

Azolla : Friend of the Farmers



VIVEKANANDA KENDRA
nardep

(Natural Resources Development Project)

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Supported by:

Department of Bio-technology
New Delhi.

The feed problem of marginal dairy farmer:

More cattle demands more fodder. However grazing lands are getting exhausted. They are shrinking very fast. Further there is ecological degradation of grassland biomes. This has resulted in reduction of fodder. Another source of fodder is the straw that comes from paddy fields. However of late the high



yielding varieties have been introduced and they have highly reduced the straw yield. Thus the fodder to animals from the fields has also been reduced. Thus in both natural ways the small dairy farmer finds his feed to the animal reduced. Apart from the high cost the chemical feeds have the following problems:

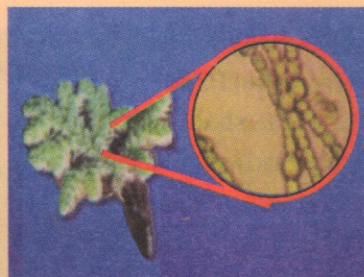
- ❖ Chemical feed can create in the long –run harmful effects for the cattle
- ❖ Chemical feed alters the milk and creates side-effect for the consumers.
- ❖ Chemical feed cuts into the small profit that a marginal dairy farmer can have.

It is in this connection that Azolla becomes an important multi-faceted solution to the problem of marginal dairy farmer

What is Azolla?

Azolla is a floating fern though it looks like algae. It belongs to the family of Azollaceae. The fern Azolla, hosts a symbiotic Blue green algae (BGA) *Anabaena azollae* which is responsible for the fixation and assimilation of atmospheric nitrogen. Azolla in turn

provides the carbon source and favorable environment for the growth and development of the BGA.



Is Azolla a good feed to cattle and livestock?

Azolla is very rich in protein and almost all essential amino acids, vitamin, A pre cursor, carotene, several growth promoter intermediaries, minerals like calcium, phosphorous, potassium, ferrous, copper, magnesium etc. The protein content is 25 – 35% on dry weight basis, mineral content 10 – 15%, amino acids and Bio-active substances and bio-polymers constitute 7 - 10%. Analysis report received from CFTRI, Mysore shows that it also contains appreciable quantities of β carotene and vitamin B12.

VK-NARDEP has conducted many field trials which have shown beyond doubt the improvement of quality and quantity of milk yield, when Azolla is fed to cattle and dairy.



Can Azolla be cultivated in the homestead area of a marginal farmer?

With the institutional support of DBT (Department of Biotechnology), the Research team of Vive kananda Kendra – NARDEP has developed a sustainable model for backyard Azolla cultivation.

Normally Azolla is grown in Paddy field or in shallow water bodies for using it as a bio-fertiliser. In Universities and Research Institutions it is preserved in



concrete tanks. Studies conducted at Vivekananda Kendra – NARDEP found both this method not suitable for its mass multiplication for biofeed purpose and hence developed Silpauline lined pit method which has become very popular and is known as NARDEP method.

What is NARDEP Method?

Step – I:

First the soil surface is cleared of weeds and leveled. Bricks with a vertical height of 10 cm are lined horizontally as shown in the figure to get a rectangle of 2.25 x 1.5 meter

Step - II:

A UV stabilised Silpauline sheet of 2.5 x 1.8 mt size with 150 GSM thickness is uniformly spread over the bricks. So as the margin of the silpauline sheet cover the margin of the rectangle made out by bricks.



Step – III:

Now silpauline lined water proof pit of 2.25 x 1.5 mt with a

depth of 10 cm is ready. About 30 – 35 kg sieved soil is uniformly spread over the silpauline pit, which will provide the primary nutrient base for Azolla plant.

Step – IV:

About 4 – 5 kg two day old cow dung made into a slurry or fresh biogas slurry is after mixing it in 15 – 20 litre of water which will provide the carbon source for the Azolla. About 40 gm of Macro-nutrient mix (Mixture made of mixing 10 kg Rock phosphate, 1.5 kg Magnesium and 250 – 500 gm Muriate of Potash) is mixed in the slurry before pouring it to the four corners of Azolla bed. Azofert is a Micro-nutrient mix which contains about 10 micro-nutrients and formulated scientifically by NARDEP is mixed well in cowdung slurry made after mixing 1 kg of cow dung in 5 litre of water and is poured in to the Azolla bed. This micro-nutrient mix will take care of both the micro-nutrient requirement of Azolla during its growth and Dairy cattle when it is feed to cattle.

Step – V:

Sufficient water is added to make the water level at about 7 – 10 cm. Grey water from bath room and cattle shed can also be used to fill up the Azolla pit. The water left after washing cloth (after the second



rinsing onwards) can also be used in places where there is a problem of fresh water availability. Now the Azolla bed is ready for Azolla inoculation.

Step-VI:

About 1 – 1.5 kg of pure Mother culture of Azolla seed material brought from a Azolla mother nursery is spread uniformly over the

water after a mild stirring of soil and water in the Azolla bed. Fresh water is sprinkled over the Azolla immediately after inoculation to make the Azolla plant upright (as some Azolla plant may become upside down during inoculation)

Step – VII:

Azolla will spread over the bed and will become a thick mat with in 7 days. The initial 1 kg will become 8 – 10 kg with in a span of 7 days and 1 – 1.5 kg depending on the growth can be harvested on the 7th day and each and every day there after. Harvesting can be done with the help of a plastic tray with holes about 2 sq.cm. Cow dung and minerals removed by the Azolla biomass has to be supplemented at least once in 7 days immediately after harvest. For this 30 grm Azophose mixed in 1 kg cow dung mixed in 5 litre slurry and 20 grm Azofert mixed in 0.5 kg cow dung mixed in a litre water should be added to Azolla bed once in 7 days.

How is Azolla fed to the cattle?

Azolla should be harvested with a plastic try having holes of 1 sq.cm mesh size to drain the water. Try tray along with Azolla should be kept in a bucket, half filled with water. Azolla should be washed to get rid of the cow dung smell. Washing also helps in separating the small plantlets which drain out of the tray. The plantlets along with water in the bucket can be poured back in to the original bed. Fresh Azolla thus collected should be mixed with commercial feed in 1:1 ratio to feed livestock. For poultry,



Azolla as such can be fed, both for layers and broilers. However, it is advisable to mix Azolla in regular feed in 1:1 ratio at the beginning, for one week. After a fortnight of feeding on Azolla mixed with regular feed, livestock may be directly fed with Azolla, without the addition of regular feed material.

What are the exact benefits a dairy farmer can expect from Azolla feed?

After feeding Azolla:

- The milk production increases by 10-15%,
- Milk quality also improves
- 20 – 25% savings in concentrate feed

Additional Benefits for marginal farmers:

- Azolla bed acts as water harvesting station and live mulch.
- The nutrient rich water in Azolla bed supports a variety of vegetables
- Two kilogram of soil in Azolla bed is almost equal to 1 kg of commercial NPK fertiliser after six months. So the fertiliser requirement of farmer is also met by homestead Azolla bed.

Can Azolla be fed to Poultry?

Yes. For poultry, Azolla as such can be fed both for layers and broilers. Azolla should be mixed with regular feed in 1:4 ratio in the beginning for one week. After one week it can be mixed even up to 1:1 ration replacing a maximum of 20 – 25% total feed requirement. The birds receiving normal diet with 5% extra Azolla diet grew faster than the bird with 100% feed alone and there was 10 – 12% increase in the total body weight.

How to integrate Azolla with vermi-compost?

Another one technology that is very helpful to farmers is vermicompost. For the economizing of space as well as for synergy

benefits Azolla and Vermicompost technologies can be integrated into a two-tier technology. where in, the farm waste is composted with the help of earthworm to a high priced bio-manure on the lower tier and nutrient rich bio-feed with 30 – 35% protein on the upper tier.



How Azolla can be used as bio-fertilizer in paddy field?

Azolla can fix Nitrogen from the atmosphere into the soil. Hence Azolla can be used as a bio-fertilizer. In a field with standing water (before transplantation) if handful of Azolla is put before plowing then in 7-10



days it will fill the entire field. After that the Azolla can be ploughed into the soil, thus integrating the Nitrogen into the soil. As the nitrogen is organic, the intake by the plant will also be more efficient. Alternatively 10 days after transplanting Azolla can be inoculated into the field. In the latter method Azolla also acts as weed suppressant. 200 kg of Azolla per acre can save 30-40 percent of fertilizer.

For more details please contact:

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