

## Hydroponic Fodder: An Overview

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### Introduction

Green fodder plays major role in feed of all livestock. Also, into the milch animals, green fodder providing required nutrients for milk production and health of the dairy animals. Green fodder feeding to livestock is important for optimization of productivity. Animals feeding and fodder production are the two important aspects for the sustainability of products and productivity in animal rearing. Although, India is the top producer of milk in the world but there are many challenges insufficient livestock feed, fodder is one of the constraints affecting growth, health, production and reproduction potential of livestock. Green fodder is the natural diet for livestock. Its production to meet the current demand has become a greatest challenge among livestock farmers. Due to many reasons, green fodder production has been facing a serious crisis and so the livestock productivity. Due to increased population day by day hence agriculture land is converted into urbanization. Now days small land holdings amongst farmers, non-availability of irrigated lands for fodder production is reduced, unavailability of fertile land for fodder production, increasing mining and coastal line has limited area for fodder production, deforestation, lack of scientific knowledge of feed and fodder production among unemployed youths for fodder farming, higher labour cost and small land holdings has left livestock as well as dairy farmer with many challenges for animal rearing and milk production in all over the world. Also, Due to increasing intensive system of rearing livestock, the need for green fodder is huge. As the gap between the demand and supply of the green fodder for livestock becoming unconquerable, researchers and farmers are in search for an alternative for green fodder or new fodder production method, that would restore fodder and livestock production. To overcome all these shortage issue of green fodder the new hydroponics technology came into exist. Hydroponics is the

state-of-the-art technology that has revolutionised the green fodder production in the 21st century. In India only 4.9% of cropped land area is utilized for cultivating fodder. Indian livestock industry faces a deficit of 35.6% green fodder, 26% of dry fodder and 41% of concentrate feed ingredients.

**Table 1. Demand and supply of fodder in India (in million tonnes) over the years and projected demand and supply.**

| Year  | Demand |     | Supply |     | Deficit |     | Deficit as % |       |
|-------|--------|-----|--------|-----|---------|-----|--------------|-------|
|       | Green  | Dry | Green  | Dry | Green   | Dry | Green        | Dry   |
| 1995  | 947    | 526 | 379.3  | 421 | 568     | 105 | 59.95        | 19.95 |
| 2000  | 988    | 549 | 384.5  | 428 | 604     | 121 | 61.10        | 21.93 |
| 2005  | 1,025  | 569 | 389.9  | 443 | 635     | 126 | 61.96        | 22.08 |
| 2010  | 1,061  | 589 | 395.2  | 451 | 666     | 138 | 62.76        | 23.46 |
| 2015  | 1,097  | 609 | 400.6  | 466 | 696     | 143 | 63.50        | 23.56 |
| 2020* | 1,134  | 630 | 405.9  | 473 | 728     | 157 | 64.21        | 24.81 |
| 2025* | 1,170  | 650 | 411.3  | 488 | 759     | 162 | 64.87        | 24.92 |

\* Figures are projections.

**Source:** Based on X<sup>th</sup> Five-Year Plan Document, Government of India.

### Hydroponics Technology

Hydroponics technology is a science of growing plants in water or nutrients rich solutions instead of soil and can be efficiently used to take pressure off the land to grow green fodder/feed for the animals (Naik *et al.*, 2015). It is also known as “controlled environment agriculture” since raising plants hydroponically requires control of environmental factors such as light intensity humidity, duration, temperature, pH of the solution and mineral nutrients. Plants require three things to grow water, nutrients and sunlight. Hydroponics technology is a straight forward way of providing all these nutrients without the need of soil under controlled environment conditions to enhance the growth of plants. Fodder obtained from hydroponics technology consists of grass with grains, roots, stem and leaves as compared to only stem and leaves part in conventionally grown fodder. This technology has been tested on various crops such as maize, barley, oats and sorghum for producing good quality of nutritious green fodder for animals. Many of the livestock and dairy farmers are shifted to hydroponic fodder production from conventional production methods, as the fodder produced by this method are highly nutritious, provide sustainable fodder production round the year and conserve water.

### Advantages of hydroponics fodder

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- 1. Conservation of water:** It requires only 2 to 3 litres of water to produce one kg of luxuriant green fodder, as compared to 60 to 80 litres of water to conventional system of green fodder production. Water left over in hydroponics is recycled to grow the fodder.
- 2. Reduced labour cost and need:** In conventional fodder production requires continuous presence of labour from cultivation to harvesting of the grass, but in hydroponics labour required is 2- 3 hours / day only. hence the cost of production of hydroponic fodder is less.
- 3. Land requirement for hydroponic technology:** For the production of hydronic fodder the space required for hydroponics house requires small land to build the system. Reduction in the amount of land required for maximum fodder production is a benefit for both regions where agriculture is difficult and densely populated areas that lacks sufficient growing space for green fodder.
- 4. Reduction in growth time of green fodder in hydroponic technology:** This technology produces green fodder faster than traditional growing methods. To obtain nutritious fodder requires only above 7 days from seed germination to fully grown fodder of 25 –30 cm height. Green fodder won't waste their valuable energy for absorption of diluted nutrients submerged deep within the soil, instead of that they can almost entirely be focused on growing and boosting the production of green fodder.
- 5. Minimising wastage of green fodder:** Green fodder produced from hydroponics will be fully utilised as there won't be wastage of the fodder during feeding of animals as compared to wastages of chopped traditional grasses during consumption by the animal.
- 6. Natural feed for animals:** Production of green fodder through hydroponics is completely by natural source. In this technology no herbicide, pesticides are used in green fodder production hence no residues of any chemicals occurred into the milk.
- 7. Availability of green fodder round the year:** This technology is capable to make provision for the green fodder round the year, as per demand of consumption of green fodder of livestock. Constant supply of green succulent fodder can be organised irrespective of season, rain, storm, sunshine (Singh *et al.*,2007).



8. **Improvement of milk production in dairy animals:** Providing regularly lush green fodder to milch animals it can compensate the concentrate feed so as to have economically feasible to the farmers and milk producing industry.
9. **Increasing balanced, palatable, nutritive value of fodder:** through hydroponics technology it is possible to improve the nutritive value by adding additional growth promoters, nutrients to provide balanced diet to the ensure the high productivity of livestock.
10. Pest and disease problems can be controlled easily while weed is non-existent. Plants grown hydroponic technology avoids soil borne pests.

### Conclusion

Green fodder is an important constituent in the feed of livestock. Due to many drastic changes in agriculture system, animal rearing and increased population there is shortage of green fodder to the livestock. Green fodder production through hydroponics technology can be a real beneficial alternative source to overcome the fodder deficiency in livestock sector with many advantages.

### References

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