



Analysis of livestock feed management under traditional and improved farming system among tribal farmers of Manipur

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ABSTRACT

The livestock sector plays an important role in the rural economy of Manipur. To ensure improved productivity, it is necessary to augment and secure feed resources through short and long term planning. Therefore, livestock feeding management is an integral component of livestock farming. The present survey was carried out at Chandel, Churachandpur and Ukhrul hill districts of Manipur during 2013-14 to 2014-15. A total of 90 farmers were surveyed for this study. In traditional farming system, farmers solely depend upon the locally available feed material as compared to IFS in which feed supplements are also being used. Simultaneously, under TFS farmers are not aware about vaccination, while farmers under IFS are more aware and careful about medical treatment at birth and disease occurrence in livestock. The higher gross returns, net returns and B: C ratios were due to more production of economical products in respective livestock components of IFS as compared to TFS. The locally available feed materials should also be supplemented by balanced nutritional feed with proper medication and better management in improved farming system.

1. Introduction

The livestock sector plays an important role in the rural economy of Manipur. Improvement in livestock production is an important pathway for increasing the income of marginal and small farmers and landless labourers. Therefore, livestock feeding management is an integral component of livestock farming. However, crop-residues from food-feed cereals such as rice, coarse cereals, pulses and legumes constitute 45-60% (on dry-matter basis) of total feed fed to large ruminants in India (Rao and Birthal, 2005). In the dry months, until the onset of rains, stored crop residues are the only feed source. Besides crop residues, cultivated green fodder crops, grasses from CPRs (Common Property Resources), pastures, forests wastelands, and fallows and Agro-industrial by-products are other important sources of feed (Kelley and Parthasarathy Rao 1996, Parthasarathy Rao and Hall 2003).

The cultivation of green fodder crops is low and largely restricted to the irrigated tracts and peri-urban areas. At the all-India level, less than 5% of the land area is under fodder crops (Kelley and Parthasarathy Rao 1994). In Manipur, there are various types of feed stuffs available for the livestock feeding. These feedstuffs can be grouped into different classes on the basis of bulkiness and chemical composition. However, no two feeding stuffs are alike in the composition and characteristic, but in practical feeding, substitution of one feeding stuff is made with another depending upon the market price and availability in a particular region. Therefore, it is necessary to know the categories of the feeds within which substitution are justified for the feeds having similar nutritional properties. Roughages are the feeding stuff which are bulky and contain more than 18 % of crude fiber. They are relatively low in concentration of energy yielding nutrients. The roughages are straw, stover, green fodders, hay, silages, etc. Concentrates are less bulky and, therefore, contain less crude fiber (below 18%). They are rich in energy yielding nutrients.

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A complete feed required for livestock cannot be provided from the limited feed sources available in villages. Though, various leguminous and fodder sources available in locality, are inadequate to supply all essential nutrients and minerals to the livestock. Livestock rearing relying totally on concentrate feed may not be economical because of higher market price of raw materials. So, alternate complete feeding system has to be explored for least cost livestock rearing. This is very important for the livestock health, for their generation as well as for healthy livestock product, which is consumed by human beings mainly as second-cycle produce, in the form of meat, eggs and dairy products. Feed shortages, notwithstanding, considerable potential exists to increase production levels of milch and beef animals by addressing the problem of imbalanced nutrition. The shortage in livestock production is due to traditional farming and non-adoption of recommended technologies in improved farming systems. Therefore, we have conducted a survey in tribal populated areas on comparative study of traditional and improved farming practices among the tribal farmers in hilly Regions of Chandel (Chandanpokpi and Chandel Khullen), Churachandpur (Vazing village) and Ukhrul (Ramva village) districts of Manipur.

2. Materials and Methods

Manipur lies between 92°58'E to 94°45'E longitude and 23°50'N to 25°42'N latitude. Altitude varies from 750 to 3114 m above mean sea level draining from North to South. Out of total geographical area of 22,327 sq km, 90% area is under hill tracts and rest is valley. The temperature varies from 0 °C in winter to 36 °C in summer months. The study was conducted in the Chandel (Chandel Khullen and nearby village), Churachandpur (Vazing and nearby village) and Ukhrul (Ramva and nearby village) hill districts of Manipur during 2012–13. A total of 90 farmers in each district, with a cluster of thirty five farmers for improved farming systems (IFS) and thirty five for traditional farming system (TFS) were surveyed for this study. The average holding of each farmer was 0.64 ha in Chandel (Chandel Khullen), 0.65 ha in Churachandpur (Vazing village) and 0.87 ha in Ukhrul (Ramva village). In all three districts, commonly piggery, poultry, duckery, goatery, dog rearing and dairy were prevalent among the tribal farmers (Table 1). The locally available feeds for feeding of livestock were banana stem, Colocasia shoot, paddy straw, Eichhornia and household waste. But under improved farming system, farmers are aware about the feeding management for better health of livestock. Besides locally available feeds, maize grain, broken grain, rice bran, starter feed (Piggery and poultry), pedigree feed (Dog) as

well as feed supplements (minerals, mineral mixture, probiotics *etc.*) are given to the livestock under IFS. During the study, we found that farmers under IFS were vaccinating animals to protect them from various chronic and zoonotic diseases. But, under TFS farmers were unaware about the importance of vaccination. During the study period, the multi-disciplinary scientific personnel from ICAR Manipur Centre visited the farmers' household on pre-scheduled time and collected necessary information from interviews using structured questionnaires. The interviews were conducted individually as well as in triangulation with the respondents. However, while interviewing in the groups, participant observation method was also employed to observe the farmers' perceptions and recording knowledge on profitability of different livestock feeding under comparative farming systems. Several visits in the rural areas were conducted to collect the information and verification of these practices. The data on cost of different inputs and return from outputs for different systems (TFS and IFS) were also recorded for each farmer. The data collected the outcomes of findings.

3. Results and Discussion

3.1 Feed management

Livestock based farming system is dominant among the tribal farmers of Manipur. Livestock, especially pig and poultry, is a key source of livelihood among the rural families and provides food for consumption, sources of income and capital and socio-cultural needs. Scientific livestock management is a profitable venture because of superior feed conversion ratio, faster growth rate, short generation interval and high proliferation in livestock (Yadav *et al.*, 2013; Ansari *et al.*, 2013; Ansari *et al.*, 2014).

Table 1. Animal breeds under different enterprises

S. No.	Components	TFS	IFS
1.	Piggery	Local Breed	Cross breeds
2.	Poultry	Local birds	Gramapriya, Vanraja, Improved
3.	Duckery	Local duck	Khaki Campell and Muscovy
4.	Goatery	Undescript breed	Black Bengal
5.	Dairy (Cow, Buffalo)	Local breeds	Cross breed
6.	Dog	Local breeds	Local breeds

Table 2. Price of different livestock farming

Particular	Price/unit (Rs)	Particular	Price/unit (Rs)
Piglet	3000	Green fodder	3.0
Pork	180	Paddy straw	2.0
Chicks	50	Rice bran	13.0
Chicken	160	Banana stem	0.50
Local birds	50	Colocasia shoot	0.75
Egg	10	Household waste	2.0
Local birds meat	200	Green vegetables (leafy)	5.0
Goat	3000	Maize grain	12.0
Chewan	450	compost	2.0
Calf (Average)	5000	Oil cakes	20.0
Beef	200	Dried stored feed	4.0
Milk	30	Pedigree/Starter feed	3000-5000
Dog	1500	Feed supplement	4000-9000
Dog meat	200	Vaccination	50

Imbalanced feeding leads to excess of some nutrients, whilst others remain deficient. This not only reduces meat production and increases costs per kg milk, but also affects various physiological functions including long term animal health, fertility and productivity. To ensure improved productivity, it is necessary to augment and secure feed resources through short and long term planning. In Manipur, Colocasia shoot, Banana stem and Eichhornia are locally available feeds for piggery (Table 3). Other than this they are also giving household waste and rice bran. In traditional farming system, farmers are solely dependent upon the available feed materials. But, these feeds are not a complete feed. However, under TFS farmers are not giving optimum quantity of feed (Table 4). On another hand, improved farming system farmers were aware about the quality livestock feeding. They are also storing feed in the form of hay and silage for lean period. In addition to local feeds, farmers are giving feed in optimum quantity and supplementing them with other quality materials *viz.* mineral mixture, probiotics and marketed feed. These make the feed as a balanced feed. The use of agro-industrial by-products (grains, brans and oilcakes) is low and mainly restricted to milch animals and commercial poultry sector. The use of grain for animal feed is less than 5% (except maize), and a lion's share of this goes for poultry feed. Thus crop-residues are by far the most important source of feed and will continue to be so in the foreseeable future. However, their nutritive value is low, thereby, adversely affecting livestock productivity. Several technologies have been developed to improve their nutritive value like, hay and silage making, urea ammoniation and urea molasses treatment or straw *etc.* The available feeds can be integrated

with high quality feeding materials (concentrate) which can act as a complete feed for livestock. Supplementation of concentrates to grazing yaks substantially reduces mortality in winter season when scarcity of feed occurred (Ghosh and Bandyopadhyay 2007).

3.2 Feed supplementation with locally available feeds

During the study, we found that farmers were not using feed supplements with locally available feeding materials in traditional farming system. Under TFS, almost farmers are not interested in quality feeding of livestock. In Churachandpur and Chandel farmers are not giving any feed supplementation except poultry for some time (Table 5). But, under improved farming system, farmers giving supplements as mineral mixture, marketed feed, probiotics with feed, oilcakes and supplementing various minerals along with locally available feed materials (Table 5). Thus, the production and health of livestock was not up to the mark in TFS as compared to IFS. Thomas *et al.* 2002 also observed that the low productivity of livestock reflects the non-adoption of technologies or their uptake has not been sustainable. Adoption of improved technology is low. The optimum amount and composition of supplementary feeds has been lacking because knowledge of animal nutrition requirements is still deficient. Under this study, we found that farmers are giving 0.5 to 1.5 kg of supplement daily for each animal throughout the dry season. It was estimated that this level of supplementation would enable the animals to maintain the weight. Murugan *et al.* (2009) found that pigs fed with concentrate feed had significantly ($P < 0.01$) higher hot carcass weight, dressing percentage and loin eye area, meat-bone ratio and lesser back fat thickness and gut weight than swill feed.

Table 3. Feeding management under TFS and IFS in hill districts of Manipur

S. No.	Components	Churachandpur		Chandel		Ukhrul	
		TFS	IFS	TFS	IFS	TFS	IFS
1.	Piggery	a. Household waste b. Rice bran c. Banana stem d. Colocasia shoot	a. Household waste b. Rice bran c. Banana stem d. Colocasia shoot e. Broken grains f. Starter feed g. Feed supplement	a. Banana stem b. Rice bran c. Food waste	a. Household waste b. Rice bran c. Banana stem d. Broken grains e. Maize f. Starter feed g. Feed supplement	a. Banana stem b. Paddy straw c. Colocasia shoot d. Waste food	a. Household waste b. Rice bran c. Banana stem d. Colocasia shoot e. Eichhomia spp. f. Broken grains g. Starter feed h. Maize i. Feed supplement
2.	Poultry	a. Rice bran b. Green vegetable c. Household waste	a. Rice bran b. Starter feed c. Household waste d. Maize grain e. Broken rice grain f. Rice bran g. Feed supplement	a. Rice bran b. Household waste	a. Rice bran b. Household waste c. Starter feed d. Maize grain e. Broken rice grain f. Rice bran g. Feed supplement	a. Rice bran b. Household waste	a. Rice bran b. Household waste c. Starter feed d. Maize grain e. Broken rice grain f. Rice bran g. Feed supplement
3.	Duckery	a. Household products b. Rice bran c. Feeding in water bodies	a. Household products b. Rice bran c. Feeding in water bodies d. Feed supplement e. Eichhomia	a. Household products b. Rice bran c. Feeding in water bodies d. Eichhomia	a. Household products b. Rice bran c. Feeding in water bodies d. Feed supplement e. Eichhomia f. Colocasia shoot	e. Household products f. Rice bran g. Feeding in water bodies h. Eichhomia	a. Household products b. Rice bran c. Feeding in water bodies d. Feed supplement e. Eichhomia f. Colocasia shoot
4.	Goatery	a. Green grass b. Pasture	a. Green grass b. Pasture c. Maize grain d. Rice bran e. Feed supplement	a. Green grass b. Pasture	a. Green grass b. Pasture c. Maize grain d. Rice bran e. Feed supplement	a. Green grass b. Pasture	a. Green grass b. Pasture c. Maize grain d. Rice bran e. Feed supplement
5.	Dairy (Cow, Buffalo)	a. Paddy straw b. Green grass c. Pasture	a. Paddy straw b. Green grass c. Pasture d. Oil cakes e. Dried feed (Hay,	a. Paddy straw b. Green grass c. Pasture	a. Paddy straw b. Green grass c. Pasture d. Oil cakes e. Dried feed (Hay,	a. Paddy straw b. Green grass c. Pasture d. Rice bran	a. Paddy straw b. Green grass c. Pasture d. Oil cakes e. Dried feed (Hay, silage)

S. No.	Components	Churachandpur		Chandel		Ukhrul	
		TFS	IFS	TFS	IFS	TFS	IFS
			silage) f. Feed supplement		silage) f. Feed supplement		f. Feed supplement
6.	Dog rearing	a. Household wastage	a. Household wastage b. Pedigree feed for pups c. Feed supplements	a. Household wastage	a. Household wastage b. Pedigree feed for pups c. Feed supplements	a. Household wastage	a. Household wastage b. Pedigree feed for pups c. Feed supplements

Table 4. Quantity of feed used under TFS and IFS in hill districts of Manipur

S.No	Components	Churachandpur (kg/unit/day)		Chandel (kg/unit/day)		Ukhrul (kg/unit/day)	
		TFS	IFS	TFS	IFS	TFS	IFS
1.	Piggery	4.5	7.0	6.5	7.0	3.5	7.5
2.	Poultry	0.44	0.55	0.45	0.55	0.35	0.65
3.	Duckery	0.25	0.50	0.30	0.50	0.30	0.50
4.	Goatery	4.0	5.0	3.0	4.5	3.0	5.0
5.	Dairy	7.0	10.5	5.5	10.5	9.0	11.5
6.	Dog	0.65	1.0	1.1	1.0	0.70	1.25

Table 5. Feed supplement (probiotics, marketed feed, minerals and mineral mixture) used under TFS and IFS

S.No	Components	Churachandpur		Chandel		Ukhrul	
		TFS (kg/unit)	IFS (kg/unit)	TFS (kg/unit)	TFS (kg/unit)	IFS (kg/unit)	TFS (kg/unit)
1.	Piggery	-	+	-	+	±	+
2.	Poultry	±	±	-	+	±	+
3.	Duckery	-	+	-	+	-	+
4.	Goatery	-	+	-	+	-	+
5.	Dairy	-	+	-	+	-	+
6.	Dog	-	+	-	+	-	+

Note: -, + and ± represents the feed supplement are not given, feed supplement are given and feed supplement given seldom, respectively

3.3 Vaccination and medical care of livestock

Livestock medical care is equally important to maintain their health. Effective control of animal diseases is a critical element of any strategy that aims at supporting and enhancing livestock dependent livelihoods of rural poor. The livestock mainly suffered from foot and mouth disease, black quarter, Haemorrhagic Septicaemia in animal and influenza virus in birds. Figure 1 shows that Churachandpur, Chandel and Ukhrul district farmers were not aware about the vaccination at birth or just after birth under TFS. Sometimes farmers got their livestock treated when they suffered from disease. In Ukhrul, farmers were careful about the medical care of livestock under TFS. However, under IFS farmers are more aware and careful about medical treatment and disease occurrence at birth and in adult livestock. Homewood *et al.* (2006) reported that the infection-and-treatment method of vaccination has a major and highly significant impact on survival. Uptake of vaccination is strongly associated with a measure of wealth that includes livestock numbers and economic security.

3.4 Economics

The current study indicates higher variable cost, gross returns, net returns and benefit cost (B: C) ratio in all the livestock farming of IFS as compared to TFS. Among the districts, Ukhrul has better adoption of farming system either TFS or IFS than other two hill districts of Manipur. The higher variable cost in all the livestock farming of IFS was mainly due to use of quality feed material, improved breeds, proper medication with better feeding management system. The higher gross returns, net returns and B: C ratios were due to more production of economic products in respective components of IFS as compared to TFS.

The lower cost of production, gross returns, net returns and B: C ratios in TFS might be due to use of poor feeding management, local breeds with poor medication just for subsistence farming for sustaining the family livelihood. Among the livestock farming, dairy farming followed by piggery farming showed higher variable cost and but higher gross and net returns was observed in piggery followed by backyard poultry (Figure 2A, B and C). The net return is the main parameter for deciding the adoptability of a farming system.

4. Conclusion

To ensure improved productivity, it is necessary to augment and secure feed resources through short and long term planning. Balanced livestock feeding management is very important for the livestock health, for their generation as well as for healthy livestock product, which is consumed by humans being mainly as second-cycle produce, in the form of meat, eggs and dairy products. In this way, locally available feed materials should also be supplemented by balanced nutritional feed with proper medication and management to improve farming system. It is of utmost importance to transform traditional farming system into the improved farming system for betterment of livelihood of the tribal farmers.

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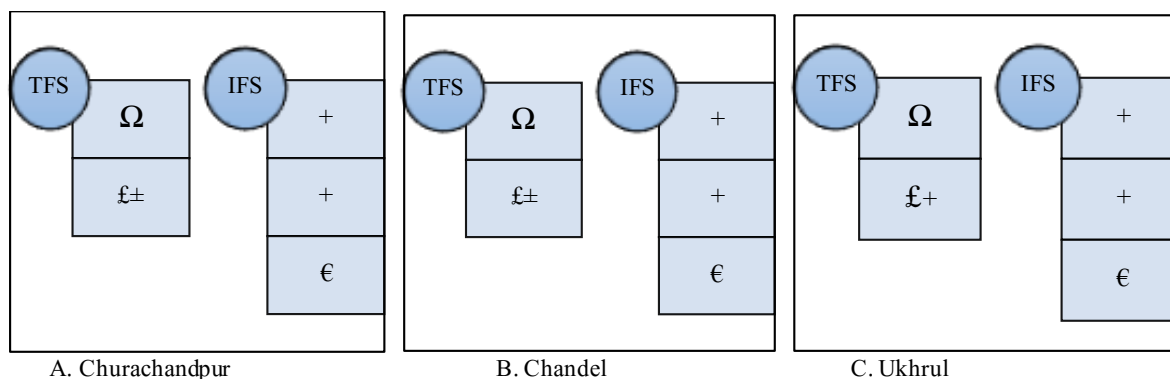


Figure 1. Vaccination and medical care of livestock

Note: Ω represents the seldom vaccination at or just after birth, $\text{£}\pm$ represents some farmers giving vaccination during disease occurrence, $\text{£}+$ represents all farmers are giving vaccination during diseases. $+$ Sign represents the all farmers giving vaccination at or after just birth and during diseases. € represents the regular care of animals to protect from various zoonotic diseases

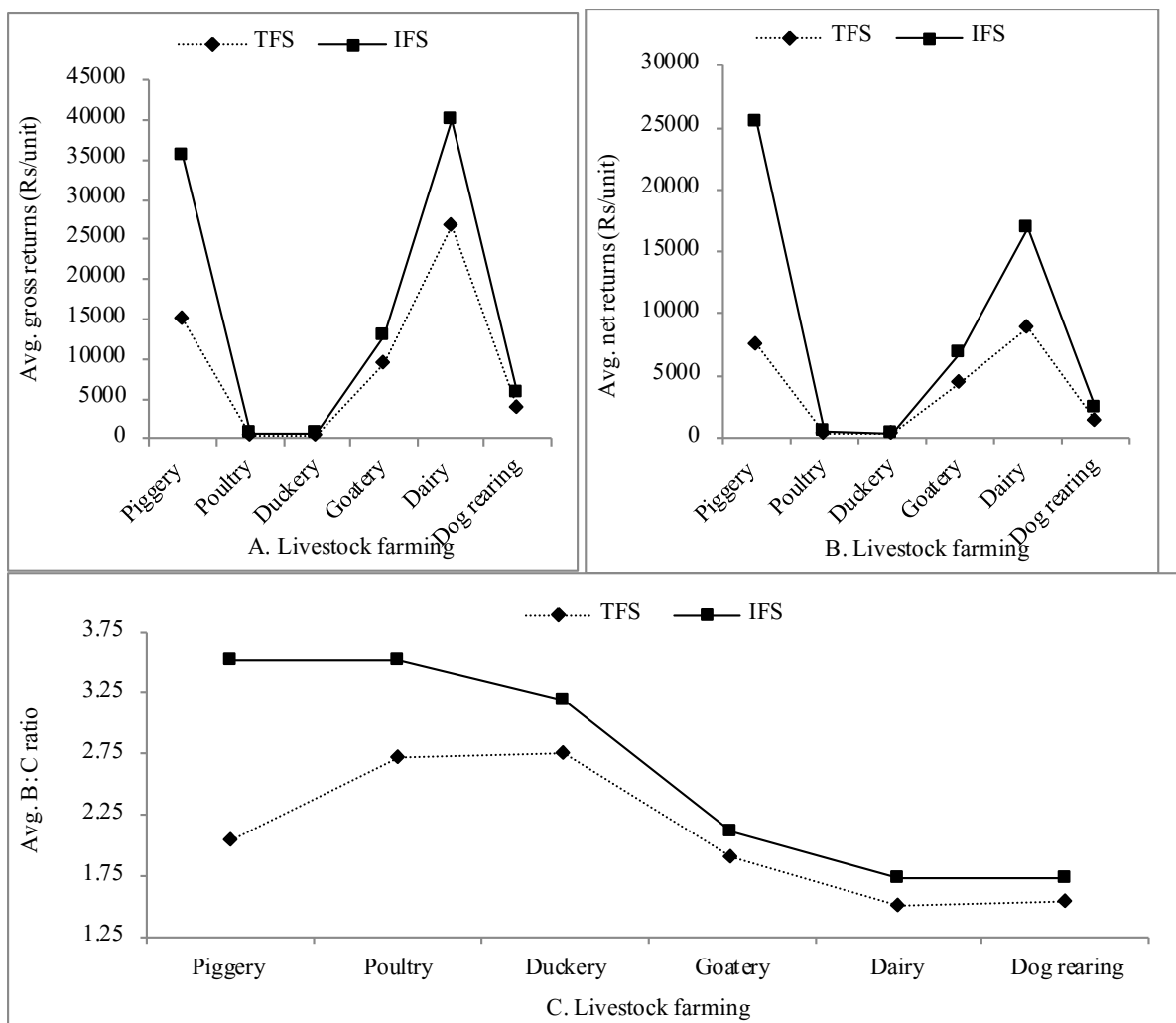


Figure 2. On an average economics (all three districts) under TFS and IFS

Note: on an average including all inputs and output/unit

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