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An Alternative to the Operation
Flood II Strategy

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This paper is the review of the document "Breeding and Feeding for Milk Production in Operation Flood II" prepared and published by the National Dairy Development Board and is intended to generate discussion among research workers, planners and administrators who are concerned with India's dairy planning. Apart from outlining the economic rationale behind the Operation Flood II strategy, the document also highlights the technical programmes for breeding and feeding of milch animals in India during the eighties and beyond. Our review of this document is divided into three sections: Section I briefly describes the salient features of the Operation Flood II strategy, Section II points out its weaknesses and Section III outlines an alternative and more effective strategy.

I. The Operation Flood II Strategy

2. The estimated demand for milk in India, taking into account the expected rate of growth in human population and income, is about 41 million tonnes by 1985 and 57 million tonnes by the 1990. Present production is estimated to be 28 million tonnes. In order to meet this growing demand for milk, it is necessary to bring about significant changes in the technology and organisational structure of milk production. Since the production of milk in India is severely constrained by a shortage of feeds, the choice of strategy should be the one which will take maximum advantage of scarce feed resources. At the same time

it must generate more employment and raise the incomes of the weaker sections of the rural population. In order to arrive at the most efficient strategy which would satisfy both these objectives, the document has examined three alternative strategies for increasing milk production. A summary statement of these strategies is given below:

Table 1: Alternative strategies for producing 37 million tonnes of milk by 1985

Strategy	Annual requirement of feeds (in million tonnes) on an 'as fed' basis		
	Dry fodder	Green fodder and natural herbage	Concentrates
1. Keeping the number of adult females constant at 82 m and increasing the feed input to each	147.2	209.6	23.6
2. Increasing the number of adult females to 124 m and keeping feed inputs per animal constant	179.6	388.2	20.2
3. Keeping the number of adult females constant and replacing 10.2 million local type milch animals by the same number of genetically improved animals and feeding this group at economic rates	130.1	309.0	19.0

3. The first two strategies do not envisage any change in the technology of milk production. In the third strategy, a certain proportion of the indigenous stock of milch animals will be replaced with

European crossbred cattle and buffaloes selected and bred for high milk yield. It is argued that this strategy is more efficient than the second because of its lower requirement of feeds. It is superior to alternative one because less land would be devoted to producing feed directly for animals as the additional concentrates required for alternative 1 would require three times more cultivated land than would be required to produce the additional green fodder in alternative 3. Alternative 3 is the OF II strategy.

4. The special herd of milch animals (termed the National Milch Herd in the OF II document) to be bred during the eighties and beyond will convert scarce feeds (mostly concentrates and green fodder) into milk with greater efficiency than the local type animals. The local type animals outside the OF II milkshed will continue to produce whatever milk and draught power is possible on a diet of crop residues and natural herbage. This National Milch Herd will be produced using the advanced breeding techniques of artificial insemination and progeny testing.

5. In addition, a comprehensive programme for rearing the calves of these superior milch animals with emphasis on adequate nutrition and care is also envisaged. Milk replacers and calf starters will be used to ensure rapid growth and early maturity.

6. In order to meet the feed requirements of the National Milch Herd (NMH) the OF II strategists have outlined comprehensive fodder production and feeding milling schemes. About 2 million hectares of irrigated area will be diverted by farmers in the OF II milksheds to the production of green fodder. Feed milling plants will be set up

to supply milkshed areas with the required amounts of concentrate feeds.

7. At the heart of this technical programme is the Anand model dairy cooperative which will function as an efficient village-level organisation for the marketing of milk from and supply of production inputs to farmers.

II. Weaknesses of OF II Strategy

8. Before going into the weaknesses of the OF II strategy, it would be well to point out that OF II planning marks an important advance over earlier planning in that it recognizes the fact that feed is the major constraint to increased milk production, and seeks a strategy to maximise output within the limitations imposed by feed supply. Earlier planners simply ignored this constraint of feed supply, or vaguely expected feed supply somehow to increase sufficiently to meet demand. The OF II strategy also recognises another important constraint to livestock productivity in India, which is the inability of farmers to invest a greater share of available feed resources in rearing young animals. Finally, it recognises that unless village people effectively organise themselves there can be no dairy development. Hence the advocacy of the Anand model milk marketing cooperatives. We shall have occasion to return to these three features of the OF II strategy.

9. The weaknesses of the OF II strategy are the several questionable assumptions underlying it. The first is that good crop land will be shifted from food and cash crops to fodder crops to ease the feed

constraint. But such an expectation is belied by past experience. All our plans for the past 30 years have included a shift of cultivated land to fodder from other crops, but no such shift has occurred. The area under fodder crops has stood at about 7 m ha over this entire period. It is really unrealistic to assume that, with our rapidly increasing human population, more land will be shifted from food and cash crops to fodder. The reverse is more likely.

10. OF strategists also, however, assume an increase in concentrate feed supplies --by 25% in the five years from 1978-79 to 1984-85. The wisdom of making such an assumption must be questioned. Only a very large increase in food production would make this possible in view of rapid human population increase. But with the green revolution already running out of steam, because of fuel and fertiliser shortages and because the most responsive crops/areas have already been covered, a large increase seems doubtful. Neither are exporters likely to lose their grip on the oilcake market.

11. Related to this is the assumption that it will be possible to divert almost the entire supply of concentrate feeds to the feeding of milch animals. At present about 20.5 million tonnes of concentrates feeds is available for bovine feeding according to the document under review and according to independent estimation done by the present writers. Of this amount about 47% is fed to adult female bovine cattle and buffaloes, 51% to draught animals and 5% to young stock^{1/}. The OF II strategy calls for 19 m tonnes or 93% to be fed to adult female cattle and buffaloes. The simple fact that farmers are, in general, far more concerned to ensure ^{that} they have adequate draught power than to

produce milk, and are thus unlikely to change the pattern of feeding the concentrates they have seems to have been completely overlooked by OF II strategists. No single feature of the OF II strategy more clearly betrays the basic preoccupation of its authors, namely, a preoccupation with producing milk to supply to city markets and to the exclusion of a balanced development of livestock productivity and enhancement of rural welfare.

12. There is yet another assumption relating to feed supply that is clearly untenable. It is that fodder supply from natural vegetation will continue at its present level. Any perceptive observer, however, cannot help but be appalled by the rapid rate at which the country's forest and grassland are being degraded by overgrazing. This degradation represents a grave threat to the continuance of fodder supplies at present levels; indeed to agricultural production in general. We cannot go into this matter in more detail here; the reader is referred to several recent publications for more information.^{2/}

13. Another dubious assumption underlying the OF II strategy, as well as the other two alternative strategies, is that cattle numbers can be increased, decreased or kept constant according to a national plan. This betrays an utter lack of understanding of the forces that determine bovine livestock numbers. A reduction in bovine numbers has been a major plank in livestock development strategy since first recommended by the Royal Commission on Agriculture in 1927, but numbers have increased steadily since then, and are still increasing. A number of excellent studies have recently been done. They indicate that complex economic forces and not official plan policies determine

the numbers and types of bovines kept. Incidentally they also indicate that religious sentiment plays no role at all.^{3/}

14. Let us now consider what the impact of the OF II strategy will be if all these underlying assumptions prove wrong. We do not need to speculate very much because there is already abundant evidence available from the OF I phase and from government dairy development projects which resemble the OF II strategy in general approach. Take first the question of feed supply. If more area is not put under fodder crops, then the potential of crossbred cows and high-yielding buffaloes can only be realised by feeding more concentrates, and this is what happens. In Kaira district of Gujarat up to 1965 increased milk production was achieved entirely by the feeding of greater amounts of concentrates -- cotton seed cake in this case.^{4/} There was no increase in the area of cultivated land used to grow fodder. The farmers of Kaira District produced at that time 6,000 tonnes of cotton seed cake, but were feeding 30,000 tonnes, which means cottonseed cake was being imported from other districts. Kerala has increased milk production dramatically with crossbreeding during the 70s, not by feeding more green fodder, but by feeding more concentrates, 70% of which at present are imported from other states.^{5/} In the situation of severely limited supplies of concentrate feeds that we have in India, where the average level of availability is about 0.5 kg/head/day for a cow or buffalo in milk,^{1/} what is the effect of some farmers monopolising these limited supplies in order to feed their crossbred cows 4 kg per day? (They need at least this much to produce 8-10 litres of milk per day on a straw-based diet). It is

vital that we attempt to answer this. It is also vital that we enquire how it is that some farmers are able monopolise scarce concentrate supplies.

15. In a situation in which the total population of adult female/bovines is constant or increasing, feeding some animals more concentrates than the average amount means others will get less than the average amount. From a consideration of the productivity of concentrates in feeding buffaloes given in table 2 it can be achieved if available concentrates are divided into equal shares for all animals. As a simple example take 3.0 kg concentrates and

Table 2: The relationship between level of concentrate feeding to buffaloes and level of milk yield^{6/}

Concentrates fed/ animal/day, kg.	Milk yield/animal/day, kg.
0	1.2
0.5	1.9
1.0	2.5
1.5	3.0
2.0	3.4
2.5	3.7
3.0	3.9

6 buffaloes. If each buffalo is fed 0.5 kg, the national average, 11.4 kg milk will be produced. If all 3 kg is fed to one buffalo and nothing to the other 5, only 9.9 kg milk will be produced.

Similar input output data for cows does not seem to be available, but there is no reason to assume that the pattern (i.e., the shape of the response function of milk output to concentrate input) is very

different than for buffaloes. If this be the case, the introduction of crossbred cows is not only not necessary but will be counter productive. The same applies to the sort of high yielding buffaloes that are envisaged under OF II. And even if it is assumed that the availability of concentrates is doubled, it can be calculated from the data in table 2 that more milk would still be produced if the additional concentrates were fed in equal shares to all animals.

16. In practice, the introduction of such animals does not even result in an improvement of milk yield per animal if the owner of the animal does not have the money or the credit to purchase additional concentrates from the market. Only if the owner has the money or is organised with others into a co-operative which can offer credit, does he achieve higher yields from crossbreds than he could with his existing type of animals -- and thus earn a greater return from milk production. The OF II strategy aims precisely at helping some farmers, by setting up feed plants and by arranging a supply of concentrates on credit, produce more milk and earn more profit at the expense of other farmers not in OF districts. This pattern of exploitation of the many by the few has already been going on for generations in order to supply our city markets. City cattle and buffalo owners have long monopolised limited concentrate supplies. They feed buffaloes as much as 10 kg concentrates to produce 10 kg milk.^{7/} Probably no single measure would make a greater contribution to the objectives of OF II than to stop this wasteful use of our limited concentrate supplies. Instead, OF II strategy actually calls for an extension of this system of waste and exploitation by fostering city type milk production in selected 'milksheds'

17. How are city milk producers and now producers in selected 'milksheds' able to monopolise scarce concentrates supplies? The answer is that because we have over the years allowed or even fostered the growth of large-scale, urban food milling units. Farm produce--cereals, pulses, oilseeds--come to these units and the by products--the concentrate feeds--are sold on the city market where they are purchased by those who have the money to do so, including, incidentally, exporters. In earlier times, food processing was done more in the village itself and the farmer retained more of his concentrates to feed his own animals and less flowed to the market. In all our discussions of fostering rural industry, have we ever considered strengthening this traditional system of food milling? Why should raw farm produce flow from village to city? Why not milled food grains and oil? In addition to generating more rural employment, village milling would contribute to greater milk production. Here again NDDB strategists are working against the interests of village people by fostering large-scale, urban oil milling.^{8/} The argument they give is that the city oil mill will be co-operatively owned by producers. This is fine as far as it goes, but why should these mills be large, urban-based mills? Why not small, village-based ones? Think of the distances oilseed and oilcakes have to be transported; and also the opportunity for exporters to continue to procure oilcakes conveniently. If there is no sufficiently small-scale solvent extraction technology at present, why should NDDB not, in the interests of greater milk production and rural welfare in general, not finance the engineering research that is necessary.

18. To sum up, then OF strategy is based upon questionable assumptions. Neither is it likely to increase the nation's milk supply, nor is it likely to encourage greater rural welfare--in general. What then is the alternative?

The Alternative

19. The alternative suggested here is also based upon assumptions. Let them be stated. They are: (1) The area of cultivated land devoted to growing fodder crops to feed animals will not increase; (2) The amount of concentrate feeds on a national scale will not increase at a rate faster than the rate of increase of food grain production; (3) Cattle numbers will not decrease in the next 20 years. Also farming will not be mechanised to any great extent and thus bullock numbers will not decrease; (4) The destruction of the nation's vegetative cover--forests and grassland--will continue and indeed accelerate as a result of uncontrolled grazing by livestock unless definite steps are taken to halt it. Thus supplies of natural herbage will decrease; and (5) Fuel will become more and more scarce, leading to still greater use of dung as fuel and also to the increasing use for fuel of crop residues that are presently fed to animals.

20. The objective of the alternative strategy is that livestock development should improve rural welfare. The supplying of cities with milk is secondary. If rural people are helped to produce more milk and they drink it, the objective of this strategy will be met. Further, milk is not the sole concern. Draught power is equally, if not more, important. Contributing objectives are: (1) Limited available

concentrate supplies must be used to secure the greatest possible livestock productivity in terms of draught and milk; (2) The nation's forests and grasslands must be rehabilitated to produce more natural herbage for livestock feeding; and (3) Democratic functioning must be ensured in village panchayats and co-operatives in order that they can effectively manage community resources and activities for greater general welfare.

21. In this strategy livestock productivity is defined as the total of livestock goods and services per village and for the whole nation, and not per animal or per farmer. Traditionally we have thought of productivity in terms of output per animal, and that too usually only the output of milk. This leads us to think that we have done our job if even 10 percent of all animal owners increase output from their animals. Which 10 percent increase output and how has not been not our concern.

22. We may now explain briefly how each of these subsidiary objectives can be met. First, the efficient use of concentrate feeds. We assume that our present large population of bovines will remain with us as every farmer seeks to maintain at least a pair of draught cattle and the complement of females and young stock that goes with it. Present, as explained in paragraph 15, maximum returns to concentrate feeding can be achieved if available supplies are uniformly fed in small equal quantities to all the animals of a village and of the nation. The present practice of some farmers and milk producers to monopolise concentrates and feed at high rates should be

counter-acted by policies such as banning cattle and buffaloes in cities and towns. Also, large-scale urban food milling and cattle concentrate mixing factories could be discouraged in favour of small-scale village units.

23. The fact that farmers typically make almost no investment in young stock has already been mentioned. Here we agree in principle with the OF II strategy that a greater investment in young stock could yield good returns to livestock productivity by reducing calf mortality and reducing overall rearing costs and rearing time. The chief way of doing this is for the farmer to reallocate some of his available concentrate feeds from his milking animals to his calves. The principle involved is again one of feeding concentrates where returns are highest. The farmer has to be helped, however, to make this investment which will begin yielding returns only after about 3 years.

24. The most important single step that could be taken to increase livestock productivity is the rehabilitation of uncultivated village common land. On an average such land produces only 3 tonnes of green fodder per ha per year during the rainy season. If planted to fodder trees like ku babal, yields could be 20-30 tonnes per ha per year, throughout the year. Qualitatively too the fodder would be better, being rich in protein. Incidentally, such fodder plantations offer an alternative to green revolution technology which is so precariously dependent on fossil fuels; one hectare can fix 500 kg of nitrogen per year which can be transferred to cultivated land via animals. Also, the planting of fodder plantations on bare, eroding village common

land would solve our environmental problem--a bonus benefit to the nation as a whole.

25. The key to realising this potential for increased productivity of village common land is the creation of truly democratic village institutions. Many of the Anand type milk co-operatives function democratically and effectively and could take up this task of rehabilitating village common land. Unfortunately they have not so far made any attempt in this direction. And there are other resources and functions that only a truly democratic village organisation can manage effectively for higher productivity and greater general welfare. Examples are village ponds, community methane gas plants, community fuelwood plantations and village industries like food milling. The latter would break the present exploitative system of large-scale urban food milling by keeping employment opportunities and milling offals (i.e. concentrate feeds for livestock) at home in the village. Last, but not least, such village institutions can market, not only milk, but milled grains and pulses and edible oils.

26. In considering village institutions we come to what must be the heart of any strategy for livestock development--indeed, any strategy for development at all. Our village institutions have for the most part been ruined by being politicalised. They are dominated by the local neta and his friends, usually the better-off and/or higher caste residents of the village, whose power derives from their support of local political leaders. The neta is able to distort the working of village institutions to his own personal benefit, thus engendering a feeling of resentment and helplessness in the majority of village

residents. Further, he may align himself with urban business interests and contactors to further exploit his fellow villagers. The Anand type co-operative is a good model but to work effectively in most villages must be preceded by basic political changes which will shift the balance of power from the neta to the majority of village residents. In the absence of such a shift no increases in either productivity nor equality will occur.

27. By way of summary we may note the differences between the OF II strategy and the alternative strategy proposed here. In the alternative strategy the Anand type co-operative is accepted as a viable model of village organisation to manage common resources and activities, but the need for basic change in the village power structure is recognised as a pre-requisite to the effective functioning of co-operatives. OF II strategy does not recognise a whole range of activities that co-operatives can take up and that would, in fact, make the major contribution to increased livestock productivity. The alternative strategy emphasises the more equitable and at the same time more productive use of scarce concentrate feed resources with desi cattle and buffaloes rather than introducing a technology (crossbreeding) which only strengthens existing patterns of economic exploitation of the many rural poor by the few rural and urban rich and which may actually reduce the nations milk production.

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Notes

1. The average amounts of feeds of different types fed to livestock in India was determined by Amble et al in the early 1960s by sample survey of the entire country. These figures are as follows:

Class of animal	Type of animal	Amount of feed fed/animal/day, kg		
		Dry fodder	Green fodder	Concentrates
In milk	Cow	3.5	4.4	0.3
	Buffalo	5.9	6.8	0.8
Dry	Cow	2.8	2.8	0.1
	Buffalo	4.0	4.3	0.1
Adult males	Cattle	3.7	5.0	0.3
	Buffalo	5.4	6.5	0.2
Young stock	Cattle	1.5	1.6	negligible
	Buffalo	1.7	1.6	negligible

The amount of grazed herbage was not estimated; the present authors estimate 5 kg per head/day as an average, which comes close to the estimate made in the NDDDB document under review. It is assumed that these figures have not changed appreciably with time. Amble, V.N., Murth, V.V.R., Sathe, K.V. and Goel, B.B.P.S., 1965. Milk production of bovines in India and their feed availability. *Indian Vet. Sci.* 35, 221.

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3. De Lasson, A., 1981. Socio-economic aspects of livestock keeping in Noakhali District, Bangladesh. Paper presented at the second seminar on 'Maximum livestock production from minimum land' held at Bangladesh Agricultural University, Mymensingh, Bangladesh from 2nd to 5th February 1981. Vaidyanathan, A., Narayanan Nair, K., and Harris, M. 1979. Bovine sex and species ratios in India. Working paper No.108. Centre for Development Studies, Ulloor, Trivandrum.

4. Desai, D.K., and Narayana, A.V.S., 1967. Impact of modernisation of the dairy industry of Kaira district. *Indian J. Ag. Econ.* 22, 54.
5. Nair, K. Narayanan, 1979. Milk production in Kerala. *Trends and Prospects Economic and Political Weekly* March 24-31, 1979.
6. These data were recalculated from those given by Mellor, J.W., and De Pontives, B., 1964. Effect of growth in demand for milk on the demand for concentrate feeds. India 1951-76. *Indian Journal of Agricultural Economics* 19, 131. The original data are from several hundred buffaloes kept in situations ranging from rural (far from milk market) to city and experiment station buffaloes.
7. The feeding rates and levels of milk production of city buffaloes have been measured by workers of the Institute of Agricultural Research Statistics for the major cities of India and published as Indian Council of Agricultural Research, New Delhi in their report series on 'Cost of milk production'.
8. Verghese, B.G., 1981. Oilseeds Co-operatives on Anand pattern. *The Indian Express*, March 19, 1981.