International Journal of Agriculture Sciences
ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 15, 2018, pp.-6866-6867.
Available online at https://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000217

Research Article

COST OF HYDROPONICALLY GROWN FODDER IN HYDROPONIC STRUCTURE

TAYADE R.G.[1*], GUPTA S.V.[2], PATIL B.N.[3], DESHMUKH M.M.[4]
[1,2]Department of Farm Structure, PGI, Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, 444104, India
[3]Department of Agriculture Process Engineering, College of Agricultural Engineering and Technology, Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola, 444104, India
[4]Department of Farm Power and machinery, College of Agricultural Engineering and Technology, Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola, 444104, India
*Corresponding Author: Email - rgtayade1126@gmail.com

Received: Aug 03, 2018; Revised: August 10, 2018; Accepted: August 11, 2018; Published: August 15, 2018

Abstract: The Study entitled with "cost of hydroponically grown fodder in hydroponic structure" was conducted for period of 120 days at Deptt of Farm structure, Dr. PDKV, Akola. Hydroponic structure was constructed using U-PVC Pipes with external dimensions such as 3m height x 2m width x 3m length and it consist of six internal rack structure with size of 0.45 m height x 0.45 m width x 0.8 m length. The internal structure was equipped with 54 plastic hydroponic trays with size of 0.45 m length × 0.30 m width × 0.15 m height, which was equipped with semi-automated sprayer irrigation. Hydroponic structure was covered with 50% UV stabilized shade net. In order to control the internal temperature of hydroponic structure, proper spraying of water was carried out at regular interval per day automatically to get a range of 25 - 300C temperature and 65-70% relative humidity. It was observed that in hydroponic structure the biometric characters such as plant height 28.55 cm, weight of tray (5.50 Kg per tray) and total yield (120Kg).

Keywords: Hydroponic Structure, Shade net, Automization, Trays, Nutrient Content

Citation: Tayade R.G., *et al*., (2018) Cost of Hydroponically Grown Fodder in Hydroponic Structure. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 15, pp.- 6866-6867.

Introduction

Hydroponic technology can play a major role in dairy production. This is because fodder production using hydroponic technology can be done anywhere as long as traditional constraints are abated by improvements in technology. The adoption of this technique can easily enable production of fresh forage from oats, barley, wheat and other grains. Therefore, with this technique in fodder production, dairy feeds quality, nutrition, dairy animal health, meat and milk production can improve tremendously. Hydroponic technology is an economical and income generation determinant among dairy farmers. Hydroponically fodder has a short growth period (around 7-10 days) and requires a small piece of land for production. It has high feed quality that is rich with proteins, vitamins, and minerals with health beneficial effects on animals. As a reason, hydroponic culture is one of the most important agricultural techniques currently in use for green forage production in many countries (5). Hydroponically grown fodder has higher moisture content also the fodder is dust free, which reduces risk, and helps to prevent and cure respiratory disease. The Produce fresh green feeds uses very little water and do not cause soil depletion caused by excessive crop production and soil erosion also produce feed without any chemicals, pesticides or massive from fertilizers making the system 100% environmentally free. Hydroponics fodder can be grown in low cost green houses with locally available or home-grown grains. To produce one Kg of fresh hydroponics wheat fodder (7 day) requires about 1litre water (if water is reused) to 3 (if water is not reused) in high-tech green house system. Many farmers revealed fresh yield up to 8-10 folds can be obtained. The cost of production of the hydroponics fodder was about Rs. 2-3/Kg fresh fodder if seed was home grown; however, if seed was purchased from market, the cost of production was a bit higher as Rs 3-3.50.

Material and Method

A field experiment was conducted during Jan-May of 2017-18 at field of Farm Structure Department, Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola.

Cost economics

Cost economics of all treatments was worked out to compare the net returns and benefit cost ratio. For this purpose the life period of U-polyvinyl chloride items was considered as 25 years and for rest of items and motor pump set as 25 years. Standard market rates were considered for each Item. Fixed cost, operating cost, net return and benefit cost ratio for each system were worked out as follows.

Fixed cost

Fixed cost comprised of interest on initial cost and depreciation on the system. The interest calculated on the capital was at the rate of 10 per cent per annum. The depreciation of the system was worked out by straight line method as follows.
Where,
D= Depreciation per annum
I= Initial cost of system
S= Salvage value @ 10 %
L= Expected life period of the system

Operating cost

Operating cost is the amount which is actually paid by the cultivator in cash throughout the cultivation period. Total operating cost comprised of operating cost of the system and interest on operating cost at the rate of ten per cent per annum.

Total cost

Calculate Total cost comprised of fixed cost plus operating cost. Total cost per ha was calculated for comparison on per hectare basis.

Gross monetary return

This is worked out by considering the yield of produce and its selling price.

Net returns

Net return is calculated by subtracting cost of production from gross return in each treatment.

Benefit cost ratio
Benefit cost ratio was estimated by using following formula.

Results and Discussion
Fixed cost
Hydroponic structure has initial cost of 51884 Rs/6m.sq comprised of the cost of 1 hp pump coupled with an electric motor as. Fixed cost in Rs/ha per year was calculated as follows.

1. Interest on initial cost @ 12 per cent=6226Rs/6m.sq.
2. Depreciation of the system =2283 Rs/6m.sq.
3. Total= 8509Rs/6m.sq.
4. The motor and system can be used for all seasons in a year. Therefore fixed cost required for one season = 3500Rs./6m.sq

Operating cost
Management and input cost of hydroponic structure with green shad net.

1. Management and input cost = 3100Rs./6m.sq.
2. Interest on management and input cost at 12 % for crop period of 12 months = 372Rs./6m.sq.
3. Total operating cost = 3472Rs./6m.sq.

Total cost = Fixed cost + Operating cost = 3500+ 3472
= 6972 Rs./6m.sq.

Table-1 Cost economics of the study

Treatment	Yield of HWF (Kg/sq.m)	Gross return (Rs/sq.m)	Total cost (Rs/sq.m)	Net return (Rs/sq.m)	BC ratio
Hydroponic Structure	4820	25500	6972	18528	3.5
Open field	2530	12250	6972	2983	1.7

(The market rate of hydroponic fodder was Rs 4/- per Kg).

Cost estimate
The total cost required for erection of structure with other accessories required during experimental work is as below.

Costing
The cost of each item for hydroponic structure was given in Table 2.

Table-2 Cost of hydroponic structure

SN	Particulars	No. of materials	Rate (Rs/unit)	Total cost (Rs)
1	Lubi Motor	1	3500	3000
2	U-pvc pipe 42mm	35m	510	17850
3	U-pvc pipes 32mm	7m	400	2800
4	U-pvc pipes 25mm	6m	350	2100
5	Regulator Valve	2	100	200
6	Flow Control Valve 16mm	5	50	250
7	Pvc Pipes 25mm	6m	110	220
8	Tea 38mm	100	50	5000
9	Tea 25mm	60	50	3000
10	Tea 20mm	35	40	1400
11	Elbow	4	50	200
12	End cap	4	16	64
13	Jet Sprinklers	50	10	500
14	Timer	1	1500	1500
15	Tray	80	60	4800
16	Disc Filter	1	2000	2000
17	Automization system to measured temp., humidity and light intensity	1	7000	7000
			Total	51884/-

The total cost required for hydroponic structure was Rs.51884/- (Fifty one thousand eight hundred eighty four only).

Conclusion
From results of this study, it can be concluded that using u-pvc pipe framed hydroponic structure the strength, durability, and with long life span showed better fodder production.

1. The land saves 65-75 % than convention fodder.
2. Cost of hydroponically fodder is less than the open field.
3. Hydroponically fodder was good quality fodder than outside so it's more economical to dairy farmer.

Application of research:
1. Green fodder round the year for milking or dairy cattle's.
2. Increasing of nutritive value of fodder and natural feed for animals.
4. Enhancement of milk production.

Research category: Agricultural Engineering

Abbreviations:
% : Percent
/ : Per
@ : At the rate of
Agril. : Agricultural
Avg : Average
Rs. : Rupees
Temp.: Temperature
U-PVC: Unplasticized polyvinyl chloride

Acknowledgement / Funding: Author thankful to Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. Maharashtra

Research Guide or Chairperson of research: Dr S. V. Gupta
University: Dr Panjabrao Deshmukh Krishi Vidyapeeth, Akola, 444104, India
Research Project Name: Development and performance evaluation of pipe framed Hydroponic Structure.

Author Contributions: All author equally contributed

Author statement: All authors read, reviewed, agree and approved the final manuscript

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Reference
[1] Gebremedhin W.K., Deasi B.G. and Mayekar A.J. (2015) *Journal of Agricultural Engineering and Food Technology* 2(2), 86-89.
[2] Naik P. K, Swain B. K. and Singh N. P. (2015) *Indian Journal of AnimalNutrition* 32(1), 1-9.
[3] Saidi M. A., Omar J. A. (2015) *Open Journal of Animal Sciences*, 2015, 5, 99-105.
[4] Singh N. P. (2011) *I.C.A.R. research complex for Goa, old Goa*.
[5] Verma S., Singh A., Karla A. and Saxena M. (2015) *Indian Journal Animal Nutr.*, 32(1), 10-14.
[6] Emam M. S. A. (2016) *Middle East Journal of Agriculture Research*, 5(2), 161-170.
[7] Naik P. K., Karunakaran M., Swain B. K., Chakurkar E. B. and Singh N. P. (2016) *IndianJournal of Animal Nutrition,* 33 (2), 233-35.