds the minimum or maximum limit was observed to be none. Thus, it strongly depicted the presence of the same in the optimum feeding plan.

6.4 Conclusion and policy implications

The existing available green fodders were not sufficient for optimal feeding plan, with minimum cost and to meet the nutritional standards. It is suggested that the change in the feeding plan as outlined in optimal feeding schedule plan II would give better result. The exercise shows that plan II optimum feeding schedule would make the feeding as whole to provide minimum cost and satisfy all the nutritional standards. The number of fodder crop suggested under optimal feeding plan II are less than these in the existing fodders. It implies that Dairy farmers should tend towards partial specialization rather than diversification.

The finding of the present study may prove useful to the policy makers, administrators, research scientists and common
dairy farmers in many ways. One of the important things is that common dairy farmers may not be easily willing to undertake these changes in feeding schedule. Therefore, it is felt that there is a great task ahead in front of extension agencies, Agricultural scientists the existing agencies can undertake demonstration of the optimum feeding schedule obtained by Linear programming at some selected dairy farm providing them assurance of minimum feeding cost and more productivity of farm. The stability of the optimum plan II has been depicted by the sensitivity analysis. It is reflected that optimum feeding plan II will not change even if the cost of fodders requirement of nutrients DCP, TDN and DM will very between the given ranges. This implies that the slight changes in costs of fodders and nutrient requirements need not go for revised optimum feeding schedule. Dairy farm owners earn the maximum net returns even under those conditions. This can certainly help to forecast the future production levels of different dairy farms.

6.5 Scope for further research

Further scope for research can be understood from inherent limitations of the model itself. To overcome these limitations further research and development in the model with adoption of rational feeding crops system may be included. Similarly the fulfillment of the objective function simultaneously may be tried finding a judicious solution for the minimization of
cost function this may give rise to adopt the non linear relationship between the various fodder crops and nutritional standards in the system. The model can be refined by adopting more fodder crops in relation to different regional cropping patterns, with the help of animal science scientist.