



Improving Livestock Feed Efficiency Leading to Sustainable Livestock Production



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INTRODUCTION

The livestock sector has become an important part of rural economy from generating rural livelihood to supporting and meeting increasing global needs for meat, milk, eggs etc. The demand of livestock products has been increased drastically with increasing population so as to protect this sector for future generation there should be a scientific approach for sustainable livestock farming. Sustainability in livestock farming refers to the production of livestock products like milk, meat and eggs with limiting environmental stress, enhancing animal welfare and economic stability. Sustainable livestock farming is a broad term and there are various aspects which governs them, but here we will be giving more emphasis on aspect which can improve livestock feed efficiency.

What is feed efficiency?

The capacity of livestock to convert the feed into its products is said to be as feed efficiency. It is expressed in terms of feed conversion ratio. Feed conversion ratio is calculated as total feed consumed/ total weight gained. Hence to achieve sustainability the feed conversion ratio should be lower. It means that lower feed should be required to achieve 1 kg weight gain. Moreover feed efficiency in livestock is also related how efficiently they convert feed into their products like milk, meat, eggs etc.



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Why livestock feed efficiency is important from sustainability point of view

- ✓ High demand of livestock products globally making pressure for a scientific approach for a sustainable production system
- ✓ Higher feed efficiency maximizes nutrient absorption and rumen motility
- ✓ It reduces environmental impact by reducing the use of resources such as land, water etc
- ✓ It lowers the emission of green house gas (mainly methane)
- ✓ Lower feed consumption with efficient utilization leading to higher productivity
- ✓ More productivity will lead to economic viability

There are various factors on which FCR are depends like breed selection, age and feed quality and precision feeding, rumen microflora etc.

1. Breed of animals:

Several research has been done on genetic improvement for improving feed efficiency in livestock because feeding costs are one of the greatest expenditure in livestock farming and it becomes very uneconomical for a farmer to sustain their livelihood with this type of rearing system, so efforts have been made through improving genes with selecting sire and dams having higher gross efficiency, lower residual intake and better maintenance efficiency to be the parent of next generation.

Here gross efficiency is similar to feed conversion ratio where the amount of product obtained is measured with respect to the amount of feed intake. In case of dairy cattle it will be measured as the amount of milk produced with respect to the amount of feed intake whereas in case of pig it will be

measured as the amount of live weight gain with respect to amount of feed intake so it made clear that the high gross efficiency is highly profitable.

2. **Residual feed intake** is another index for measuring feed efficiency which can be defined as the difference between the total feed taken by any livestock and the amount of feed they should take according to its live weight. A lower residual feed intake further means that less feed intake is required for production with respect to expected feed required.

Moreover research has made clear that production traits are correlated with feed conversion efficiency and the indices (gross efficiency, residual feed index etc) are related to production output (Gibson 1986). So a high producing livestock selected as a parent will indirectly lead to production of a progeny having better FCR as well as better production traits.

3. Age of animals:

Age is an inherent factor which governs feed conversion efficiency, not every age group of livestock has better efficiency. Researchers have shown that FCR becomes higher as age advances because energy utilized for maintenance increases with age, this is the reason why milk production in dairy cattle gets reduced as age advances, broilers birds are sold for marketing at young age as they have low FCR. So it is advised that young age groups are more productive as they have lower feed conversion ratio. They can be used for breeding purpose as it will lead to more sustainable farming system.

4. Quality and precision feeding to the animals:

Feed quality and precision feeding is another factor which influences FCR and productivity. It has been found that livestock feed rich in essential nutrients like energy, protein and vitamins and minerals leads to higher growth rate, milk production, reproductive health and more resistance towards diseases whereas poor quality feed leads to lower productivity and growth (Ahmet Baris, 2023).

Good quality feed increases efficient utilization and production, with good quality feed, precision feeding and a balanced ration is beneficial from sustainability point of view. A farmer should regularly check over good quality ration and their proportion which should be in 60:40 ratio (60% roughages and 40% concentrates on dry matter basis), it lead to limited resource use, becomes economical to farmer & promote wellbeing of livestock and farm further lead to a sustainable farming system

5. Rumen microflora interventions:

Rumen microflora plays an important role in efficient breakdown utilization of feed, lessen the emission of greenhouse gas methane. The rumen microbiota works on symbiotic relationship with the host, the host provides food and shelter for microbes in exchange they helps utilizing essential nutrients through breakdown of complex carbohydrates, synthesis of

protein through non proteinaceous nitrogen.

There are various microbes present in the rumen such as cellulolytic, proteolytic, amylolytic, hemicellulolytic, methanogens, several strains of fungi and protozoa etc. which have their distinct role in the breakdown of macromolecules into end products which are utilized for production. The methanogenic bacteria present in the rumen acts on the hydrogen atom released after breakdown of macromolecules to produce methane. Such as roughage to concentrate ratio, more roughages can lead to more methanogenic bacteria producing methane. Manipulation of rumen microflora is hence becomes beneficial for sustainability point of view this can be done through dietary intervention. Use of feed additives can also be used to improve rumen microflora such as feeding probiotic which boost growth of beneficial microbes.

Finally it is concluded that, feed conversion efficiency plays vital role in sustainable farming system through reducing environmental impact by limiting resource use, reducing emission of green house gases, increasing profitability and productivity, reducing stress and promoting social well being of farm animal. There are ways through which FCR can be corrected which have been discussed like selection, age, feed quality and rumen microbiota. A farmer should learn them to make livestock rearing sustainable.