DEPARTMENT OF ANIMAL HUSBANDARY AND VETERINARY SERVICES, KARNATAKA
BANGALORE

ECONOMICS OF PIG PRODUCTION

Economics of Pig breeding is a very vital problem and has been lately attracting serious attention of producers and extension workers alike and that is important too as one would like to know the returns he would get by undertaking this industry. Efforts has been made in this paper to workout the approximate expenditure and expected returns. Some suggestions have also been offered which are considered helpful in improving the economics of this industry. The economics of pig industry depends on:-

a) The cost of production of pigs
b) The return expected from sale of carcass, offals and manure etc.
c) The cost of production depends on the following factors mainly:-

1) The number of pigs produced per sow per year
2) The efficiency with which the pigs can convert meal into meat
3) Other expenses (fixed costs)

The above is an over simplification of the problem since each of the above factors can be successfully tackled by the pig producer through skill and good management.

The other costs of production are relatively "fixed" and will differ according to systems of raising. The fixed costs include labour, overheads depreciation, veterinary aid etc., Now let us examine each of those.

1. The number of pigs produced per sow per year:-

In a well managed herd one can expect 1.75 litters from a sow in a year each litter consisting of about 8 piglets. Accounting for 25 percent mortality in sucklings, one can hope to have about 10 weaners in a year. The cost of maintenance of sow therefore, shall be distributed on ten piglets[1] will be equivalent to the cost of 730 Kg. of feed mixture. In other words each piglet will share cost of 73 Kg. of feed.

In case, the farrowing index happens to be better than 1.75 or the litter size bigger than 8 or mortality less than 25% the farmer will get more piglets and this will bring down, the expenditure on each piglet from sows' account. Conversely if the producer gets smaller number of piglets from a sow, there will be greater distribution of cost of sows' maintenance on each piglet.

Cost of maintenance of boar:-

On an average, 35 to 40 litters can be expected to be produced in one year from a boar. The cost of maintenance of boar will, therefore get distributed on 35 to 40 litters.

2. The efficiency with which the pigs can convert the meal into meat:-

The feeding cost is the chief factor affecting cost of production. It involves about 75 to 80 percent of the total expenditure. If it gets under control and in proportion of output there is hardly any thing standing between breeder and prosperity.

[1] On an average a breeding sow consumes 2 kg. of the feed mixture per day. Therefore the amount which has to be distributed on ten piglets.

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The pigs excel all other farm animals in terms of their efficiency in converting feed into edible meat. Because of this and also because of greater efficiency in the utilization of food nutrients, they make much more rapid gains in proportion to their live weights. The amount of feed required per Kg. gain in live weight is lowest for young pigs and steadily increase as they grow older. Normally, in our country, a pig is marketed to factory when it is about 70Kg. body weight Assuming that the piglet was weaned at 12Kg. body weight, the pig gains 58Kg. from weaning to market. To produce this weight, the following quantity of feed will be consumed taking the feed conversion ration to be 1:4.

i) Before weaning the suckling pig will consume creep feed - 6 Kg.

ii) From weaning to 70 Kg. live weight the pig will consume feed - 6 Kg. 243.6 Kg. & 237 Kg.

3) Quality of carcass:-

The quality of carcass produceed has also an impact on market value. A good carcass should yield from 75 to 80 per cent of dressed weight. In ill fed pigs having poor conformation, the dressed weight obtained will be low and the carcass quality will also be inferior. The returns from such a carcass will also be lower, similarly, a cracass having more lean meat will bring better returns as compared to one having more fat.

4) Other expenses:-

The expenditure on other item (fixed costs) will work to about 20 per cent. Thus the cost of production of pig to pork Market has been calculated on feed mixture ranging in cost from Rs.50/- to Rs.90/- and presented in Table No.1

RETURNS:-

Returns are expected from the carcass, offals and manure of pig. The dressed weight from a well fed and high quality carcass is expected to be from 75 to 78 percent inclusive of head. Dressed weight without head comes to about 66 percent. Thus from a 70 Kg. carcass, we expect 46.0 Kg. of meat approximately plus head and other offals like heart, liver, lungs, stomach intestines etc., The cost of 46 Kg. meat as per market price of Rs.8/- per Kg. works out to be Rs.368/- The cost of head and offals will fetch Rs.25/- approximately. Thus the receipts from one carcass works out to be Rs.393/- per pig.

Approximately about a tonne of manure is produced by one pig in a year which brings an additional income of about Rs.60/- per pig.

Thus the total returns expected from one pig will be around Rs.453/-only.

Profit and Loss:-

From the foregoing data it would be observed that the breeder will get a return of Rs.453/- as against the cost of production worked out at various feed costs in table 1. It would be apparent from the above comparision that pig raising becomes uneconomical as soon as the price of feed mixture goes beyond Rs.90/- per quintal. The margin of profits when the feed mixture costs from Rs.50/- to Rs.90/- per quintal may be as follows:

The above profit have been worked out on the presumption that the cost of pork will remain at Rs.8/- per Kg.

Cost of Production per pig upto 70 Kg. Live weight different market Rates for Pork Production

Item	Feed Consumed	Cost of feed mixture when market rate is Rs.50/- P.Qtl.	Rs.55/- P.Qtl.	Rs.60/- P.Qtl.	Rs.65/- P.Qtl.	Rs.70/- P.Qtl.	Rs.75/- P.Qtl.	Rs.80/- P.Qtl.	Rs.85/- P.Qtl.	Rs.90/ P.Qtl
Expenses incurred		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1. On feeding a sow to produce on piglet	73 Kg.	36.50	40.13	43.80	47.45	51.10	54.75	58.40	62.50	65.7
2. On feeding a boar to produce one piglet	25 Kg.	1.25	1.37	1.50	1.62	1.75	1.87	2.00	2.13.	2.25
3. On providing creep feed to piglet till weaning	6 Kg.	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.0
4. On feeding one weaner to attain 70Kg Live weight after weaning	243 Kg.	121.50	133.65	145.80	157.95	170.10	182.25	194.40	206.55	218.7
TOTAL		Rs. 165.25	181.17	197.10	213.02	228.95	244.87	260.80	277.18	292.6
5. Other Expenses at the rate of 20%		Rs. 33.00	36.28	39.40	42.60	47.78	48.96	53.60	55.60	58.6
Total cost of production one pig		Rs. 198.25	217.45	236.50	255.62	276.73	293.83	314.40	332.73	351.3

Recently, however, a trend on production of prices of maize and ground-nut-cake has been noticed. Whether this trend would continue and if so to what extent is a different aspect. The situation however, should not dishearten or discourage us but it should provide stimulus to fixed ways and means to tide over the situation and allow the industry to flourish. The following suggestions are offered for consideration in this respect;

(1) Extensive use of the facilities of boars and sows of improved breed distributed by the Animal Husbandry Department to the Farmers.

(2) By improving the genetic worth of pigs through proper selection and systematic breeding at organised piggeries. The heritability estimates of growth rate have been recovered to be 29 percent while that for economy of gains at 31 percent indicating that if properly selected and bred such improvement may be made quicker as compared to litter size or piglets weaned whose heritability is low. Pigs are like machines the better they are generally, the more efficient shall be production.

Commodity	Parts	Market rate on 25.1.68	Cost
Maize	50 parts	81.00 per Qtl.	40.50
Wheat Bran	27 parts	32.00 per Qtl.	8.70
Ground nut cake	15 parts	50.00 per Qtl.	7.50
Fish meal	6 parts	100.00 per Qtl.	6.00
Mineral Mixture	1-25 parts	120.00 per Qtl.	1.50
Calcium Carbonate	0-7 "	22.00 per Qtl.	0.16
			64.36

In this way growth rate in pigs can be improved and food conversion ratio more efficient. This will decrease the cost of production.

3. The hybrid vigour generated by cross breeding may play an important role in the production of Commercial pigs quickly and economically.

Balance Feeding:-

4. It is necessary that pigs with good genetic material, are given adequate balanced feed for the genes to express properly. Nutritional requirement of pigs has been worked out in many countries and is known in terms of amino acid, minerals, Vitamins etc., It will not be difficult to compact a well balanced ratio , for pigs, keeping in view of their nutritional requirement.

Recently, emphasis is being laid on the production of a cheap ration for pigs, Here, it may be cautioned that cheap food is not always the most economical unless its conversion ratio also is superior, as a pig will consume more of it to enable it to produce required gain in live weight.

5. While selective breeding, judicious feed and provision of suitable housing may possibly be looked after by the breeders with the assistance of technical personnel, there are certain aspects which are beyond the scope of breeders. It is for the Govt. to come to the aid of the breeders in providing feed mixture at economic price and subsidise the cost if necessary. Even in advanced countries the pig industry is subsidised. In England this industry was subsidised by 39.7 million pounds during 1965-66. Actually in England a very close watch is kept by the Ministry of Agriculture over the

A margin of 20 per cent profit is also added to the cost of production and the Government fixes the price which the farmer should get for his pig. As soon as the pig is brought to the Factory, the Factory pays according to the cost of meat in the market. The gap, if any, in the price is paid by the Government. In this way, Govt. checks the increase in the price of pig meat in the market and on the other hand gives due profit to the pig farmer. The factory and the Ministry of Agriculture also pay premiums to better carcasess to provide incentive to breeders to produce better pigs.

In Italy the issue of subsidizing the pig industry made a news item in the papers. Italian farmers left about fifty squealing pigs on the road to protect against the low subsidy rates for pig Farmers and demanded higher Government, Assistance to make this proposition profitable. In Denmark, production is very much controlled and pig meat is the main foreign exchange earner for that country.

6. The other aspect where the State Government should come to the assistance of the Pig Breeders is the selection and provision of high quality breeding animals. In England, pig industry Development Authority is religiously engaged in helping the farmers to maintain proper records and improve the quality of pig Research on nutrition and carcass quality has been taken up on a large scale.

7. It is also essential that Training, Research and advisory service may be set up in each state for the guidance of the people engaged in this trade. It is therefore necessary that in India also the central or State Government may consider the possibility of making available feed at fair price to the breeders if necessary to subsidize the cost of mixtures.

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DEPARTMENT OF ANIMAL HUSBANDRY & VETERINARY SERVICES IN MYSORE, BANGALORE

MODERN PIG HUSBANDRY

PIG FARMING

Latest Trends in Swine Husbandry

Introduction :

The population of the cities and towns is increasing year after year due to industrialization, and concentration of several educational, defence and other institutions. Consequently the demand for all food stuffs has increased considerably while the production and supplies are inadequate. To meet the progressively increasing demand for food, every effort is being made by all agencies to grow more and more food through extensive irrigation, improved and increased supply of fertilizers and insecticides. Livestock breeding policies are being modified to augment milk and meat production.

Out of the food animals, sheep and goats are getting scarce, beef is mostly not accetable to the Indian Public on religious grounds and poultry meat is comparatively costly and hence out of reach for the common man. Under such conditions, pig, alone is the most useful and valuable animal which on account of its prolific nature, rapid growth, early maturity, letter size, food conversion efficiency. These are the most important economic factors in the pig industry. The pig excells all other farm animals in the efficiency with which it converts feed into edible meat. Pigs also yield a higher percentage of dressed carcass. A large proportion of the carcass is edible. Pork is richer in energy than other meat, because ofhigher content of fat and slightly lower percentage of water.

Other advantage of pigs in addition to their efficiency in food production, being prolific is that they do not require expensive buildings. Also they are especially suited to utilise feed such as dairy by products, garbage and, (vegetable garden waste) that might otherwise be wasted. For this reason, practically every farmer should raise some pigs to supply pork.

A sow, if properly managed, can be made to breed twice a year and drops from 8 to 14 piglets at each farrowing. The piglets grow quite quickly and under good conditions of feeding and proper care would attain in 24 weeks a weight of approximately 80 to 85 kgs. thereby giving a good return to the producer.

Unfortunately the pig industry has remained neglected still, partly on account of ignorance about the potentialities and qualities of this animal, and chiefly due to its being controlled and handled mostly by the people who kept them as scavengers.

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Pigs can easily consume by-products of cereals, wastes from agriculture farms, by-products of dairies and brewaries, and leftover from kitches, hostels and restaurants and usefully convert them into nutritious protein-rich food for human consumption. Hence farmers if they raise some pigs along with their cattle and chickens cannot only add to their income, but assist at the same time the nation on the food front in a significant way.

Breeds of Pigs :

There is no recognised breed of pigs in India. The indigenous white or black pigs commonly seen in villages are derived from the wild forest pig, after continuous domestication. The Desi "Sukara" has slightly arched back with long thick bristles directed upwards and backwards, a long face with narrow, almost pointed snout, convex belly, coarse skin and usually a hanging tail. This breed is a good graizer and is very hardy.

The slightly improved varieties now noticed in villages and in blocks are the breeds from large white boards and indigenous sows. The important foreign breeds of pigs can be classified as white breeds and coloured breeds.

Exotic Breeds :

(1) The Large White - Also known as Yorkshire due to its origion from the country of Yorkshire in England. This is the most popular breed in Britain and is also considered best for our purposes. It is very prolific, rapid grower, efficient food converter, has good milking capacity and grades much better in carcass quality.

A typical large white pig has a light head and jowl, short neck, pricked stand up ears, slightly concave face, large snout, level back, straight underline, at least 12 evenly spaced teats, short glossy hair and a curled tail.

(2) The Land Race - This breed was developed in Sweden and Denmark, and is superb for bacon purpose. The ears in this breed are dropping, and inclined forward parallel to the snout.

(3) Wessex Saddle Back - This is black, lop cared pig with a white belt extending from withers down to the feet on both sides. This is quite a popular breed in Britain and is good for bacon purpose.

There are various other breeds of pigs also found in Europe and America such as the middle white, the large black, the Berkshire, Tom worth, Hamshire, Essex Poland, China, Gloucester Oldspot but they need not be illustrated here.

Breeding and Management :

A gilt well fed and managed is usually ready for service at the age of 8 to 9 months. She should also be about 90 to 100 Kg in liveleight at this age. The heat period in a snow lasts

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2 to 4 days. Mating should be done after the first day of the onset of heat. Once service per male is quite enough. However, if there are only few sows to be bred, a service both in the morning and evening may be allowed to have better fertilization. A boar is fit for service at the age of one year and one boar is enough for breeding 15 sows.

Signs of Heat :

The female is off feed, wanders about to be close to a boar, mounts other sows, becomes usually docile and permits pressure on its back which is usually called "Haunch Test". There may be redness and swelling of the lips of vulva and frequent passage of urine in small amounts.

Mating :

It is advisable to take the sow to the boar and watch it being mated properly as sometimes the Pernis is directed in the rectum instead of vulva. Mating in sow, is not a quick process of hit and go as in cattle. A boar usually takes from 5 to 20 minutes to serve. If the sow does not return to service after 21 days, she is safely in pig.

Breeding Cycle :

The gestation period or pregnancy ranges between 112 and 116 days. Weaning, that is, separation of the litter from mother, is usually carried out after 8 weeks of suckling. Within 5 to 7 days after weaning, the sow normally comes again in oestrum, when she is remated. Thus the total time from conception to remating takes about 175 to 180 days. Hence a sow has two full breeding periods in a year, if properly attended and cared for.

Farrowing :

The im-pig sow, if possible, should be allowed some grazing daily. This will not only supplement her with nutritious greens but also keep her in good condition by providing adequate exercise

A week before she is due to farrow, she should be washed, scrubbed thoroughly, particularly in the region of the teats to remove any worm eggs sticking there and then put in the farrowing house. Adequate soft bedding such as paddy straw or wood shavings be provided in the pen for the coming young ones.

Birth of piglings is usually a simple matter, as compared to birth of lamps and calves and often the whole litter of 10 or 12 piglings is born within an hour or two. As soon as they are born, the mother cleanses them by licking and then they are upon their feet searching for teats to have their first milkfeed.

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After Care of the Litter :

After farrowing, the solied and damp bedding, should be removed and replaced by adequate clean straw. The placenta when expelled should also be properly disposed off. Quite a large number of piglings are lost during the first few days of their birth. The main causes of this mortality are cold, direct draughts, dampness of the house, insufficient milk of the mother due to inadequate feeding and crushing through over laying by the dam.

To avoid this loss, the sow should be well fed, particularly during lactation and latter part of gestation. The farrowing pen should be dry, warm, and well bedded with straw to keep the young ones confortable. Crushing and overlaying can be prevented by fitting guard rails in the pen along the sides. The following operations need be carried out after the birth of the litter.

(i) Teeth Cutting - There are eight needle-sharp teeth in the mouth of each pigling at birth, two on either side of the upper and lower jaws. They must be cut with a tooth-cutter. This practice prevents injuries being caused on the teats of the mother and also wounds inflicted by suckling piglets while fighting one another for teats.

(ii) Ear Marking - To identify pigs and record their future growth rates, it is essential to ear-mark them either by notching or tattooing. For notching small flaps of ear are cut with a notching machine at specific position.

Tattooing is carried out by punching numbers individually on the ears with tattooing ink and forceps. It is advisable to tattoo both ears, one on the inner side and the other on the outer.

(iii) Weighing the Litter - The litter must be weighed both at birth, at three and 8 weeks. This is important for studying growth rates, feed converting efficiency and to assess the milking capacity of the mother. A young pigling at birth weighs from 1.25 to 2 kg. and a good litter as a whole should weigh nearly 14 kg.

Creep Feeding :

The milk of the dam starts decreasing a month after farrowing thus it becomes insufficient for the growing piglings, whose appetite and thirst are on the increase. It is essential therefore, to provide some nutritious and palatable food in the creep from 3 weeks onwards to keep pace with the rapid growth of piglings and to ensure their growth unchecked. This feed, if possible, should consist of flaked maize, dry skimmed milk, white fish meal, molasses, and wheat bran. Adequate clean drinking water must always be available in the creep area.

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Weaning :

Weaning means separation of the young ones from the mother, when they start, leading an independent life. There are different opinions as to what age the litter be separated from the dam. In foreign countries early weaning is being practised at 5 and 6 weeks through supplementation of nutritious creep feeds. According to conditions as they are with regard to foods in our country, the best time to wean the litter is 8 weeks. There are a few important things which ought to be done at weaning as a routine.

These are :

(i) Weighing - Each pigling should be weighed individually with a view to study its later growth rate and feed converting efficiency. A good weather should weigh at 8 weeks from 15-18 Kg.

(ii) Castration - All surplus males (boars) not required for breeding may be castrated at weaning. It is even preferable to do this operation earlier at 3 weeks as the younger piglings are easily handled and the incision is to be small. It is a simple operation for which two persons are needed. One man is to hold the head and forelegs between his knees with belly upwards and grasp firmly the hind legs one in each hand. The operator then holds the scrotum with thumb and forefinger and gives a bold incision on it in the centre. The testicle is removed by pulling it out and an anaiseptic is applied. Healing of wound usually takes place in a few days.

(iii) Deworming - Worm infestation is quite common in pigs and it is a good practice to deworm pigs at weaning time. There are various types of worms found in pigs but the most common is the large round, worm, namely Ascaris. Piperazine is the most effective anthelmintic against this worm and must be administered in feed to all piglings at weaning time.

(iv) Swine Fever Vaccination - To safeguard pigs against this serious disease of swine causing enormous losses, it is essential to vaccinate all weaners with lapinised swine fever vaccine. This vaccine is quite safe to be administered at this age and affords satisfactory immunity for a number of years to the vaccinated stock.

Breeding record :

To improve the stock it is essential to keep a proper record of the performance of each sow such as date of service, number of the boar used date of farrow, number of piglings born, average birth weights, date of weaning, numbers weaned and the average weights at three weeks and at weaning. These records are a valuable aid in culling and selection of the breeding stock.

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Selection of the Stock :

Selection is based upon type and strain of the pigs and their breed conformation. For this purpose verify and check up the performance and progeny cards, birth record of growth rate and feed converting efficiency and decide accordingly. For body conformation points, look for good length, well developed hams, light shoulders and head, fine glistening skin, short glossy hair, level back, straight underline, twelve evenly spaced teats on both sows and boar and a curl in the tail. The stock should, of course, be from a disease-free herd.

Feeding :

Feed constitutes 80 per cent of the cost in pig production. This aspect should, therefore, be thoroughly understood by all persons involved in pig. Hence to make pig industry profitable raising. It becomes imperative to devise and compute the ration in such a way that it is as cheap as possible and has at the same time no adverse effect on the health and growth of the pigs.

Pigs unlike ruminants are single stomach animals and are incapable of digesting highly coarse and fibrous foods and thus need be fed concentrate rations for their upkeep and rapid growth. They can however, make considerable use of bulky foods such as grasses, tubers and roots during shortage of feeding stuffs as is the state in our country at present. But under these circumstances they will have slow growth rate. Effective use should be made of inferior cereals and their by-products not consumed by the human population.

The common ingredients used in pig ration are barley maize oats, rice polish, wheat bran, molasses, groundnut cake, linseed coks, fish meal, and bone meal. When compounding in rations one should bear in mind that the younger the pig, the higher must be the energy and protein contents of the ration and lower the fibre. As the pig becomes heavier, the percentage of protein can be reduced. To ensure economic use of foods preferably three types of rations for pigs need be computed.

TABLE - I

Ration for pregnant sows, nursing sows and weaners upto 40 Kg. live weight

	Ingredients	Composition (per cent)	Available Crude protein	Available Fibre
1.	Groundnut oil cake	15	6.00	1.05
2.	Linseed cake	5	1.40	0.30
3.	Fish meal	5	2.25	..
4.	Rice polish	20	3.00	2.00
5.	Wheat Bran	20	1.60	2.20
6.	Broken Maize	15	1.50	0.30
7.	Broken rice	20	1.20	0.10
	Total	100	16.95	6.15

TABLE - II

Ration for pigs above 40 Kg. live-weight to marketable weight, gilts, dry sows and boars

1.	Groundnut oil cake	10	4.00	0.70
2.	Linseed cake	5	1.40	0.50
3.	Fish meal	2	0.90	..
4.	Rice polish	20	3.00	2.00
5.	Wheat bran	25	1.92	2.64
6.	Broken maize	18	1.80	0.36
7.	Broken rice	20	1.20	0.10
	Total	100	14.22	6.30

TABLE - III

The quantity of feed to be fed to different classes of pigs may be as indicated below :

Age in months	Quantity required per day	Requirement from birth to end of period
0-1 month	nil	nil
1-2 months	0.50 kg	15.0 Kg
2-3 months	1.00 kg	45.0 kg
3-4 months	1.25 kg	85.5 kg
4-5 months	2.00 kg	
5-6 months	2.00 kg	187.5 kg
6-7 months and above	2.50 kg	337.5 kg
Adult boar	3.00 kg	

There are other foods which pig producers can economically make use of whenever available such as dairy by-products, left overs from canteens, hostels, army camps, hospitals and wastes from vegetable markets comprising carrots radish, cauliflower and cabbage leaves etc., etc.

Garbage :

The composition and feeding value of garbage vary greatly from place to place and tend to vary with the prosperity of the people. Garbage from public eating places is usually more nutritious than house hold garbage. This should be boiled for one hour and then a little quantity of wheat bran and fish meal may be added as protein supplement. Garbage is "messy" to

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feed, and it is difficult to keep the feeding area in sanitary condition. To do this two concrete feeding floors are required. They are used on alternate days and are thoroughly cleaned after each use. The refused garbage should be buried.

Housing :

Housing is the most controversial aspect of pig management. Some advocate elaborate buildings while others feel that ordinary open sheds and shades are an adequate protection from sun, rain and cold to pigs. Though pig by nature is an outdoor animal and does well under natural conditions yet under present day circumstances of pig husbandry some sort of housing accommodation is necessary particularly under extremes of climate in our country.

Housing requirements of pigs may be divided into four categories :-

1. Dry and in-pig sows
2. Sows with litters,
3. Weaner and fatteners,
4. Stud boars.

Dry and in-pig sows :

These animals are quite tolerant and need only an open enclosure made of barbed wire or pucca compound wall, 3½ feet high with a covered shelter 8' x 10' in the centre. Portable feeding troughs are provided in the open yard. Such an enclosure will be enough of 8 sows.

Sows with Litters :

This part of housing is very important as the new born certainly needs a dry, warm and comfortable accommodation. A farrowing pen of 8' x 8' is enough for both sow and litter, with an open yard preferably brick lined measuring 16' x 8'. It is best to have a central passage 3½ feet wide and farrowing pens and weaner. Pen on both sides to facilitate feeding.

Weaner and Fatteners Pens :

A weaner needs 5 to 6 square feet while an adult pit 8 to 10 square feet of floor space. Thus a pen measuring 12' x 8' is enough either for 16 weaner or 12 adults. It is advisable and economical to have both farrow and weaner pens under one roof on the sides of the feeding passage with open runs behind.

Boar house :

Stud boars must be kept separate one in each pen. A simple enclosure made of thick wire of pucca brick compound wall is quite enough with a shelter 6' x 7' at the back wall.

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Pig Diseases :

Pigs, like other animals are susceptible to quite a number of diseases which cause significant losses both direct and indirect to the pig farmer. The direct losses include the value of the animals and the cost of feed, etc., spend on rearing them, while the indirect is the resultant of poor growth and performance of the pigs that survive. These losses can, however, be prevented to a great extent through better sanitation, proper feeding and good care.

(A) Virus Diseases :

(i) Foot and Mouth Disease - This is one of the commonest contagious diseases of pigs and is communicable from cattle to pigs as vice versa.

The characteristic symptoms are fever, partial loss of appetite, lameness followed by erruption of vesicles on the feet which later burst leaving behind raw and red surface. The lesions are mostly confined to feet but they have been noticed oh the snout as well as in the mouth in some cases.

(ii) Swine Fever or Hog Cholera - This is the most serious disease of pigs causing enormous losses. This disease appeared in the country only a few years ago. The mortality rate is 90 to 95 per cent and all age groups are equally susceptible.

The clinical signs are dullness, loss of appetite, high rise of temperature, gumming of eye lids, purple discolouration under the abdomen and inner side of legs, staggering gait and death in about 7 to 12 days. Vomition is seen in some cases and some pregnant sows abort during the course of the disease.

The treatment lies only in the prevention of the disease. Restrict movement of pigs, isolate the affected ones; properly dispose off carcasses and thoroughly disinfect pig houses. All healthy stock should be got protected with lapinised swine fever vaccine. As a routine measure all young pigs at the time of feaning should be inoculated with this vaccine. It is essential to notify the local Veterinarian immediately, who will make arrangements for the vaccination of herd as also give advice on other control measures.

(iii) Virus Pneumonia - This is almost a chronic respiratory disease of pigs with symptoms of sneezing, dry non-productive cough, acceleration of respiratory movements, appetite almost normal but there is loss of condition with very poor growth.

No effective treatment is available. However, use of Sulpha drugs and broad spectrum antibiotics shorten the course of the disease and lessen its severity. Good management can play an important role in the control of this infection.

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(B) Bacterial Diseases :

(i) Pasteurellosis - This disease is usually secondary to some other infection such as swine fever, paratyphoid, or infectious pneumonia but primary infection has been noticed in individual cases with sudden deaths.

Chief symptoms are rise of temperature, discharge from eyes, complete loss of appetite the cough, difficult respiration, swelling on the throat region, frequent drinking of water in small quantity and inco-ordinating gait.

Treatment consists in giving larger doses of H.S. serum 25 to 30 cc. to effected animals. Immediate use of sulpha drugs and antibiotics gives good results. Affected carcass should be buried deep in the ground and premises thoroughly cleaned and disinfected.

(ii) Abortion in Sows - Where many sows abort or give birth to litters of dead pigs, contagious abortion due to Brucella organism is suspected. Abortion may also occur as a sequence of some serious disease like swine fever or as a result of some mechanica, injury or a deficiency of vitamine-A. Prevention consists of getting the breeding stock tested by sero-agglutination through a competent Veterinarian and disposing of the reactors for slaughter. Pregnant animals should be handled with are and should not be driven hard or crushed together.

(iii) Swine Paratyphoid - This disease is caused by Salmonella organisms and chiefly affects young pigs. Lowered vitality, poor nutrition and management predispose the animal to the disease.

Main symptoms observed are dullness, inappetence, fever, constipation followed by dirty yellow coloured offensive diarrhoea.

Treatment lies in giving broad spectrum antibiotics and sulpha drugs. Terramycin intramuscular injections give relief in about 75 per cent of cases, shorten the course of infection and lessen the severity of the disease.

(iv) Anthrax - It is caused by an organism named bacillus anthracis. The disease though not encountered in an epidemic form, has been seen to occur in individual cases. Apparently healthy looking animals drop dead show early putrefaction, and the carcass looks tympanic.

No treatment is possible as usually the animal is dead before any illness is noticed. The disease is communicable to human beings, hence all orifices of the carcass should be plugged and the carcass buried deep into ground. The pig house should be thoroughly sterilized by burning straw on the floor.

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(C) Parasites and Parasitic Diseases :

(i) Mange - The disease is caused by mange mites. It is quite common in pigs and is usually associated with unhygienic condition and low nutrition.

Affected pigs show itching scratching and rub the affected parts against hard objects. The hairs fall off and there is scale and crust formation. The lesions are usually confined to the root of the tail and ears.

Complete recovery can be effected by the application of sulphor oil, Ascabiol or 0.3 per cent solution of neguvon. Good management and proper feeding play a great part in the control of the disease.

(ii) Lice and Ticks - These blood sucking parasites are quite commonly observed in local pigs. They not only cause dermatitis and loss of condition but may act as carriers of diseases.

All insecticides like Gemmaxane, Negtvon and D.D.T. are equally effective in destroying this pest. To avoid this nuisence, pig stalls may be kept clean, and walls sprayed with one of these insecticides.

(iii) Worms in pigs - There are a number of parasites affecting pigs but Ascaris, the large round worm, is the most common.

For treatment piperazine is the drug of choice and should be given in a dose of 0.2 gm. per kg. body weight in feed. Pregnant sows should be thoroughly washed with soap and water before farrowing to remove any eggs sticking on their teats.

(D) Nutritional and other disorders :

(i) Piglet Anaemia - This condition accrues due to deficiency of iron in the pigs diet and appears in young piglings which are entirely dependant on mother's milk and have no access to the soil.

Clinical signs are diarrhoea, loss of appetite, pale yellow colour of the skin and poor growth.

Affected pigs should be dosed individually with an iron mixture made up of copper sulphate $\frac{1}{4}$ ounce and iron sulphate $2\frac{1}{2}$ ounce dissolved in a gallon of water, in a dose of 1 tea spoonful daily for a week. A single intramuscular injection with an antianaemia preparation such as inferon 2 c.c. per pigling is very efficatious. Provision of green food like berseem and cabbage leaves alleviates anaemic condition.

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CENTRAL POULTRY FARM, HESSARAGHATTA

A Scheme for 100 and 200 layer farm:

PREAMBLE: In rural parts of the Country multiple farming consisting of Agriculture, Dairying, Poultry Farming is considered more practicle way of supporting the rural folk. Under these circumstances a big poultry unit is not possible to be looked after by the farmer. He requires a small unit of 100 or 200 layers which he can manage besides conducting his routine agricultural operations and dairying activities. Therefore a scheme for starting a 100 layer farm is given below.

A 100 or 200 layer farm are small units and it will be considered as luxury if a separate labourer is appointed for the work. The farmer himself or the house wife or the children can look after the poultry unit.

Construction of poultry houses should be made using cheap and locally available materials.

Cost of land is not included in the scheme with a view that the farmer will be able to take up poultry farming on any piece of his waste land which is considered as unfit for cultivation.

No separate scheme is given for a 200 layer farm, because both the schemes are subjected to similar financial implications. A separate scheme will usually be essential forthe big farms of 500 or more layers units. To calculate the financial statements of 200 layer farm the figures given for 100 layer farm may be multiplied by 2.

P.T.O.

(ii) Avitaminosis - A deficiency of vitamins in the diet of pigs especially vitamins 'A' and 'D' may cause mal-nutrition resulting in stunted growth, staring cost, partial paralysis of hind quarters, blindness and general debility.

The feeding of properly balanced rations with a supply of greens access to pasture and are the best safeguards against vitamin deficiency. If that is not possible a daily dose of vitaminised shark liver oil may be given in a dose of ½ ounce per day per head.

(iii) Rickets - This disease generally affects young pigs and is due to deficiency of minerals particularly calcium and phosphorous and vitamin 'D'.

Affected pigs exhibit pain and swelling in the joints lameness and sometimes bent legs.

Treatment should be preventive rather than curative. The mineral content of the ration should be sufficient and where necessary small doses of shark liver oil may be added to the feed. Good management and proper feeding are sure preventives.

(iv) Lactational Failure in Sows - Many a time, a freshly farrowed sow either does not let down any milk at all or has very insufficient milk for the young sucklings. This consequently results in lossess of baby pigs on account of starvation.

Common causes are obesity excessive confinement during the pre-partum period, hot weather, poor ventilation, chilling, mastitis, metritis, retained placenta and hormonal imbalanced.

Sows during gestation should be fed individually and grazed on pasture if possible. Sudden changes in diet and over feeding should be avoided and farrowing pens should be well ventilated. Treatment with antibiotics for a few days coupled with anterior pituitary 2 cc. intramuscular has surprisingly a marvellous effect in restoring milk supply in some cases. High potency cortisons is also very efficacious and may be given for three days.

Sd/-
V.S. JANAKIRAM,
Piggery Development Officer,
Animal Husbandry and Veterinary
Services, Bangalore

SOME TERMS USED IN PIG PRODUCTION

1.	SOW	..	A female pig which has farrowed
2.	BOAR	..	An Adult entire kept for stud
3.	GILT	..	A female pig who has not yet farrowed
4.	STAG	..	A boar castrated after many services
5.	BARROW	..	A male piglet castrated while young
6.	FARROW	..	The act of giving birth in pigs
7.	LITTER	..	Young ones both male and female born at one time
8.	WEANING	..	Separation of litter from mother after suckling period
9.	CREEP	..	An enclosure for the young ones within the farrowing pen where the mother cannot enter
10.	PORK	..	Fresh pig meat usually from an animal slaghtered at 35 to 55 kg. body weight
11.	BACON	..	Cured sides of a pig slaughtered at 80 to 90 kg. body weight.
12.	HAM	..	Cured hind leg of a bacon pig.
13.	SAUSAGE	..	Minced pig meat along with some fat rolled in intestinal or synthetic casing.

DEV-11.4

GOVERNMENT OF KARNATAKA

DEPARTMENT OF ANIMAL HUSBANDRY AND VETERINARY SERVICES

State Poultry Farm
Hessarghatta,
Bangalore.

"MYCHIX" is a pure strain of white Leg Horn Breed specially bred for increased egg production and Egg Size at STATE POULTRY FARM, HESSARGHATTA.

Scientific Breeding Programme implemented since 1968 at the State Poultry Farm, has resulted in evolving a superior high yielding strain of White Leg Horn named as "MYCHIX".

"MYCHIX" has stood the keen competetion of the Random Sample Laying Tests conducted by Government of India from 1st to 6th tests. It has been the top bird in 6th Random Sample laying test.

"MYCHIX" has been the strain of choice for conducting experiments and improvement in other strains, due to its outstanding performance both at research stations and the field.

Disease resistence, early maturity, persistency in lay, good egg size and number (249 eggs for 11 months) are the outstanding features of this strain of White Leg Horn.

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GOVERNMENT OF KARNATAKA

STATE POULTRY FARM, HESSARGHATTA

'M Y C H I X'

For Egg Production

Sl.No.	Traits	Performence
1.	% Hatch on all Eggs set	90
2.	Mortality in 1st Week	1.5%
3.	Mortality up to 20 weeks	
	(a) Lymphoid Leucosis	Nil
	(b) Other causes	3.5%
4.	Feed consumption up to 20 Weeks	7.658 Kgs
5.	Average weight at Housing (18 Weeks)	1.22 Kgs
6.	Age at first Egg	143 Days
7.	Age at 10% Production	147 Days
8.	Age at 50% Production	178 Days
9.	Hen housed Production (11 Months)	239.9
10.	Hen Day Production (11 Months)	248.9
11.	Total feed consumption per Bird in Kilos from 20 weeks	44.68 Kgs
12.	Average per Day	134 Grams
13.	Kilos of feed used per 12 eggs	2.15 Kgs
14.	Kilos of feed used per kilo eggs	3.47 Kgs
15.	Average weight of Eggs laid	51.7 Grams
16.	Average Body weight of Pullets at the end of test	1.77 Kgs

Farmers can get their requirements of day old and brooded chicks directly from the State Poultry Farm, Hessarghatta or the Regional Poultry Farms, in the state.

Special concession of 10% extra at day old and 5% extra of brooded chicks are supplied free of cost to the farmers.

Sexed Day Old Pullet Chicks are sold at Rs.2-75 per chick and straight run at Rs.1-60

"MYCHIX" has been the bird of choice not only within Karnataka State but also in all the states in India where "Co-ordinated Research projects for eggs" are taken up. This is the bird of choice for the Scientific Breeding programme and strain cross work.

It is needless to say that it has reached a prestigeous position in the country, only on its merits.

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For further de-tails contact:
SENIOR ASSISTANT DIRECTOR
STATE POULTRY FARM HESSARGHATTA
BANGALORE (NORTH)562113.

Phone: 38377

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CENTRAL POULTRY FARM, HESSARAGHATTA

A Scheme for 100 and 200 layer farm:

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P.T.O.

DEV-11.5

POULTRY ADVISER

Dr. K. VISWANATHA RAO
B.V.Sc., N.D.P.H., P.G.(Australia)
Senior Asst. Director,
State Poultry Farm, Hesserghatta,
Bangalore.

ROLE OF YOUTH IN POULTRY DEVELOPMENT:

Agriculture is the backbone of development of our country. India lives in villages and any development programme without development of the village cannot contribute to the development of the nation. This is more true as far as poultry development is concerned. The father of all modern breeds of poultry is the jungle fowl, the bird to be seen even today in the villages of our country.

Despite all efforts made to improve the economy of India, much remains to be done since the part played by the people in villages is far from satisfactory. The main cause is lack of interest and know-how of the developments to be introduced. The aged could not be moved to overcome the old prejudices and religious faith which has stood against the developmental schemes being implemented. The only way left is to educate the youth and utilise the power of the rural youth to make development a real success. India has vast youth power which remains to be exploited for rural development. The present day problem of food shortage and protein deficiency could be overcome to some extent if these rural youths could be induced to take up scientific approach to the problems of more protenecous foods. Egg and chicken meat from the most important and unadultrated food of high calbre value known to us.

Even today the jungle fowl has its place in rural economy. The villager is still having the country fowls to look after his family needs for eggs and chicken meat. This could be exploited to maximum advantage of both the farmer and the country. The eggs produced from a country bird has better value and demand in these days also though it cannot compete with the exotic breeds in production of both meat and eggs.

From time to time several schemes have been initiated to improve the village flock of poultry with little success. The main reason is lack of co-operation from the villagers. This could be overcome if rural youths could be made to take up the projects aimed at development of poultry. The following are some of the rural poultry projects which could be implemented through rural youths who could be primarily trained at any of the State Poultry Farms in the techniques of poultry management.

EXCHANGE OF COCKRELS:-

The value of a good bull is well known to the villagers. The same principle applies for poultry also. Exotic breed cocks could be used for upgrading the village poultry. This is quite simple and effective.

A simple survey must be made to assess the number of country cocks available in the village. This is quite easy nowadays since the farmer is keeping this as a flock isolated in a compound or room as he is always afraid of thefts and predators. All such country cocks could be collected and sold away for table in the nearest city or town where there is always good demand for such birds.

With the same cost exotic breed cocks could be purchased from any of the State Poultry Farms and these cocks could be left with hens in the village. This would help in grading up the local breed. The hatching of eggs could be locally done using Broody hens. Such graded hens produced, will lay better eggs than their mothers and add more eggs to the income of the farmer at no extra cost.

This scheme can be accepted wherever N.E.S. or Taluk Boards have schemes for development of poultry. Rural youths have to take up interest in this scheme and restrict entry of country cocks coming into the village because the use of country cocks will spoil the programme.

This is a simple and fast way to improve poultry in villages.

Even with the advancement of science and technology with exotic breeds, rural poultry plays an important role in the economy of the country. Out of the total poultry population, still 60% are country birds. This number could be fully utilised with the help of rural youths.

REARING IN CONFINEMENT:

Experience and experiments have proved that with better feeding methods the egg production in country fowl could be improved considerably. Many of the eggs laid by the country fowl are lost or damaged since the necessary facilities for safe egg laying are not provided for the bird. This could be made simply by providing a nest and birds be enclosed in a shed type of construction. This shed could be constructed using all locally available materials like bamboos and palm leaves. A shed of 10'x15' could house as many as 50 to 55 adult hens. These could be fed using the balanced feeds now available in the market or could be made at village level by using poultry concentrates which are available now. The surplus grains produced by the farmer could be utilised for feeding poultry which in turn will lay more eggs for better profits.

This method should be made acceptable. A model small shed could be set up under Rural Youth Programme (N.E.S. Scheme can assist in this) and this model project could later on be copied by other farmers. Such backyard units raised in a village form pockets for better egg production.

Every year thousands of country fowls are wiped off due to outbreak of Ranikhet and Fowl Pox diseases which are harbouring the rural areas. Very little is known to the villagers that these diseases could be completely controlled and eradicated. The department has been able to produce effective vaccine which are supplied free for the benefit of the villagers. Rural youths could take up this project to protect country fowl from diseases. All that is needed is an organised method of periodical vaccination which the department does free of cost. This can save a least 60-75% of the mortality among village flocks. This needs no money but an effective team work which rural youth can take up.

Effective marketing had been one of the major handicaps in the economy. This aspect could be well organised at village panchayat, or service co-operative society level. The middleman who is making the maximum profits could be avoided. Service Co-operative Society under the leadership of rural youths can play an important role to get better price for the eggs produced.

Backyard poultry using improved breeds of poultry for better egg production have been a great success in Kerala State.

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Small Farmers Dev. Agency

This could be taken up in our State also. Massive support is being given in S.F.D.A., M.F.A.L. Projects wherein subsidy and loan are provided to start poultry units. These schemes could be implemented through rural youths. Much remains to be done in this. The begining has been made.

Production alone will not meet the requirements of a country. The utilisation of the produce is most important. The health of the youths and child depend upon the nutrition standards. This has been stressed in Applied Nutrition Programmes but had little effect. The effect of better feeding of poultry products on health and mental aptitude of people could well be stressed by organising camps by the rural youth to educate the people of the village. Rural youth have ample scope in this field.

For development of our country, achievements of science and technology should reach the village level. Their requirements are to be met. The only link between the rural and urban area is the rural youth, who has the/experience of urban area. His approach and action will certainly help for better progress.

/ background of rural area and has the

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MANAGEMENT PRACTICES AND ECONOMICS OF BROILER PRODUCTION

Procurement of Stock

Commercial Hybrid day-old chicks of superior quality available from the following commercial hatcheries:

(1) Arbor Acres Farm Ltd.,
P.C. General Hospital,
Telegaon, Dist, Poona.

(2) Hyline:-
Uday Hatcheries,
34, Shivajinagar, Sangli.

(3) Ranishaver:
Starbro Chicks, India
Poultry Farm, Vimala Building,
Bangalore-25.

(4) Poona Pearls "Anak Broilers"
225/9-A, Hadaps, Poona-28.

(5) UBRO Hybrids:
Poultry Farm, University of
Agricultural Sciences, Hebbal,
Bangalore-24.

(6) "Keggbro":
Komarla Hatcheries,
Old Tharagupet, Bangalore.

(7) Pilch Deklab,
P.B. No.4804,
Delhi - 110023.

(8) Thornber Studler Broilers,
Premier Poultry Breeders,
No-1, Keerthinagar, New Delhi.

Any of the above eight broiler chicks can be procured for broiler production. Advance booking should be made for procurement of day-old chicks.

Management Practices

Housing: The house built should be having good ventilation and able to maintain the temperature. If the old house is used, it should be thoroughly cleaned before the chicks are brought in.

Brooding equipment: Electric bulbs (4) hovers or bamboo basket with bulbs (4) may be used for brooding 200-250 chicks.

Feeders: G.I. sheet grill type feeders are durable and easy to clean and there will be less feed wastage. About 2 inches liner feeding space should be provided up to 10 weeks of age per bird.

Waterers: G.I. sheet waterers are the best for keeping water. In the early stage two of 2 litre capacity for every 100 chicks and when chicks grow two of 1 gallon capacity for 100 chicks may be used. In the beginning, a wooden board may be placed below the waterers to avoid falling of litter in the water.

Getting ready for the chicks:

(1) About 2-4 of dry absorbent litter (Paddy husk or saw dust) should be spread on the floor.

(2) Precaution to be taken to cover the litter with old newspaper for the first few days because the chicks are extremely hungry and may eat the litter material before they learn to know the feed to eat.

(3) Two days before the chicks arrive or to be brooded start the brooders to make sure they are in working condition to maintain proper heat required.

(4) Use chick-guard to keep the chicks confined to the brooders at least a metre away from the brooders. Chick-guard may be used upto 8 to 10 days.

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(5) Few hours before the chicks are to be brooded, water and feed should be kept.

(6) Waterers and feders should be placed at equal distance around the brooder.

Care when the chicks are received

(1) Chicks should be taken to the brooder house immediately.

(2) Care should be taken not to get the chicks chilled while transferring them from chick boxes to the brooder.

(3) Chicks are let down under the hover where the heat is there and to watch them few minutes whether they find their way to the water and feeders.

(4) During the first few weeks they should be looked after with utmost care.

(5) Giving extra attention at this time help them to grow vigorous, healthyand profitable broilers.

Brooder House Management

(1) Required a temperature control is very essential for good brooding.

(2) Approximate temperature to be maintained at the edge of the hover i.e., 2" off the floor is 95oF.

(3) This temperature should be reduced about $5^{o}F$ each week until the chicks no longer require artificial heat (for 4 weeks)

(4) It is very essential to see the chicks are comfortable for the first few days as their body temperature is not fullyregulated.

(5) Another important thing is to keep the room temperature of the brooder house aroung 70^{o} to $75^{o}F$ by covering the ventilators/ windows by gunny bags or plastic sheets.

(6) Feeding: First few weeks (0-5) broiler chicks should be given broiler starter mash having 22 to 23 per cent protein. After this period i.e., 6 to 10 weeks broiler finisher mash having 18 to 19 per cent protein should be fed. Feed wastage may be watched very carefully and can be avoided by filling $\frac{3}{4}$ of the feeders 2 or 3 times daily.

Vaccination: General practice of vaccination is as follows:

Ranikhet - Day old - First time with F strain vaccine.

Sixth week - Second vaccination F strain vaccine.

Fowl Pox - Fourth day - Pigeon - pox vaccination or 5th week fowlpox vaccine.

Prevention of coccidiosis: Coccidiostats like bifuran or Amprol feed additives should be used in the feed after two weeks of age as recommended by the respective drug manufacturers. Inspite of using preventive doses, if there is any out-break of disease, different coccidiostat other than used earlier namely Codrinal or Sulphemazathine should be used in the drinking water as recommended by the manufacturers.

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PROJECT TO PRODUCE 1000 COMMERCIAL BROILERS

Plan: 1,000 chicks will be started afresh bi-weekly, which will be ready for sale at 9 to 10 weeks of age. There would be 5 batches of 5,000 chicks during 3 months, with an interval of two weeks during which time cleaning of the pen etc., will be done. In a year, there would be 20,000 broilers raised from 4 lots of 5,000 each.

A. Expenditure:

1. Non-recurring:

(a) Building: 6,000 sq. ft. including store room at Rs.8/- per sq.ft. (Accommodation for five batches)	48,000-00
(b) Equipments:	
1. Brooders-floor 8 at Rs.200/-	1,600-00
2. Water fountain 50 at Rs.8/-	400-00
3. Chick feeders 4' length with grill 20 at Rs.20/-	400-00
4. Hanging feeders 40 at Rs.30/-	1,200-00
5. Miscellaneous	300-00
TOTAL (a+b)	51,900-00

2. Recurring:

(a) Cost of chicks 1,050 day old at Rs.2-40 each	2,400-00
(b) Cost of feed (starter & finisher) 4 tons at Rs. 1,450/- per ton	5,800-00
(c) Labour/man-power at Rs. 100/p.m.	300-00
(d) Cost of medication at 25 paise per chick	250-00
(e) Miscellaneous	100-00
(f) Cost of litter, electricity, water etc.,	400-00
TOTAL	9,250-00

B. Income

(a) Sale of 960 broilers (live birds) at Rs.12/- per bird	11,520-00
(b) Sale of empty gunny bags at Rs.1-50 each	60-00
(c) Sale of litter as manure 2 tons at Rs.100/- per ton	200-00
Total Receipts	11,780-00
minus Expenditure	9,250-00
N E T I N C O M E	2,530-00 / flock
Rs.2,530-00 x 5 flocks in a year	12,650-00
Miscellaneous and maintenance of building, equipment etc., per year	650-00
Net income per year	12,000-00

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NET INCOME PER BIRD Rs. 2-50

Suggested Feed Formulae for Broilers (in percentage)

Ingredients	Broiler starter (0-6 weeks)			Broiler finisher (6 to 10 weeks)		
	I	II	III	I	II	III
Yellow maize	50	40	35	53	28	35
Tapioca flour	--	10	--	--	15	--
Rice polish	13	12	28	11	20	28
Groundnut cake	13	10	23	14	10	13
Sesame cake	10	14	--	10	15	12
Silk worm pupae meal	5	--	4	5	--	3
Fish meal	5	10	6	3	8	5
Mineral mixture	3	3	3	3	3	3
Vitamin Premix*	1	1	1	1	1	1
Coccidiostat**	50g	50g	50g	50g	50g	50g
Neftin '50'	100g	100g	100g	100g	100g	100g

* 20g of vitablend $AB_2 D_3$ or Rovimix $AB_2 D_3$ to be mixed in one kg. of rice polish, or maize flour

** 50g of Amprol or Bifuran feed supplement

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THE ROLE OF CATTLE BREEDING AS A DEVELOPMENT TOOL IN RURAL AREAS

A brief analysis of the nature of the existing technology.

In the transfer of technologies to rural areas, it has been our common experience that when a technology demands a high level of capital investment and a wide contact with bureaucracy, industry and urban centres as preconditions for its adoption, the benefits are usually siphoned off amongst the already economically and socially powerful rural elite.

An argument often put forward in defence of such transfers is that a percolation effect takes place which benefits the weaker sections. The fresh inflow of investment helps in building up an agro-based industrial infrastructure which increases the employment potential. However, the rate of increase in the income of the rich and the poor is so disparate that the economic gap between the two is further widened. The poor become increasingly dependent upon the rich and less masters of their own destinies.

Our attempts at taking technology directly to the under-privileged groups have encountered tremendous obstacles. The rural elite, intent on retaining their stranglehold on a semi-feudal economy, fight tooth and nail against any drastic changes in the economic and social hierarchy of their society. The bureaucracy remains indifferent. Lack of finance inhibits investment and limits access to more remunerative markets. Industry often remains sceptical about the ability of such groups to successfully adopt a technology which demands proper management.

Let us examine this process although briefly and superficially at this stage, with reference to the technology of cattle breeding. A cross-bred cow can,

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in many ways, be regarded as a machine. It coverts fodder into more highly valued milk with an efficiency that earns a profit for its owner. If skillfully managed it can become a regular income source and capital accumulator for its owner. Seen in this light, a cross-bred cow in a village can be visualised as a cottage industry.

The collective experience of using this cottage industry as a development tool in rural areas has shown that the cattle breeding technology too is elitist. For example, with regard to capital investment, present trends in institutional financing put the cross-bred cow beyond the reach of the following categories : the small and marginal farmer, the landless agricultural labourer, the village artisan the petty shop-keeper and the tribals and adivasis dependant on forest produce for a livelihood. It would be instructive to reflect that these categories constitute over seventy percent of the rural population.

The sophisticated nature of this technology is further illustrated by the technological tie-ups it demands. Artificial insemination with frozen semen requires foreign collaborations for the supply of progeny-tested semen and liquid nitrogen containers for storing the semen. The intensive veterinary care demanded by a cross-bred cow brings in the pharmaceutical industry for the supply of veterinary formulations and preventive vaccines. On another level, when the market for milk is saturated, there is increasing pressure to convert milk into milk products like butter-milk powder, cheese etc. Industry provides the conversion technology. Rural areas thus become increasingly dependant on industrial expertise, technology and finance. This dependence soon siphons off a significant portion of profits for the maintenance of high-salaried dairy technologists and managers. Large marketing networks and intensive advertising campaigns to sustain and widen markets eat further into these profits. The ~~owner~~ progressively earns less for his efforts.

Given the more remunerative prices and greater demand for milk and milk products in urban areas, the phenomenon of rural areas dependant upon and producting for, urban areas soon becomes an unavoidable reality. In trying

to reach these markets fresh relationships have to be created with the bureaucracy of transport licensing and taxation officials and veterinarians.

Policy makers ignore another important aspect of cattle breeding. The large green fodder requirement of a cross-bred cow makes it necessary to convert the much valued land under cereal production to the cultivation of fodder and ingredients of concentrates. Expensive irrigation facilities and scarce fertilisers too are diverted. In the process there is a loss by a factor of about five in the total energy output per acre of land. The argument that milk contains essential proteins for bridging the protein gap in India is not valid. What we lack is sufficient calories, not protein. Milk has no special advantages over a combination of cereal and dal with regard to calory and protein content.

The large farmer and trader will, however, strongly lobby for the adoption of this technology. It is more remunerative and, therefore, in their interest. With their greater buying power they soon increase the demand for unnecessary consumer goods and thus perpetuate a pattern of industrial growth that is irrelevant and damaging for the weaker sections.

Are there alternative technologies available which can bring about an economic and social equalising effect in rural areas? Is there a possibility of making cross-breeding more appropriate and less dependant upon high finance and industrial and urban collaboration? Can one design and carry out experiments to test possibilities like :

i) converting marginal land into rain-fed pastures

ii) using liquid semen stored in coconut water or other cheap media in place of more expensive frozen semen

iii) evolving low-cost refrigeration techniques for milk storage to replace expensive chilling units

iv) Improving and rationalising local veterinary medicines.