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# Mixed Farming

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**IN INDIA**

54 KAM



**November 1957**

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*This is the 40th of a series of bulletins being issued by the Indian Council of Agricultural Research on agricultural and animal husbandry subjects. These Bulletins are so written as to give an overall picture of the farming practices in vogue in the country, with suggestions on improvements based on research results.*

*For any further information, and especially on the recommendations suitable for his locality, the reader is advised to contact the local agricultural officers.*

**Editor : M. G. Kamath**



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# MIXED FARMING

in India

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BY

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Ministry of Food and Agriculture

21.5, 14, 19

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INDIAN COUNCIL OF AGRICULTURAL RESEARCH  
NEW DELHI



## MIXED FARMING IN INDIA

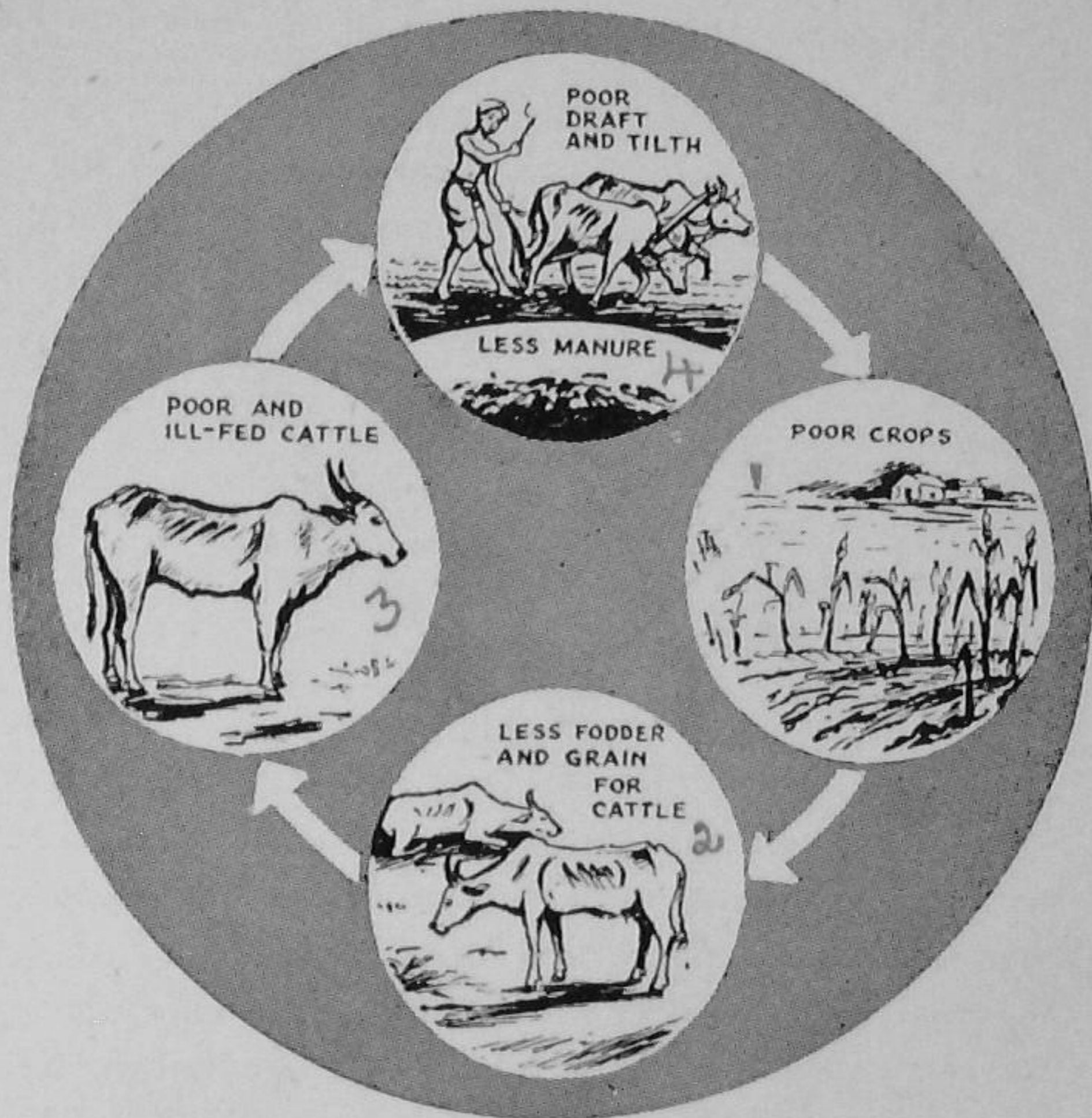
FARMING is the prime industry of our country. As against nearly five per cent of the population of the United Kingdom and 13 per cent of the United States of America, about 51 per cent of the Indian population is dependent on agriculture. More than half of our national income is derived from agriculture.) This part of the national income can be considerably increased by harnessing science for improving agriculture, thus making it more remunerative. At present, agriculture is providing just enough returns to farmers to stay on in the industry.

About 361 million people and 300 million livestock (excluding the 73 million poultry) compete for the nearly 323 million acres of land (including natural grazing) in this country. Our per capita availability of cultivated land is only 0.97 acres, as against 1.26 acres for the entire world and 2.87 and 3.02 acres for the U.S.S.R. and the United States of America, respectively. The combined average available area of arable and grazing land per head of livestock is just over an acre. In spite of such a heavy pressure of population on land, the Indian farmer and his work-cattle remain idle for about half (45 per cent) and three-fourths (70 per cent) of their time, respectively.

With the decrease in <sup>മരണനിരക്കുകൾ</sup> mortality rates made possible by a rapid scientific advancement in the prevention and control of human and cattle diseases, the man (and/or animal) : land ratio is increasing rapidly. In the absence of any positive measures for regulating natural fecundity and birth-rate, the human population is increasing every year by about  $1\frac{1}{4}$  per cent, and the scrub cattle also are registering a steady rise in their numbers. <sup>2-072105</sup>

This is responsible for the creation of a <sup>ഒരു, ദുർബ്ബല ചക്രം</sup> vicious cycle. Weak, low-producing animals and weak human beings, poor yields of crops





**The vicious cycle**

obtained from a progressively *Ex. 10/10/19* deteriorating soil, lack of full employment of men and cattle in agriculture and high costs of production are the symptoms of this vicious cycle. This fact, however, is being increasingly realized and emphasis is now laid on greater production per acre. Research has been undertaken to produce more food and fodder to help maintain the human and cattle populations on normal standards of living, and increased efforts are being made to bring the results of such research to the farmer. ✓

*subi*  
**BALANCED FARMING**

How HAS this want of balance in our farming practices come about? What can be done to remedy it? Before we make



an attempt to answer these questions, let us briefly review the history of agriculture as it developed with the growth of civilization.

When man was in a savage state, he used to feed on the roots, fruits and leaves of plants and on the animals which he killed. With the increase in population, he started experiencing difficulty in finding food, and the idea of owning cattle to have meat, milk and milk products for his food occurred to him. Thus, human beings in their <sup>பெயர்ந்து</sup> nomadic <sup>நிலம்</sup> state moved from one place to another for grazing their cattle. This state of affairs also could not continue for long and the necessity of cultivating land for raising food and fodder was soon felt.

This is how cultivation of land began. These people did not have agricultural implements, nor did they employ animals to cultivate the land. They scratched the land and scattered seeds of various crops over it. The small quantity of produce thus obtained was probably enough for them. When one patch of land was exhausted of its fertility, it was abandoned, and they moved away to raise crops elsewhere. In short, a shifting type of cultivation was practised. Not that all groups of people had taken to this kind of cultivation; there were other groups which continued to rear cattle. <sup>உயர்க்கும், பால் குடிக்கும்</sup>

Later on, instead of leading a nomadic life and moving from place to place in search of land for cultivation and pastures for grazing their cattle, men settled down and started growing better crops with the help of the manure obtained from the dung and urine of the cattle maintained by the other groups and by using better tools. It was natural that in course of time it occurred to those who had taken to farming that they also rear milch and draught cattle to become self-sufficient in the manure needed to enrich their fields and the cattle required for traction in cultivation.

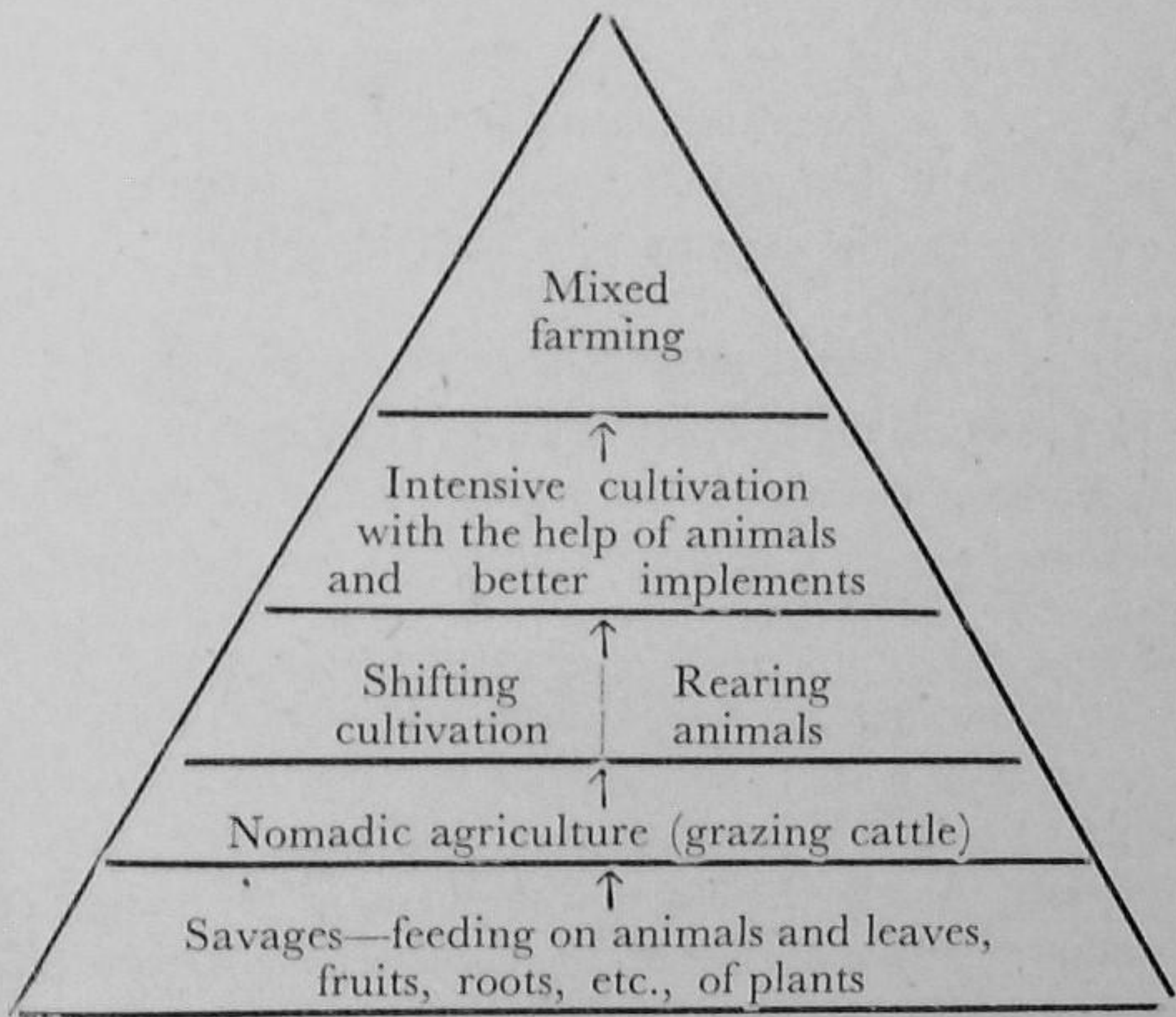
This is how animals came to be associated with agriculture. This led to a fundamental agricultural evolution in which stock management became a supplement to the <sup>மூல</sup> indigenous shifting cultivation method. Instead of raising only one crop a year, man took to intensive cultivation and began growing more than one crop



in a year with the help of better agricultural implements worked by animals, manure and irrigation.

As the cattle needed for agricultural work could not provide enough manure to get the best out of the land, he thought of rearing milch cattle also, so that besides meeting his requirements of manure, he could obtain milk, milk products and meat to supplement his grain diet and a continuous supply of young draught animals to replace the old ones. This is the system which now generally goes by the name of mixed farming.

It may thus be seen that in the evolution of farming, mixed farming occupies the highest place and is absolutely necessary for a successful intensive cultivation.



**The cone of agricultural evolution**

Though mixed farming is an old practice in our country, due to several reasons there has been a gradual deterioration in this

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type of farming and in the health and breed of domestic animals. This has resulted in an all-round deficiency of good bullocks, cows and buffaloes and, consequently, of milk and milk products and manure, and, above all, in the depletion of the fertility of our land.

The most flourishing farmers of India are the *jats* of the Punjab, Delhi and western Uttar Pradesh and the enterprising *kisans* of the Charotar tract of Gujarat in Bombay State, the Konkan and Kerala. Most of these farmers go in for mixed farming. For every pair of draught bullocks which they maintain for cultivation, they rear, on an average, two milch animals, mostly buffaloes. The milk and milk products which they obtain from their milch cattle supplement their incomes and also provide them with a more varied and wholesome diet. Precious cow-dung and farm-yard manure are also thus naturally obtained and go to enrich the fields. The improved diet of the farmers gives them a sturdy physique suited to agricultural work. It is in mixed farming, therefore, that the key to prosperous agriculture lies.

### WHAT MIXED FARMING IS

IN ENGLAND, the term mixed farming is generally applied to a farm consisting of both grass and arable fields. A farm without livestock does not exist in that country.

The Nigerian Agriculture Department employs the term somewhat differently. A mixed farm in Nigeria consists of at least two separate, and not logically interdependent, parts. It comprises considerable proportions of both permanent grass and arable lands. It also implies that the basis of the manuring of the arable land is farmyard manure produced on the farm by cattle standing on a straw bed.

A grass farm, whether the grass is used for sheep-rearing or dairying, is not a mixed farm, because only a small proportion of its land is under the plough and is growing food for the livestock. Nor is an arable farm a mixed farm if sheep folding is the basis of the manuring of the arable land. Besides, no one can describe as a



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mixed farm a farm on which practically no stock is kept and from which everything—straw and roots as well as grain—is sold off and where, consequently, the farmer relies on the purchase of artificials and of stable manure from elsewhere for the maintenance of the fertility of the soil.

The normal characteristic of a mixed farm is that profits are realized by selling animal products such as milk, butter and cheese and by rearing or fattening cattle, or from all these, as well as from grain. It is thus very nearly true to regard this as an essential feature of the English mixed farming system. Certain farms where the preparation of farmyard manure is as much an essential feature as is the mixture of arable and grass land are known as mixed farms; but the sale of animal products is not quite one of their essential features.

A farm which is concerned, for instance, with only the sale of milk or beef and with the necessary feeding of the stock with grass or even cultivated and manured fodder, would simply be a dairy farm or a stock farm rather than a mixed farm.

According to Whethan, the most outstanding point in the evolution of farming is the present-day tendency to move away from the old-fashioned idea of the 'one-crop farm' and the 'dairy farm' towards their combination in the mixed farm, the two main components of which are the dairy herd and arable crops. They should not be regarded as separate components, but should be welded together to the mutual benefit of both. This welding of the two types of farming has been very correctly expressed as 'making the milch cattle grow the crops for the farmer.'

According to King, mixed farming represents a gradual evolution from the shifting method of cultivation to a static type of agriculture by the introduction of animal husbandry and by the use of animals for cultivation.

In India, mixed farming implies dovetailing of crop production and animal husbandry to the best advantage of the farmer. This relationship of the two may be expressed as a complementary



use of livestock and crops. This enables a full utilization of the by-products of crops and their conversion into valuable animal products. Thus, farmyard manure becomes available, and the spare time of the cultivator and his family is fully utilized.

In addition to maintaining cattle and buffaloes, the mixed farmer may also keep with advantage some sheep, goats, pigs and poultry as an additional source of income. Where water reservoirs, tanks or ponds are available on a farm, fish-rearing may also be profitably introduced.

A mixed farm should produce the required quantity of food, including fruits and vegetables as well as sufficient fodder for the livestock kept on the farm besides such cash crops as will yield the largest profit to the farmer. In order that the farmer may be able to use the entire farmyard manure for compost-making, he should also grow fuel and fodder trees such as *babul* and *shisham* on the sides of the roads, along the farm boundary and in other convenient places.

Mixed farming is not something new to the Indian cultivator. Today, however, he practises it merely as a tradition handed down to him by his ancestors in which sentiments and superstitions rather than up-to-date technology or a commercial approach loom large. Mixed farming means a combination of dairying and animal-raising with crop production to the best advantage of both. For this reason, therefore, there are people who do not favour rearing of sheep and goats on a mixed farm, unless the area is extensive.

Though poultry and honey-bees are sources of additional income, they cannot utilize the by-products of the arable farm, nor can they supply manure to enrich the soil as the draught and milch animals do. People of conservative outlook in India, therefore, feel that mixed farming should have the combination of arable farming and dairying limited to the rearing of milch cattle like cows and buffaloes.



## WHAT EXPERIMENTS SHOW

GRANTING THAT mixed or diversified farming is beneficial, the question may be asked: precisely how and to what extent is this practice superior to arable farming? During 1941-1946, the Indian Council of Agricultural Research conducted experiments on small holdings to investigate into this question. The experiments were carried out in selected holdings in Madhya Pradesh, Uttar Pradesh, the North West Frontier Province and Sind (the last two now in West Pakistan). The results of these investigations are summarized below.

**Madhya Pradesh.** Funds for the purchase of milch stock and setting up of the units were provided by the Government as *taccavi* loans which were later recovered in instalments. Results of the experiments indicated that

- (i) a unit-holding of  $12\frac{1}{2}$  acres worked with a pair of bullocks proved capable of maintaining two buffaloes without the need for purchasing fodder from outside,
- (ii) the cultivator practising mixed farming could earn an extra income varying from Rs. 200 to 250 by the sale of milk and Rs. 125 to 200 by the sale of butter,
- (iii) the supply of manure was increased by about 15 tons and was sufficient to manure another three to four acres,
- (iv) the extra manure enabled the production of a sufficient surplus of dry fodder and grain to tide over scarcity periods of fodder supply,
- (v) about 25 to 30 per cent extra milk and milk products consumed provided additional nutrition to the family and
- (vi) the extra manure supply enabled the farmer to grow half to one acre of a cash crop very successfully.

**Uttar Pradesh.** In Uttar Pradesh, the comparable mixed farming units were located in the districts of Meerut, Bareilly, Lucknow, Bara Banki, Gorakhpur and Deoria. The size of the



holdings varied from eight to ten acres in the different districts. Details of the net revenue obtained from the mixed farming units compared to the arable units are given below.

**Average profits per acre obtained in 1941-42**

Name of district	Unit	1st year	2nd year	3rd year	4th year	5th year
		Rs. a.	Rs. a.	Rs. a.	Rs. a.	Rs. a.
Meerut	Mixed farming	66 8	229 2	179 8	211 4	316 0
	Ordinary farming	42 1	136 2	86 0	78 4	117 0
Bareilly	Mixed farming	4 10	54 14	128 0	68 3	150 0
	Ordinary farming	5 14	39 8	2 8	13 3	60 0
Lucknow	Mixed farming	34 10	59 9	159 0	43 6	79 3
	Ordinary farming	25 9	54 6	138 4	34 2	34 0
Bara Banki	Mixed farming	11 12	19 11	63 0	122 2	7 0
	Ordinary farming	8 14	29 3	43 0	72 0	70 0
Deoria	Mixed farming	18 4	97 0	156 7	164 4	232 0
	Ordinary farming	15 7	58 0	67 2	29 10	57 0
Gorakhpur	Mixed farming	8 0	111 9	160 15	125 3	163 0
	Ordinary farming	6 11	54 3	66 7	48 12	60 0

**Average profits per acre of all holdings**

Unit	1st year	2nd year	3rd year	4th year	5th year	Mean
	Rs. a.	Rs. a.	Rs. a.	Rs. a.	Rs. a.	Rs. a.
Mixed farming	23 15	95 5	141 2	122 6	169 6	110 7
Ordinary farming	17 7	61 13	67 3	46 6	65 5	51 10
<i>Per cent increase over ordinary farming</i>	37.4	52.0	110.0	167.3	159.3	105.4



The Bara Banki unit gave the lowest extra profits and depressed the general profit level of all the units.

From the other units, the extra profits ranged from 37.4 to 167.3 per cent over the comparable arable farming units. This increased profit was possible as a result of the production of milk, a greater employment of the family and an extra yield of cash, fodder and grain crops. In the western districts, the mixed farming unit-holder could maintain three milch animals and a pair of bullocks, and in the eastern districts, two milch animals and a pair of bullocks could be maintained on an eight to ten-acre holding.

**North West Frontier Province.** The area of mixed farming units in the N.W.F.P. varied from five acres in the most intensively cultivated holding in the Charsadda *tehsil* of Peshawar district to 12 acres in the Paharpur *tehsil* of Dera Ismail Khan district. Mixed farming positively increased the yields of grain and cash crops, the gain being less under the drier conditions of Dera Ismail Khan compared to that in the amply irrigated areas of Peshawar and Mardan districts. The returns were comparatively lower from the mixed farming units in the submontane and mountainous regions of Kohat and Abbottabad districts. The returns in the latter case suffered due to lack of marketing facilities. The surplus manure dressed to the sugarcane and tobacco crops increased the gross returns from these crops in the mixed farming units over those obtained in the arable units.

**Sind.** In Sind, three mixed farming and three arable farming units were set up on a comparable basis. The size of each holding was 24 acres. On the average, for three years for the mixed farming units in Tharparkar, Nawabshah and Hyderabad districts, the extra returns over the arable units were 16.1, 18.7 and 12.8 per cent, respectively. The Sindhi *hari* (cultivator) could maintain two milch animals besides a pair of bullocks. For these animals he could obtain dry and green fodder and part of the concentrates from his mixed farming holding. By keeping two milch animals on the average, his income on the holding increased by Rs. 281. The extra income varied in relation to the market value of animal



products and the incentive to produce more because of the nearness of the market.

More recent work on mixed farming which is being conducted at Devi Hosur, Puntamba, Dohar, Kumpta and Nasik in Bombay also supports the earlier findings.

**Northern Nigeria.** One of the arguments advanced by the opponents of mixed farming is that the addition of manure to a dry land has a burning effect and does more harm than good to the soil. Investigations over a period of six years carried out at Maigana in Northern Nigeria showed that per-acre yields of mixed farmers in dry areas were considerably higher than those of arable farmers. Of course, this increase cannot be attributed to the use of manure alone, but is due also to better cultivation.

Experience gained from trials also shows that the by-products of ten acres of the ordinary crops of the country, when properly conserved, helped a great deal in maintaining a suitable herd of stock for such an area. Since the experiments were conducted, a complete mixed farming system suited to the conditions of the country has been steadily elaborated.



**The better income from mixed farming helps raise living standards**





**Mixed farming enables the farmer's family to have a more nourishing food**

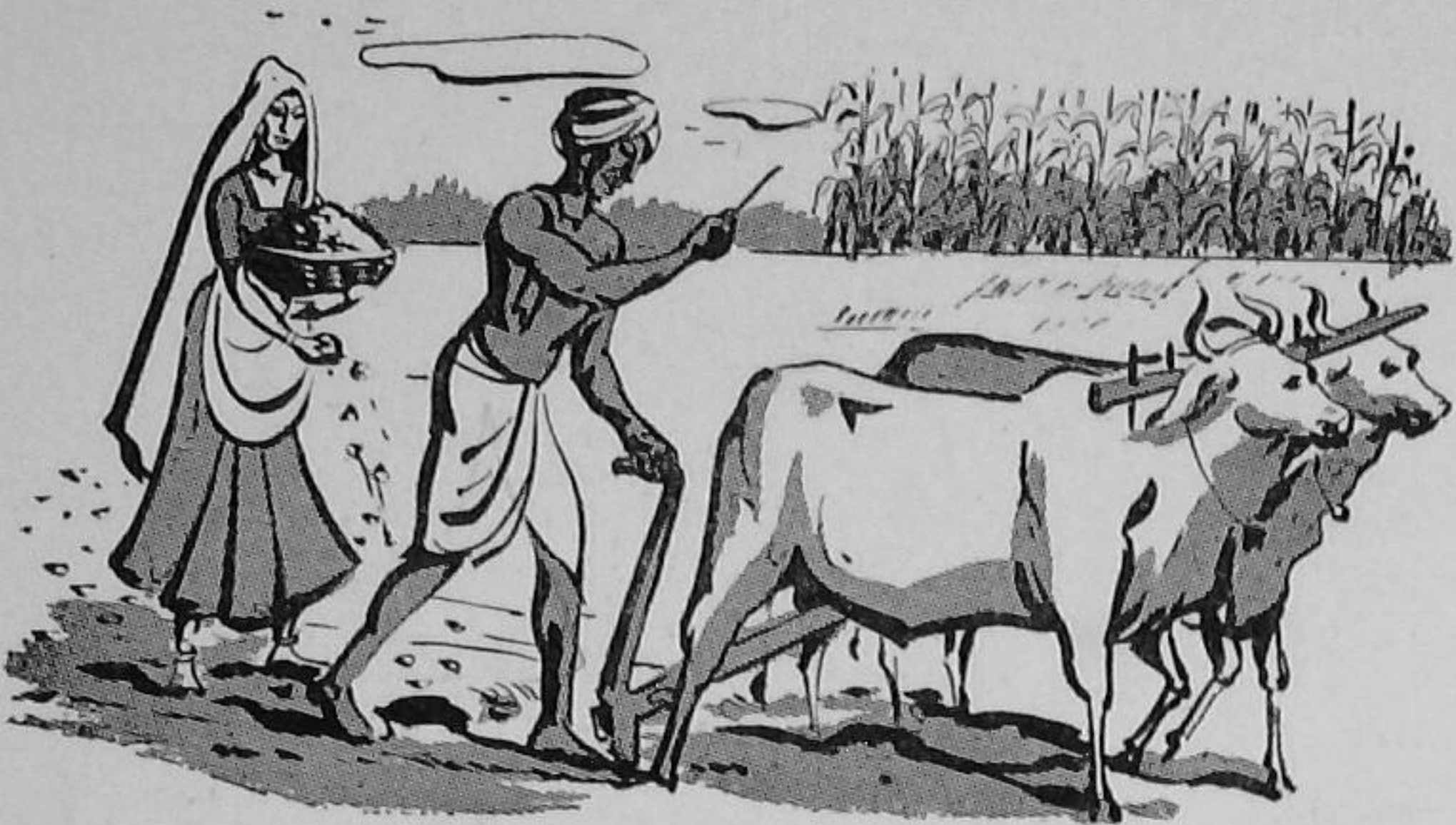
The above results and discussion conclusively show that mixed farming has several advantages.

(1) The cultivator and his family find an extra remunerative employment in their homestead. All idle time is usefully spent in the subsidiary occupation of tending cattle and producing fodders and feeds. The demo-  
ralizing influence of idleness on the members of the family is avoided.

(2) The fertility of the land improves by extra manuring and production of leguminous and other fodders for the cattle. This reduces the necessity for fallowing the land to help the soil recuperate. The leguminous fodder grown in rotation with other crops and manured with the extra manure now available enables the farmer to produce more from the land for himself and his cattle.

(3) An intensive use of the land is brought about by adopting intensive cropping to meet the fodder and feed





**Mixed farming enables a better use of draught animals**

requirements of the cattle and domestic requirements of grains, vegetables, etc.

- (4) The by-products of crop <sup>crop husbandry</sup> husbandry are more profitably consumed by animals to produce milk, which is the chief protective food for most vegetarian families in India. Thus, the members of the family get a more nourishing food and are able to maintain better health, so that they can put in better work and increase agricultural production.
- (5) In the <sup>monsoon</sup> monsoon season, the natural growth of local grasses provides useful <sup>fodder</sup> forage for the animals when maintained on the farm. This forage otherwise is sometimes not weeded out, which practice contributes to the lowering of crop yields, the forage itself going waste.
- (6) In times of stress, when prices of grains are low and it pays less and less to work on an arable farm, the subsidiary occupation supports the family. In the unirrigated tracts, milk production provides a support to the family when rains fail and crop yields are low.



- (7) The farmer is able to raise his draught animals on the farm and does not have to invest capital from his pocket. The dry stock is usually maintained on the fodder and the forage available on the farm.

In the final analysis, as a result of investigations conducted and observations made in India and elsewhere, it may be stated that considering the net remuneration per acre of the land held, per pair of bullocks and per adult member of the family of the holder working on the land, mixed farming is definitely superior to arable farming.

Most farmers are involved in debt and when compelled to replace their bullocks, have very often to go to money-lenders for a loan at exorbitant interest. This emergency does not arise with a farmer practising mixed farming, as he can have animals from his milch stock for the cultivation of his land. Incidentally, it may be mentioned that prices of bullocks have gone up so high these days that it is beyond the means of an average farmer to purchase them. Home-bred animals obtainable under a mixed farming system offer a simple way out of this difficulty.



**In times of stress, the subsidiary occupation will support the farmer's family**



## WHAT MAKES MIXED FARMING A SUCCESS

IT MAY be worth while now to highlight briefly some of the important factors which help make mixed farming advantageous.

Ghatge attributes the success of the Charotar farmer in Bombay State to the following :

- (1) he makes a choice of a more economic animal without being sentimental ;
- (2) he prefers purchasing a bullock to rearing his own which he finds uneconomic ;
- (3) he disposes of calves immediately after the weaning stage without bothering to rear them ;
- (4) he feeds them in stalls except in the three monsoon months, and thus he gets every bit of the manure he can ;
- (5) he disposes of the animals before they get too old ;
- (6) even in the case of bullocks, he prefers sending them to *pinjrapoles* and paying the necessary fees instead of feeding them at home.

From the above, it is evident that the Charotar farmer believes in business and not in sentimentalism. If a farmer maintains cows which have long dry periods and yield little milk on his farm only for the sake of keeping them because cows are considered sacred, he is bound to lose heavily. That is so because merely the manure obtained from them will not be commensurate with the cost of their maintenance, nor will the family of the peasant derive as much benefit from the consumption and sale of milk and milk products as is expected from mixed farming.

Farmers of western Uttar Pradesh, Delhi and the Punjab also believe in keeping high-yielding milch animals and in disposing them of when they become old and unprofitable. But quite a few of them do rear home-bred calves to replenish their draught



animals. The average Indian farmer is so poor that he can hardly purchase a really good bullock costing about Rs. 500 to 600. The only way he can have good draught animals for use on his land is to rear good home-bred calves. Of course, it is understandable that draught or milch animals when old are sent to *pinjrapoles* instead being kept on the farm. Sentiment of the society in which the farmer has to live has to be respected, but not to the extent of coming in the way of his progress.

The mixed farmer should keep only as many animals as he can conveniently maintain without taking recourse to purchasing food and fodder from the market.

He should conserve the maximum amounts of dung and urine available on the farm, turning them into good farmyard manure and compost. Only then will he be able to practise intensive farming and obtain high yields from his crops. If he does not do so, his income from the food and cash crops gets reduced. To engage the family fully all the year round, he should supplement his income with poultry-keeping, fish culture and bee-keeping.

To summarize, mixed farming implies :

- (a) a diversified farming of food and cash crops ;
- (b) rearing suitable dairy stock over and above the work-animals ;
- (c) adequate provision for cultivation of suitable forage crops in the cropping scheme ;
- (d) an optimal use of cattle manure and other farm wastes.

The cropping of the unit naturally becomes intensive and at the same time flexible within this broad objective. But it is self-sufficient and self-contained both in crop and animal produce in so far as the primary requirements of the rural family are concerned. The small size of the holding is no handicap for its success, and its benefits can be multiplied and magnified in larger



holdings. It is the best system of diversified farming that can be adopted in the limited small-holding economy.

Mixed farming, therefore, is one of the useful measures for increasing productivity of both livestock and farm crops. It can easily be adopted on a nation-wide scale not only in regions where the practice is well known (such as the western districts of Uttar Pradesh, Gujarat, the Konkan and Kerala), but also where a highly developed livestock industry is existing side by side with intensive farming practices.



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