Azolla Feeding and Goatary

(A) Azolla as source of feed in livestock

KVKs : Burhanpur, Sehore, Balaghat, Chhindwara, Katni, Panna, Umaria, Durg-I

Description of technology adopted:

Azolla's composition make it one of the most economic and efficient feed substitutes for livestock and poultry, particularly as can be easily digested by livestock due to its high protein and low lignin content. Poultry chickens can be raised on a diet including fresh Azolla. Its high content in proteins, essential amino acids, vitamins (vitamin A, vitamin B12, Beta Carotene), growth promoter intermediaries and minerals. Its high rate of growth in water with natural ecological systems. Cultivating Azolla for livestock feed and its profitability when used as a livestock feed as protein source.

What is Azolla?

- Azolla Species are free –floating water fern
- Live symbiotically with Anabaena azollae, nitrogen fixing blue green algae
- A main stem growing at the surface water, with alternate leaves and adventitious roots at regular intervals along the stem
- Azolla fronds are triangular or polygonal
- Float on the water surface individually or in mats
- Also known as duckweed ferns
- Size (Diameter) – ranges from 1/3 to 1 inch (1-2.5cm)

Species of Azolla found:

A.Filiculoides *A. caroliniana* *A.mexicana* *A.Microphylla* *A. nilotica* *A.pinnata*

Chemical Composition of Azolla

S. No.	Composition	Dry matter
1	Crude protein	25.78%
2	Crude fiber	15.71%
3	Crude fat	4.8-6.7%
4	Mineral content	10-15%
5	Nitrogen	4-5
6	Calcium	0.4-1.0
7	Amino acid	7-10%
8	Soluble Sugar	3.5
9	Starch	6.54
Singh and Subudhi (1978), (Kamalasanana et al., 2002 Basak et al., 2002		

Promising characteristics of adoption technology

S.No	Promising characteristics	Observation (Unit)
1	Increase in Milk production (%)	10-15
2	Decrease in cost of production (Rs/cow/day)	16.5
3	Increase additional net return(Rs/cow/day)	28.5

Horizontal spread of technology

Name of KVK	No. of village covered	No. of farmers	No. of units (5 pits)
Burhanpur	10	30	30
Sehore	39	148	60
Balaghat	35	24	24
Chhindwara	150	750	750
Katni	68	324	324
Panna	30	100	100
Umaria	50	40	40
Durg-I	20	20	40
Total	402	1436	1368

Material required for preparation of azolla pit: Plastic sheet 90 mm, Healthy Azolla culture(5kg), Soil (80-100 kg), Fresh dung(10 kg in 20 lit of water), Shed net, SSP

Economic analysis of a pit preparation of 10 x 5 x 1.5 feet

Sr No	Materials	Quantity (unit)	Rate(Rs.)	Value(Rs)
1	Plastic Sheet	25.60 m	12/m	307
2	labour	2	150	300
3	ssp	400 gm	10/kg	4
4	Azolla culture	1 kg	50/kg	50
5	Nylon net	1 m^2	100/m^2	100
6	Additional expenses			50
Total expenditure /pit				**811**
Expenditure Per Unit (5 pits) : 711*5= Rs 4055				

Economics of adopted technology:

	Before intervention	After intervention
Avg. milk yield (l/cow/day)	2.9	3.2
Avg. fat of milk (%)	2.7	3
Cost of production (Rs/cow/day)	71	54.5
Gross return (Rs/cow/day)	116	128
Net return (Rs/cow/day)	45	73.5
B:C ratio	1.63	2.34
Additional net return(Rs/cow/day)	**28.5**	

Impact of adopted technology in economic and social terms

Farmers which are using Azolla for their livestock as feed are satisfied with this new intervention as this reduces feed cost Rs 16.5/cow/day with increase milk yield 10-15%. Additional net return Rs28.5/cow/day. Again after 4-5 days farmer can harvest 12 kg azolla per pit. In one lactation of cow Rs 4620 is saved from concentrate feed cost and Rs 7980 is additional income per cow total profit per cow by using azolla as a source of protein is Rs 12600, as a result majority of the livestock farmers willing to start azolla production.

B. Stall Feeding Model for Goat Rearing

KVKs : Korea, Jashpur, Gariyabad, Kanker, Dantewada, Durg-1, Balrampur , Mandla, Tikamgarh, Umaria, Chhatarpur

Description of technology adopted:

- Stall feeding model for hygienic feeding and watering system.
- Introducing of improved and sensitive breeds of Goat.
- Income generation and livelihood security.

Promising characteristics of technology:

S. No.	Characteristics	Observational Unit	Observation
1.	Hygienic feeding management by stall feeding	1. Incidence of Contagious Diseases	50% decrease in contagious diseases 10% reduced mortality (Biosecurity)
		2. Herd to Herd Disease Spread.	Zero Incidence of Herd to Herd Spread
		3. Parasitic Infestation	Very Low parasitic load observed (unquantified).
2.	Clean water management through automatic water machine	1. Water Requirement	30% reduced water requirement.
		2. Quantity and Ease of mineral and vitamin supplementation through water.	All dewormer, mineral and vitamin supplemented through drinking water.
3.	Proper space between goats for increasing growth rate and reduction in energy losses during grazing	1. Higher Bodyweight in Lesser Time Period.	25% higher body weight in 8 months compared to grazing condition.
		2. Higher Fecundity (Kids/Yr.)	2-3 Kids Per Year

Horizontal spread of technology

Technology promoting KVK	No. of village covered	No. of farmers	No. of units
Korea	11	186	11
Jashpur	20	100	100
Balrampur	12	120	12
Gariyaband	1	10	10
Durg - I	40	80	80
Dantewada	5	20	20
Kanker	28	40	40
Chhattisgarh Total	**117**	**556**	**273**
Mandla	223	280	280
Tikamgarh	53	312	312
Umaria	24	65	90
Chhatarpur	05	15	15
M.P. Total	**305**	**672**	**697**

Economics of adopted technology:

Economics of 1 Unit of 55 Goats (50 Female 5 Male)

1. Cost of Goat Shed : Rs 7.28 Lakhs (Depriciation 10%) Hence annual investment Rs 72,800 plus interest (3%) on loan Rs 21,840 is Rs **94,640**
2. Cost of goats purchased at beginning is Rs 3,30,000 (Not Included in BC Ratio)
3. Annual feeding cost under stall fed condition : Rs **1,19,000**
4. Medicine vaccine and other recurring cost : Rs **20,000**
5. Cost of part time labor for 12 months @ Rs 3500 is Rs. **42,000**
6. Hence total investment Rs **2,75,640**
7. Sale of goats @ Rs 5500 for **110** goats Rs. **6,05,000**
8. Assest value at the end of 1nd Year Rs 3,96,000 (Not Included in BC Ratio)

Cost (Rs)	Gross return (Rs)	Net return (Rs)	B:C ratio
2,75,640	6,05,000	3,29,360	2.19

Impact of adopted technology in economic and social terms.

1. Farmers who are able to invest in Goat Farming under stall-fed are willing to take up this, since this technology significantly reduces requirement of hired labor as grazer (*charwaha*).
2. Best suited as a component of IFS where agriculture by-products can be diverted to stall feed goats.
3. Rearing goats under this technology is a good alternative for dairy farming with similar investment structure.
4. Reduces spread of contagious disease in the farm / region.

Glimpses of photographs

Goat Farming at Farmer Field, KVK, Korea

Goat Farming at Farmer Field , KVK Jashpur

Goat Farming at Farmer Field , KVK Gariyaband

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