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Management of Dairy Cow and Buffalo in Integrated Farming Systems Model in Marathawada Region of Maharashtra

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ABSTRACT: *Management is defined as an art and science of combining ideas for planned proceeding with available resources to produce and market a worthwhile product. India is basically an agricultural country. Livestock production is more impressive than that of food grain production. Land, labour, capital and organization are the basic resources available in the rural sector. These four factors of livestock production are roaped-in proportionately to augment the production of finished goods; namely milk, meat, pork, wool and multifarious products of commercial importance. These products follow their regular path-ways of processing, preservation, pricing and quality control. The role of dairy cattle in integrated farming systems is easily overlooked when dairying is examined through western eyes. Nevertheless, smallholders may not consider becoming specialist dairy producers until an assured market and the reliability of income is clear, and most appear to prefer to integrate the enterprise with other agricultural activities. This creates efficiencies in family labour usage, use of residues and farm nutrient recycling. The smallholder views dairy cows as fertilizer producers, power supply for cultivation, companions, users of easily grown or procured fodder, a self replacing crop, sellable assets from time to time, an acceptable livestock enterprise, and various other modes. Dairying in integrated farming systems is therefore a complex enterprise. Potential improvements and increased productivity from this enterprise can only come from a better understanding of the nature and extent of the interactions with the other sub-sectors, like crops and natural resources, economic benefits, as well as the impact on the livelihoods of small farmers and the environment. Research on these aspects provides major challenges for sustainable dairy development and integrated farming systems in the future.*

Key words: *Cow and Buffalo, Dairy, Integrated Farming Systems and Management*

INTRODUCTION

India is basically an agricultural country. It is likely to be so, in future to come. At present 70 per cent of Indians depend for their livelihood on agriculture. Out of total land holding 30 per cent is held by small and marginal farmers. They manage 80 per cent of total livestock in the country. Livestock production is more impressive than that of food grain production. The activity of livestock production is largely confined to the rural sector. Land, labour, capital and organization are the basic resources available in the rural sector. These four factors of livestock production are roaped-in proportionately to augment the production of finished goods; namely milk, meat, pork, wool and multifarious products of commercial importance. Each one of these products is of characteristics in nature. These products follow their regular path-ways of processing, preservation, pricing and quality control. The age-old format of conventional dairy management is being transformed into a more meaningful and scientific form, based on improved breeding, feeding, heeding, housing and health cover practices. India has the largest cattle population in the world (210 million). Their contribution to Indian economy accounts for about 26 per cent of overall agricultural production. India has a pride possession of a large livestock wealth, both in terms of number as well as diversity. This is endeavored, with the complexity, to sustain under hard conditions with scares resources. Conventional agriculture is known to cause soil and pasture degradation because it involves intensive tillage, in particular if practised in areas of marginal productivity. An integrated crop-livestock farming system represents a key solution for enhancing livestock production and safeguarding the environment through prudent and efficient resource

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use. The increasing pressure on land and the growing demand for livestock products makes it more and more important to ensure the effective use of feed resources, including crop residues. An integrated farming system consists of a range of resource-saving practices that aim to achieve acceptable profits and high and sustained production levels, while minimizing the negative effects of intensive farming and preserving the environment. Based on the principle of enhancing natural biological processes above and below the ground, the integrated system is the combination that (a) reduces erosion; (b) increases crop yields, soil biological activity and nutrient recycling; (c) intensifies land use, improving profits; and (d) can therefore help reduce poverty and malnutrition and strengthen environmental sustainability. (Gupta *et al.* 2012).

Livestock is an integral component of agriculture. It makes multifaceted contributions to the growth and development of the agriculture sector. Though the GDP rate of agriculture has shown a declining trend during recent decades, but has a large scope to sort-out the causes of lag-phage and corrects them. Livestock helps to improve food production and provide nutritional security. It generates income, employment and act as a cushion against crop failure. It provides drought power and manure inputs to raise the crop. It also contributes to foreign exchange through the export of animal products. By using crop residues as feed, livestock saves land for food production that would otherwise be used for fodder production. Additionally, livestock contributes to environment conservation, supplying drought power and manure and domestic fuel that save the use of petro-products.

METHODOLOGY

Management of Cow and Buffalo

Feeding

Immediately after calving, parturient cow and buffalo should receive mild laxative, palatable and energy giving feed. Usually 2 kg bran + ½ kg *jaggary* moistened with lukewarm water is given. The gruel prepared from *bajara* grains 1.5 kg + *jaggary* 0.5 kg + 125 gm of *soaf* + 125 gm of *balant sepu*, be mixed and the mixture be cooked on mild fire. After cooking, it should be allowed to cool, and thereafter be given to the cow and buffalo. The gruel feeding should be continued for first 3 days after calving and thereafter the cow and buffalo should be brought on normal feed. After 3 days of calving, a mixture of bran + GNC cake + *maize* bran be given.

Feeding should be planned to get peak production in about 40 days. Roughage portion of diet should include green legume and dry fodder to avoid possibility of bloat. Usually concentrate allowance is given at the time of milking which stimulate the process of let-down of milk. For cow and buffalo 1 kg of concentrate mixture per 2.5 and 2.0 kg of milk produced is given respectively in addition to maintenance allowance. The concentrate mixture should contain required quantity of important minerals like Ca and P, the feed is generally preferred than mash feed for milking animals.

Housing

Each cow and buffalo requires about 5 X 1.2 m barn space. Each cow and buffalo requires 1.5 X 1.2 m standing space and 0.6 to 0.7 m feeding space. The shed for milking animals should be at higher plane and near to the calf pen and milk collecting room. Flooring should be hard, impervious, non-slippery and with slope. House should be well ventilated and should protect the milking stock from rain, strong sunlight, wind etc. There should be separate manger for each cow, to allow measured quantity of ration which should not be carried away and shared by another cow.

Management

Milking cows and buffalo should be handled with kindness. Milking shed, milking parlour, cow and buffalo should be washed before milking. Grooming should be preferred 2 hours before milking to avoid contamination of milk with hair, dust, dirt or dung particles. Before milking udder should be washed with 0.1% KMnO4 solution and is wiped-off with a clean cloth. Gentle, rapid and complete milking should be done by adopting correct method. Avoid excitement of cow before and during milking. For safe milking secure hind legs with anticow kicking device or 8 shape loops and quick release knot, usually cows and buffaloes are milked two times a day. However in cow giving more than 10 liter of milk per day are milked three times a day. Follow regular milking time and uniform intervals between two milking. Animals should be inspected daily for any health problem. Periodical checking for mastitis should be done. Cows in herd should be tested each year for contagious diseases like Tuberculosis, John's disease and Brucellosis. Routine vaccination and deworming schedule should be followed. Regular spraying of insecticides should be practiced to control ectoparasites.

Exercise

Confining cows and buffaloes too long without exercise cause stiffness in their limbs and overgrown hoofs leading to possibly lameness. Exercise keeps animal fit, growing and maintains the appetite.

Integrated Farming System

Integrated farming is defined as biologically Integrated farming system which integrates natural resources and regulation mechanisms into farming activities to achieve maximum replacement of off-farm inputs, secures sustainable production high quality food and other products through ecologically preferred technologies, sustain farm income, eliminates or reduces sources of present environment pollutions generated by agriculture and sustains the multiple function of agriculture.

RESULTS AND DISCUSSION

Objectives of IFS

Efficient recycling of farm and animal waste, Minimizing the nutrient losses, Maximizing nutrient use efficiency, Adoption of efficient copping systems and crop rotations, Complementary combination of farm enterprises.

Advantages of IFS

Productivity, Profitability, Sustainability, Balanced food, Environmental safety, Recycling of waste, Saving energy, Adoption of new technology, Money round the year, Availability of fodder, fuel and timber, Employment round the year, Agro-industries, Increases input efficiency, Standard of living and Avoid degradation of forest.

Allied Enterprises of IFS

Dairy farming, goat farming, poultry farming, ducks, turkey rearing, pigeons for meat, japanese quall, piggery, rabbit farming, bee keeping, aquaculture, sericulture and mushroom cultivation. .

Dairying in Integrated Farming Systems

Types of Integrated Systems

Two broad categories of integrated farming systems are identified:

1. **Systems combining animals and annual cropping:**
   i. Systems involving non-ruminants, ponds and fish
   ii. Systems involving ruminants
2. **Systems combining animals and perennial cropping**
   i. Systems involving ruminants
   ii. Systems involving non-ruminants

Economic Importance of Animals

It is important to keep in perspective the economic role of animals in an integrated farming system. There are four broad advantages:

1. Diversification of resources and reduction in socio-economic risk
2. Promotion of linkages between system resource components (land, water and crops)
3. Generation of value-added products (e.g. utilisation of fibrous crop residues to produce meat, milk and fibre), and
4. Contribution to sustainable agriculture and environmental integrity.

Major Constraints to Dairy Production

In most small farm situations, land is a limiting factor, but small farmers try to maximize production through diversification of the available resources and efficient use of low cost inputs. Within an integrated system where dairying is an important component, there are two major constraints to production, firstly the availability of improved genotypes and secondly, feeds and nutrition.

Concerning the availability of improved genotypes, cattle crossbreeding programs in many countries have lacked co-ordination and have been further constrained by problems of infertility, instability of the crossbreeds and inefficient artificial services at the farm level. The level of exotic blood in the crossbreeds, mainly Holstein Friesian, is highly variable, and ranges from 25-75 per cent in small farms. The overriding issue is inadequacy of numbers and their instability, resulting in inability to intensify and expand commercially. Constraints related to feeds and feeding are as follows:

Feed Resources and Nutrition

The availability and quality of feed resources and efficient nutritional management is the principal constraint to dairy production. This was the case in an assessment of livestock research priorities for crop-animal systems in rainfed agro-ecological zones of nine countries in South East Asia (Devendra *et al.* 1997). The problem is also exacerbated by the higher

nutrient demand of improved dairy animals, for example Holstein Friesian crossbreeds, for milk production. The feeds available include grasses and forages, crop residues, agro-industrial by-products (AIBP) and non-conventional feed resources (NCFR).

Priorities for use of AIBP and NCFR

Priorities for efficient use of both animals of agro-industrial by-products (AIBP) and non-conventional feed resources (NCFR) in Asia.

Supplements and supplementation

A variety of supplements exist that can be used for feeding dairy animals. These include oil meals and cakes as well as leguminous tree forages such as *Leucaena* and *Gliricidia*. Purchased concentrates (mainly energy and proteins) are expensive and their use can only be justified in relation to six factors:

i. Scarcity or inadequacy of dietary nutrients for milk production (quantity and quality)
ii. Plentiful supplies of AIBP and NCFR
iii. Restriction in energy uptake imposed by bulky roughages
iv. Relatively low price of alternative mixed feeds, home grown or purchased concentrates
v. Increased lactation length and also persistency, and
vi. Increased milk yield where monetary value is greater than the cost of the concentrates required to produce it.

Nutritional Strategies

Feeding and nutrition represents the principal constraint to production and strategic intervention is a most important means to increase productivity from goats. The situation has recently been reviewed in depth. (Leng and Devendra, 1995) and involves the following approaches:

1. Intensifying the use of crop residues which include:
   i. Improvement of potential digestibility
   ii. Strategies to enhance rumen function
   iii. Manipulating net rumen microbial growth
   iv. Provision of by-pass nutrients
   v. Demonstration of profitable responses
   vi. Ensure post-production facilities for efficient marketing.
2. Enhancing the utilisation and digestibility of straws through alkali treatment.
3. Strategic supplementation.

In view of the immediate benefits associated with improved feeding, several studies in various countries have demonstrated good results and have been reviewed (Devendra, 1993). More recent examples are reflected in the results from using Zebu and Shorthorn cattle in Tanzania, crossbred Malgache Zebu cattle in Madagascar and crossbred Holstein Friesian cattle in India and Nepal.

IDEAL MODEL FOR MARATHWADA REGION OF MAHARASHTRA

Dairy (Milk production)

Size of the animal unit – 2 milch animals (1 buffaloes + 1 cow or 2 buffaloes as per choice of the family) & their young ones

Economics of Milk Production

1. Animal unit production costs (Fixed + Recurring)

a) Fixed cost :

i) Purchase cost of the animals:

One buffalo = Rs.60,000/-

One Holdeo (HF X Deoni) crossbred cow = Rs.45,000/-

Total cost of animals = Rs.1, 05,000/-

ii) Miscellaneous expenditures including milking utensils and other petty items during initial establishing phase = Rs. 5,000/-

Total (a) = Rs. 1,10,000/-

b) Recurring expenditure

i) Concentrate mixtures = Rs.36,160

@ 4kg/day/animal x two animals x265 days @ Rs 18/kg

ii) Dry period ration = Rs.7,200

@2kg/day/animal x two animal x 100 days x Rs.18/kg

iii) Dry fodder/straw = 38.0q x Rs.300/q = Rs.11,400

@ 5kg/day/animal x two animal x365 days

iv) Green fodder =Rs.19,875

@25kg/day/animal x two animals x365days x Rs.0.75/kg

v) Mineral mixture = Rs.2375

@50 gm/day/animal x two animals x 365 days x Rs.65/kg

vi) Medicines and other miscellaneous = Rs.5, 000

vii) Cost of vermicompost preparation = Rs.10,800

Total b) : = Rs. Rs.92,810

Total cost of production = Rs.1, 08,310

2. **Production from dairy animals:**

   i) **Milk production**

   Buffalo – At an average milk production of 8.0 liter per day = 2120 liter X 265 days milk period

   Market value @ Rs.28.0 per liter = Rs.59, 360

   Holdeo cow - At an average milk production of 12.0 liter per day = 3600 liter X 300 days milk period

   Market value @ Rs.25.0 per liter = Rs.90,000

   ii) Young ones of animals –Two @ Rs.5000/calf = Rs.10,000

   iii) Vermicompost 60.0 q @ Rs.500 per quintal = Rs.30,000

3. **Gross returns from dairy unit =** Rs.1,89,360

4. **Net Profit** (Gross returns Rs.1,89,360 - 81,050/year Cost of production Rs.1,08,310).

CONCLUSIONS

The role of dairy cattle in integrated farming systems is easily overlooked when dairying is examined through western eyes. Nevertheless, smallholders may not consider becoming specialist dairy producers until an assured market and the reliability of income is clear, and most appear to prefer to integrate the enterprise with other agricultural activities. This creates efficiencies in family labour usage, use of residues and farm nutrient recycling. The smallholder views dairy cows as fertilizer producers, power supply for cultivation, companions, users of easily grown or procured fodder, a self replacing crop, sellable assets from time to time, an acceptable livestock enterprise, and various other modes. Dairying in integrated farming systems is therefore a complex enterprise. Potential improvements and increased productivity from this enterprise can only come from a better understanding of the nature and extent of the interactions with the other sub-sectors, like crops and natural resources, economic benefits, as well as the impact on the livelihoods of small farmers and the environment. Research on these aspects provides major challenges for sustainable dairy development and integrated farming systems in the future. IFS approach not only fulfils the household needs but enrich diet of human being and animals both and simultaneously keep the people away from the hazards of residual toxicity of the chemicals being used in agriculture on a large scale. Further, diversified nature of the model provides huge employment opportunity for unemployed rural youths. Economic and livelihood analysis of the system revealed that beside household food and fodder security.

REFERENCES

Devendra C. (1993), Feeding and Nutrition. *Proceedings* Dairy Farming in Asia, *Asian Productively Association*, Tokyo, Japan. pp. 65-105.

Devendra C., Thomas D., Jabbar M.A. and Kudo H. (1997), Improvement of Livestock Production in Crop-Animal Systems in the Rainfed Agro-ecological Zones of South East Asia. ILRI (*International Livestock Research Institute*), Nairobi, Kenya. pp 107.

Leng R.A and Devendra C. (1995), Priorities and Direction for Research for More Effective Use of Feed Resources by Livestock in Asia. In: Devendra C. and Gardiner P. (eds), *Global Agenda for Livestock Research. Proceedings of the Consultation for the South-East Asia Region, IRRI, Los Baños, The Philippines, 10-13 May 1995*. ILRI (International Livestock Research Institute), Nairobi, Kenya. pp. 25-44.

Vinod Gupta, Pradeep Kumar Rai and K.S. Risam (2012), Integrated Crop-Livestock Farming Systems: A Strategy for Resource Conservation and Environmental Sustainability. *Indian Research Journal of Extension Education, Special Issue*., **49** (II).