GUIDELINES FOR SETTING UP A CATTLE DAIRY FARM

A. Why Dairy Enterprise?

1. Dairying forms an important livelihood activity for most of the farmers, supporting agriculture in the form of critical inputs, contributing to the health and nutrition of the household, supplementing incomes, offering employment opportunities, and finally being a dependable ***"bank on hooves"*** in times of need. Through dairying, the agricultural by-products can be gainfully utilised for feeding of dairy animals. The manure from animals provides a good source of organic matter for improving soil fertility and crop yields.
2. Dairying is an important source of income among the landless, small and marginal farmers and women in the rural sector. Since agriculture is mostly seasonal, there is a possibility of finding "***employment throughout the year"*** for many persons through dairy farming.
3. Subject to possession of high-yielding animals, optimum land availability and good sale rate of milk, a dairy farmer/entrepreneur can earn upto Rs 7000 per cow per month. Even more profits can be earned depending upon the managerial skills and "***value addition"*** of milk (e.g., through manufacture of milk products like khoa, curd, cheese, etc).
4. Dairy enterprise can also be taken up as a main occupation around urban colonies where the demand and price of quality milk is high.

B. Pre-requisites to Project Formulation.

A basic knowledge regarding dairying should be obtained from officers of Animal Husbandry Department/ registered veterinarian(s). An entrepreneur should visit local dairy farms and discuss the profitability of dairy farming. If the economic analysis leads the entrepreneur to conclude that the net income aimed at can be achieved, he should obtain practical training in dairy farming, even if he plans to keep labour at the farm. This will ensure efficient supervision.

C. Project Formulation.

1. A project can be prepared by the entrepreneur after consulting a registered veterinarian for ensuring technical feasibility and economic viability.
2. The project should include information about the topography of the land, livestock markets, availability of water, feed, fodder, veterinary aid, breeding facilities, marketing aspects, training facilities, experience of the farmer and any type of financial assistance available from the Government.
3. The project should also include information about the number and breed of animals to be purchased, their production performance, cost and other relevant input and output costs along with detailed description.
4. The animals must be insured.

D. Technical Recommendations for Cattle Dairy Farmers

Modern and well established scientific principles, practices and skills should be used to obtain maximum economic benefits from dairy farming. The major norms and recommended practices are as follows:

I. Housing:

A well-planned and adequate housing of cattle is an important component of efficient management of cattle. Important considerations include comfortable and durable accommodation for individual animals throughout the year, proper sanitation and arrangement for clean milk production within the parameters of economic feasibility. A dairy house is required in order to protect cattle from inclement weather conditions. It should include cow sheds, calving boxes, isolation cum quarantine box and sheds for young stocks. In Kashmir province, loose housing system is not advisable due to extreme weather conditions during winter.

The points to be taken into account before the construction of dairy buildings:

1. ***Topography and drainage.*** A dairy building should be at a higher elevation than the surrounding ground to offer a good slope for runoff and drainage for the wastes to avoid the creation of unsanitary environment within and outside the buildings. Flood plains, low lands, water-logged/marshy areas/bogs and areas having proximity to unhygienic places like dumping grounds should be avoided.
2. ***Soil type.*** Soil must be suitable for strong foundation. Marshy, clayey and sandy soils are not suitable. Loamy and gravely soils are best suited for building construction.
3. ***Exposure to the sun and protection from wind.*** As far as possible the long axis of the cattle house should be set in a manner so as to have the maximum benefit of insolation.
4. ***Accessibility.*** The dairy farm should have good road connectivity. Proximity of dairy farm to market and veterinary aid cum semen centre should be preferred.
5. ***Water supply.*** Adequate supply of clean water should be available.
6. ***Electricity.*** A modern dairy farm requires electricity for lighting, operation of electric equipments, etc. Utilization of solar energy in this regard is preferred.
7. ***Planned layout.*** The dairy farm should be constructed in a way that it is easily accessible to the feed stores, hay stacks, silos, etc keeping in view the accidents like fire to save the precious animals. There should be a provision of appropriate and comfortable accommodation for labourers.

IMPORTANT NOTE: A dairy farm of 10-cows requires an area of 25 kanals of land for cultivation of fodder crops. It is recommended that farmyard manure be converted into vermicompost which can serve as organic supplement for increasing the fertility of land.

a) **Cow sheds.** They can be arranged in a single row if the number of cows is upto 10 or in a double row if the herd is a large one. In double row housing, the dairy house should be so arranged that the cows either face-out (tail to tail system) or face-in (head to head system).

Plinth. Depending upon the topography of land, plinth should be 1-2 ft higher than the ground.

Ramp. It should be having a non-slippery surface and a gradient of 10 degrees for easy entry and exit into the shed.

Floor. The inside floor of the cow shed should be of some impervious material which can be easily kept clean and dry and must not be slippery. Grooved/corrugated cement concrete floor or brick floor is such a good example. The floor of the ***standing space*** should have a slope with a gradient 1 in 40 towards gutter. However, during winters proper bedding like paddy straw is recommended to keep the animal warm.

Walls. The wall should be made of bricks. The inside of the walls should have a smooth finish of cement (preferably white-washed) to prevent any lodgment of dust and moisture. As an alternative, the farmer can use mud plaster instead of cement. Corners should be round.

Roof. The roof of the cow shed should be of corrugated galvanized iron sheets. A height of 8 feet at the sides and 15 feet at the ridges is sufficient to give the necessary air space for cows. There should be hang over 3 ft beyond wall to prevent rain water from entering cow shed. Ceiling is not mandatorily required.

Manger. Cement concrete manger is recommended from the point of view of durability and cleanliness. A height of 1.5 ft (18 inches) for a manger is sufficient. The height at back of the manger should be kept at 2.5 to 3 ft. If need is felt to prevent cows from jumping over the manger, cast iron pipe may be used as a barrier. An overall width of 2 to 2.5 ft is sufficient for a good manger. A manger length of 2 ft per animal is sufficient. For watering, separate spaces between adjacent mangers for drinking water troughs (of approx. 20 liters capacity) with automatic water flow regulator (Ball cock valve) to ensure all-time water availability from the main supply are advisable.

Alleys. The central walking space/passage should have a width of 5 to 6 ft exclusive of gutters when cows face out and 4 to 5 ft when they face in. The central passage should show a slope of 1 inch from the center towards each gutter thus forming a crown at the center.

Gutter. It should be have a gradient of 1 inch for every 4 ft length to permit a free flow of liquid etc. Suitable dimensions are 8 inches width and a depth of 4 to 5 inches with a crossfall away from standing. The top of the gutter should be covered by removable iron grills. Dung will be manually removed by the farmer/labourer.

Doors. The doors of a single row cowshed should be 5 ft wide and for double row shed the width should be 6 ft. The height should be 7 ft in both the cases. All doors of the cow shed should lie flat against the external wall when fully open.

b) Calving room

Allowing cows to calve in the milking cowshed is undesirable and objectionable. It leads to insanitary milk production and spread of diseases like contagious abortion (brucellosis) in the herd. Special accommodation in the form of a separate, enclosed and well-ventilated room with an area of about 150 sq. ft. should be furnished to a parturient cow. It should have ample soft bedding material laid after proper disinfection.

c) Isolation cum quarantine rooms

Animals suffering from infectious diseases must be segregated from rest of the herd. Enclosed boxes of about 150 sq. ft. are very suitable for this purpose. They should be constructed at some distance from other sheds. There should be provision of feeding and watering space inside the room. Proper equipment for restraing the animal be provided, Always clean and disinfect the area before and after inducting animal(s).

d) Pens for Young Stocks

As far as possible, young calves should be kept close to the cowshed. A suitable pen(s) within the cow shed having wooden planks/iron grill partition of 3 ft height on the free side of the pen is provided. There should be provision of feeding within the pen for calves in the form of a continuous manger with manger length of 15-20 inches per calf with a manger height of 1 feet. Provision of water inside each calf pen in the form of a centrally placed and fixed water tank/container/trough is recommended. Calves can be classified into two groups depending on their age and accordingly be kept separately with covered space as recommended below.

Age of the Calf	**Covered Space Required (Sq. ft.)**
< 6 Months	25-30
> 6 Months	40-50

II. Selection, Purchase and Transport of Animal(s):

1. A decision about what breed one wants to keep depends on the resources available with the farmer and the suitability of a breed to the locale. A decision should be taken only after detailed discussions with the local veterinarian and should conform to the breeding policy of the State.
2. The animals should be procured from reputed breeding farms of the country with proper pedigree details (and other records like age, health, production, etc) and must have average milk yield of > 15 litres/day. It is advisable that animals purchased should have been born of Progeny Tested bulls. Local high yielding (average milk yield > 12 litres /day) cross-bred animals can also be purchased.

3. Buyer seller agreement on judicial paper should be signed wherein various parameters like age and production are mentioned. A health certificate from a veterinary officer should also be obtained.
4. Purchase of freshly calved animals in their second/third lactation is preferable.
5. All steps should be taken to avoid stress while transportation. Adequate space with provision of bedding like paddy straw (or stuffed mattresses made of it) and proper restraint should be provided. Feed, water and rest should be provided at regular intervals while transporting for long distances.
6. Identify the newly purchased animal by giving suitable identification mark (like ear tagging).
7. The induction of livestock be done in a phased manner so that the milk production of the farm remains at an optimum level.

III. Feeding/watering of Animals

1. The feed and fodder requirements vary from animal to animal in terms of age, level of production, pregnancy status etc.
2. Always feed the animals a balanced least cost ration comprising of good quality feeds and fodders in consultation with the concerned veterinary officers of Animal Husbandry Department.
3. Feed costs for milking stock can be reduced by feeding a greater proportion of roughage, preferably leguminous like Berseem, Lucerne, etc.
4. Give adequate green fodder in the ration. As far as possible, grow green fodder on your land. Cut the fodder at the flowering stage when there is maximum yield of digestible nutrients.
5. The guidance of the local veterinarian may be employed for preservation of fodder for use during lean periods (in the form of hay/silage) and fortification of poor quality straws.
6. Changing from one feed type to another type should be in a gradual manner.
7. Faulty feeding practices should be avoided as they can result in diseases like bloat, acidosis, metabolic problems, laminitis etc.
8. Half crushed grains are preferred for feeding instead of finely crushed grains.
9. The oil cakes should be flaky and crumbly.
10. Moisten the concentrate mixture before feeding.
11. Provide adequate vitamins and minerals either through fortified salt licks (preferable) or addition of mineral mixture to the concentrate ration.
12. Various feed ingredients can also be mixed to make total mixed ration (TMR). This ration can be fed in 3-4 equally divided parts in a day. This would reduce spoilage, selective feeding and increase the digestibility.
13. Ensure availability of clean water round the clock.

IV. Milking of Animals

1. Milk the animals two to three times a day.
2. Milk at fixed times.
3. Milk the animal in a clean place.
4. Sick cows should be milked at the end to prevent spread of infection.
5. As far as possible, milking should be done by the same person regularly who is well-trained for the purpose.

6. Milker should be free from any contagious diseases.
7. Wash the udder and teat with antiseptic lotions/lukewarm water and dry before milking. The milker should wash his hands with soap and water followed by antiseptic lotion.
8. Full hand milking followed by stripping should be adopted, for quick and complete milking. . Knuckling (thumb-in milking) should be avoided.
9. Dry hand milking should be practiced.
10. Milking should be completed in one sitting within eight minutes.
11. Post- milking teat dip should always be practised.
12. Before milking the next cow, the milker should always wash his hands with soap and water followed by antiseptic lotion to prevent spread of mastitis in the herd.
13. The animal should be offered green fodder after milking so that it remains standing for at least 45 minutes.
14. If milking machines are used, the manufacturers guidelines should be followed strictly.

V. Marketing of Milk

1. Milk pails/cans/utensils must be washed thoroughly with detergent followed with disinfectant solution and finally rinse thoroughly with clean water.
2. The drawn out milk be transported immediately to the nearest market keeping the time period minimum between production and marketing or can be stored for some time in a cold store.
3. Too much agitation of milk during transit must be avoided by providing some cushion to the milk cans and avoiding/ driving slowly on rough roads.
4. Transport the milk during cool hours of the day (i.e., during wee hours and evenings).

VI. Health Management

1. Parasitic control (Deworming, use of ectoparasiticides etc)

Type of Animal	**Deworming Schedule**	
Calf (upto 6 months)	10-14 days of age	Repeat Monthly
Calf (>6 months) and Adults		Repeat every 3-6 months
Pregnant Cow	10 days before and 45 days after expected date of calving	Repeat every 3-6 months

a) Deworming should be done strictly in consultation with the veterinarian.
b) To avoid drug resistance, do not administer the same drug repeatedly.
c) Withdrawal period for milk after deworming must be strictly adhered to as per manufacturer guidelines.
d) Spraying of cattle and shed with ectoparasiticidal solutions should be done strictly in consultation with the veterinarian.

2. Vaccination

S. No.	Name of Disease	Age at first dose	Booster dose	Subsequent dose (s)
1.	Foot and Mouth Disease (FMD)	4 months and above	1 month after first dose	Six monthly
2.	Haemorrhagic Septicaemia (HS)	6 months and above	-	Annually in endemic areas
3.	Black Quarter (BQ)	6 months and above	-	Annually in endemic areas
4.	Brucellosis	4-8 months of age (Only **female** calves)	-	Once in a lifetime
5.	Anthrax	4 months and above	-	Annually in endemic areas.

All type of vaccines should be stored at 4 °C i.e., putting them in the lower part of the refrigerator and ***never*** in the freezer.

Note: For post-bite prevention of rabies, the following regime should be adopted: 0 day, 3rd day, 7th day, 14th day, 28th day and 90th day (optional). The vaccine should be administered as soon as possible after the bite and the day of first vaccination is treated as day 0 and all other dates are counted from day 0.

Example: If first vaccine is done on 5th August (day 0), then the subsequent vaccines should be done on 8th August (3rd day), 12th August (7th day), 19th august (14th day), 2nd September (28th day) and 3rd November (90th day; optional).

3. Testing of animals for various diseases

Conduct periodic tests for Brucellosis, Tuberculosis, Johne's disease, Mastitis etc.

4. Quarantine

Keep the newly purchased animal(s) under observation for a period of three weeks and then mix with the general herd. Proper quarantine will protect the herd from diseases. One should attend to the newly purchased animal only after attending the herd. For lactating animals, milk the newly purchased animal separately and, only after milking all the other animals in the herd.

5. Isolation

In case of outbreak of contagious disease, immediately segregate the sick, in-contact and healthy animals and take necessary disease control measures.

6. **Keeping vigil**
   Be on the alert for signs of illness such as reduced feed intake, fever, abnormal discharge or unusual behavior. Consult a veterinarian for help if illness is suspected.
7. **Hygiene**
   a) Maintain a hygienic environment in and outside the shed.
   b) The carcass should be disposed off in consultation with the concerned veterinary officers of Animal Husbandry Department.
   c) Disinfect the shed in which any diseased animal is kept.
   d) There should be provision of an incinerator for disposal of bio-hazardous and non-biodegradable materials.
   e) Clean/ Wash/ Groom the animals from time to time to promote sanitation.
8. **Exercise**
   Give adequate exercise to the animals.

VII. Breeding Care

1. The onset of heat be ensured within 60 to 80 days after calving.

2. Observe the animals keenly for signs of heat so that they are inseminated at proper time.

3. If the animal does not come to heat after insemination, get it examined for confirmation of pregnancy between 1.5-3 months of insemination, depending on the expertise available.

4. Animals which fail to conceive after three consecutive inseminations or which fail to come in heat be got examined by concerned veterinary officers of Animal Husbandry Department.

5. For enhancing the efficiency of farming, the practicability of heat synchronization may be discussed with a veterinarian.

VIII. Care during Dry Period

The dry period is the ***most important phase*** of a dairy cow's lactation cycle. For safeguarding animal health and optimum performance in the next lactation, lactating animals should have an opportunity to rest and regenerate mammary tissue between lactations. During this phase, the cow and her udder prepares for the next lactation; hence any abnormalities during the dry period will have a negative effect on the cow's health and milk production after calving.

The length of dry period should be around 60 days and should start from completion of 7^{th} month of pregnancy. If animals have prolonged dry periods, they run the risk of becoming obese, experiencing obesity-related diseases and having difficulty in calving.

Due to the amount of milk they produce, the drying-off process is often more complicated for

dairy animals. Preparation for dry off should begin at least two weeks prior to the dry-off date with a significant change in the animal's diet. Reducing the energy content of the diet and feeding primarily a high-fiber diet will reduce the nutrients available for the animal to make milk; this is often all that is needed to reduce milk production to a level that makes dry off safe and simple. The milking should be stopped abruptly. Dry cow therapy for prevention/ treatment of mastitis may be done by the concerned veterinarian.

Care during Late Pregnancy

Usually a cow will be pregnant for a period ranging between 270 to 290 days after conception, averaging 282 days. Knowing expected date of calving is a "must" for taking all future care of the pregnant cows.

In handling cows in advanced pregnancy (i.e., after completing 7 months of pregnancy), care should be taken to prevent them from being injured by slipping on stable floors or by crowding through doorways, or by mounting cows that are in heat.

Do not feed calcium supplements in excess during advanced pregnancy as it may predispose the animal to milk fever. Anionic salts like ammonium chloride and magnesium sulphate or ammonium sulphate (50-100 g each/day) may be fed during last 3 weeks before calving in order to reduce the chances of milk fever in prone animals.

It is normal for the udder to become large and swollen just before calving. Special precaution should be exercised to see that sharp objects do not cut and injure the swollen udder.

IX. Care during Parturition

1. Symptoms that an animal is about to calve include swelling of the udder, swelling of the vulva and dropping away ligaments around the tall head. At this stage the cow should be housed in a calving pen.
2. The majority of domesticated animals require little or no assistance in the actual act of parturition, provided they are in a reasonably healthy and vigorous state. In most cases, during calving, the front feet of the calf appear first, then the head. Preferably the parturition be attended by a qualified veterinarian so as to deal with any problem cropping up.
3. During cold months, the cow should be kept warm to prevent her from chill and it is desirable to give her warm water to drink after parturition.
4. The expulsion of placenta should occur within 12 hours of birth. If it is not still expelled, call a veterinarian. When the afterbirth (placenta) has been discharged, it should be properly disposed under hygienic conditions. All care should be taken to avoid licking or ingestion of placenta by the cow.
5. There are always dangers that cows will develop milk fever, uterine prolapse and mastitis. The dairyman should remain alert for signs of these diseases and promptly seek help from a veterinarian. The early stage of milk fever is characterized by loss of appetite, scant faeces and excitability with fine muscle tremors over flank and loins. Later on, the animal is unable to stand up and lastly becomes recumbent, first with its neck turned to one side and then laterally. Eye reflex is also lost.
6. Feed the cow at first only bran mash moistened with lukewarm water to provide laxative effect. Some green grass may also be given. If the cow is in good condition at the time of calving the amount of feed during these two days does not matter. The amount of concentrates should then be gradually increased with the aim of reaching full expected milk production.

X. Care of Calves

1. The first hour after birth is the most critical period in the entire life of the new born calf (the golden hour).
2. Cleaning nostrils and mouth soon after birth helps the calf breathe better and helps prevent future breathing problems. The mother should be encouraged to lick the calf clean as it promotes circulation within the calf's body and prepares the calf to stand up and walk.
3. Tie the navel cord with a thread at a distance of around 2 inches from the base and cut the remaining cord with a clean and sharp instrument. Dip the navel (a simple smearing will not serve the purpose) in 7% or higher tincture of iodine solution and repeat after 12 hours. A poorly maintained navel is the gateway to serious infections.
4. A new born calf should be given 2 litres of colostrum within the first 2 hours of birth and 1-2 litres (based on size) within 12 hours of birth. A calf must receive adequate colostrum to protect it from diseases for the first three months of its life. Colostrum is the calf's "passport to life".
5. Many calves do not recieve adequate amounts of colostrum from their dams within the first few hours of life, and thus they may not receive adequate immunity. Hand-feeding new-born calves is recommended so that the farmer is sure about the amount of colostrum an individual calf receives.
6. If weaning is practiced, the calf should be taught to drink from the pail or nippled container.
7. Avoid overfeeding as it can cause calf scours/ diarrhea. Calves do not digest table sugar (sucrose) effectively and giving the same may worsen diarrhoea leading to more fluid and electrolyte loss. Glucose is hence preferred.
8. The calf should get colostrum for first three to five days @ $1/10^{th}$ of its body weight per day in divided doses. Then whole milk should be fed from sixth to fourteenth day. After that, whole milk may be substituted with skimmed milk, partially in the beginning and completely after two months. Skimmed milk is rich in protein but comparatively low in energy. Therefore, when skimmed milk feeding is introduced, an energy-rich concentrate mixture (milk replacer) should be given. Besides these, the calf may be started on good legume hay or early cut green fodder from second week onwards. This will stimulate rumen development and establishment of proper rumen micro-organisms and will enable the calf to adapt to cheaper roughage feeding at an early stage.
9. Protect the calves against inclement weather conditions, particularly during the first two months.
10. De-worming should be done within 10-14 days of age subsequently on a monthly basis up to the 6th month. When the animal is 3 months old, contact the veterinarian for vaccination.
11. Dehorn the calves around 4 to 5 days of age for easy management when they grow.
12. A calf takes few months till its rumen is fully developed. Until then, the calf is similar to a monogastric animal nutritionally. It will benefit from high quality protein. Apart from vitamins A and D, vitamins belonging to B-complex group are a nutritional necessity during this stage.
13. Group the calves according to their age.
14. Sell off extra calves not to be reared/ maintained for any specific purpose as early as possible.
15. The female calves should be properly reared. The feeding and management during the early stages of life greatly influences the future production.

16. Absence of foreign bodies like plastic bags in the environment should be ensured to avoid complications like intestinal obstruction which can prove fatal.

XI. Culling of animals

Follow judicious culling and replacement of animals in a herd. Chronic repeat breeders, old animals (after 6-7 lactations), chronic mastitis cases, animals testing positive for diseases like tuberculosis, Johne's disease, brucellosis, etc should be culled.

XII. Maintenance of records

It should be done on individual basis.

1. Daily Milk Record Register
2. Lactation Record Register
3. Daily Feeding Register
4. Fodder Crop Register
5. Breeding Register
6. Cattle History and Pedigree Sheet
7. Herd Health Register including vaccination and deworming history
8. Calf register
9. Financial record (cash book, stock book, etc.)

XIII. Other essentials in management

1. Regularity of care
2. Kindness in handling
3. Early detection and prompt treatment of bad habits/ vices (e.g., licking in calves, kicking, suckling, etc.)