



Low-cost grain sprout production using hydroponics

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Introduction

Per capita availability of land and access to irrigation are the main constraints for fodder cultivation in Odisha. More than 80% of livestock owners in Odisha are landless, small or marginal farmers and cultivating green fodder for livestock feed is a big challenge for them. Therefore, there is a big need for an alternative approach for green fodder production. The hydroponic method has been identified as an alternative to mitigate this challenge especially in Odisha where natural calamities like floods and cyclones are frequent. This will play a vital role for green fodder production in the short term.

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What is hydroponics?

Hydroponics is a technique of growing plants in water or nutrient solution without using soil as medium of growth. In recent years, a number of hydroponic units are being used for green fodder production in different states like Maharashtra, Andhra Pradesh, Karnataka etc. This will assist in overcoming the shortage of green fodder during lean periods. The majority of these units run on electricity and need reliable power supply to ensure periodical sprinkling of water in low cost models and to regulate temperature as well as humidity in the high-end models.

The technology has been tested on various crops such as Maize, Sorghum, Barley and Oats for producing high quality and nutritious green fodder for dairy animals. In addition, hydroponics can be used for growing wheat grass, paddy saplings and similar crops in eight to nine days with optimum growth. Fodder obtained from hydroponics consists of grass with grains, roots, stem and leaves as compared to only stem and leaves in conventionally grown fodder.



Advantages of hydroponics

- By using hydroponics, one can conserve water and reduce labour requirement. It requires just 2–3 litres of water to produce one kilogram of lush green fodder, as compared to 60–80 litres in the conventional method.
- This technology makes it possible to get green fodder round the year irrespective of rain, storm, sunshine or drought.
- Growing green fodder through hydroponics generally doesn't entail chemical use.
- Green fodder produced from hydroponics will be fully utilised as there won't be loss of fodder during feeding as compared to wastage of traditional grasses.

Methods of growing using hydroponics

- Producing grain sprouts under modified hydroponic system in wooden structures with PVC coated galvanized iron netting will cost INR3,000.
- This method solves the problem of traditional hydroponic units like high cost, mould growth and power requirement.
- Pre-soaked grains like maize/wheat/oat are treated with 4% vinegar, kept wrapped in moist cloth for two days and germinated grains are grown with or without straw bedding in trays for five to seven days.
- Use of battery-operated knapsack sprayer (INR2, 300) will make spraying of water (3–6 times per day depending on local weather conditions) easy. Manual sprayer can also be used.
- If chaffed crop residue is used as the base, entire straw mat with grain sprouts is taken out on the 6th day and fed to livestock.
- Four kilograms of mould-free sprouts are produced from 1kg of maize grains, using about eight litres of water.
- The cost of production is INR4–5/kg of wet sprouts of maize.
- This technology improves green fodder availability during lean months and enhances milk yield. Maize sprouts contain about 13% of crude protein.
- If a farmer has land, producing green fodder in this method is not economically viable as it is more costly compared to the traditional method.

Nutritional composition of different hydroponic fodder

No.	Type of fodder	Growth duration (days)	Moisture (%)	% dry matter basis				
				CP	CF	EE	TA	NFE
1.	Maize	8	76.75	10.55	5.51	4.62	1.80	77.52
2.	Horse gram	4	90.18	30.26	13.00	2.06	5.43	49.25
3.	Sun hemp	4	77.07	38.73	13.11	4.64	4.48	39.04
4.	Cowpea	4	77.93	27.84	6.51	1.93	4.88	58.84
5.	Bajra	4	74.80	9.22	4.16	4.57	1.49	80.56
6.	Ragi	4	87.86	10.62	8.80	2.52	2.95	75.11
7.	Foxtail millet	4	75.08	14.69	12.11	5.38	3.59	64.23
8.	Jowar	8	90.06	13.27	13.39	4.99	2.98	65.37
9.	Moth bean	8	94.37	38.83	18.91	2.63	6.61	33.02
10.	Saamai (little millet)	8	83.60	13.46	15.74	4.75	8.11	57.94
11.	Varagu (kodo millet)	8	80.97	8.87	15.21	3.15	4.08	68.69
12.	Kuthiraivaali (sanwa millet)	8	86.40	10.70	19.61	4.39	11.60	53.70

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