Azolla is a free floating water fern. It is a common bio-fertilizer in rice crop. The blue-green algae (Anabaena azollae) grow in symbiotic association with this fern and are responsible for nitrogen fixation. Among different species of genus Azolla, A. pinnata is popular. The higher crude protein content (above 20 % on dry matter basis) and presence of essential amino acids (high lysine content) vitamins like A & B and minerals like calcium, phosphorous, potassium and magnesium made Azolla useful feed supplement for livestock, poultry and fish.

**Requirements for growth**

It requires light for photosynthesis and grows well in partial shade. Generally, Azolla needs 25 to 50 per cent of full sunlight for its normal growth. Water is the basic requirement for the growth and multiplication of Azolla and is extremely sensitive to lack of water. Maintenance of adequate water level (at least 4 inches in the pond) is essential. The species vary in their requirement of ideal temperature. In general, the optimum is 20 C to 30 C. Temperatures above 37 C will seriously affect the multiplication of Azolla.

The optimum relative humidity is 85 to 90 per cent. The optimum pH is 5 to 7. Too acidic or alkaline pH has an adverse effect on this fern. Azolla absorbs the nutrients from water. Though all elements are essential, phosphorus is the most common limiting element for its growth. About 20 ppm of phosphorus in the water is optimum. Micronutrient application improves the multiplication and growth.

**Cultivation of Azolla**

Selection of location for the pond: It is better to select an area near to the house to ensure regular upkeep and monitoring of the pond. A suitable water source should be nearby for regular water supply. The site under partial shade is ideal or else, shade has to be created to reduce the evaporation of water and also, for better growth of Azolla. The floor area of the pond should be free of pointed stones, roots and thorns that can puncture the sheet and cause leakage of water.

**Pond size and construction**

The size of pond depends on factors like number of animals, quantity of supplemental feed required and availability of resources. For small holders, an area of 6 X 4 feet for Azolla cultivation can produce about one kg of supplemental feed per day. Selected area should be cleaned and levelled. The side walls of the pond can be of either bricks or raised embankment with the excavated soil. After spreading the durable plastic sheet (silpauline, a polythene tarpaulin) in the pond, all the sides have to be secured properly by placing bricks over the side walls. After the inoculation of culture, the pond needs to be covered with a net to provide partial shade and also, to prevent the fall of leaves and other debris into the pond. Thin wooden poles or bamboo sticks are to be placed over the pond walls to support the shade net. Bricks or stones can be used as weights on the edges for securing the plastic sheet and also, the net over the pond area.
Maintenance of pond

Sieved fertile soil mixed with cow dung and water need to be spread uniformly in the pond. About one kilogram of fresh Azolla culture is needed for a pond of 6 X 4 feet size. It has to be applied uniformly in the pond. Biogas slurry can also be used instead of dung. The depth of water should be four to six inches. During the monsoon season, if rain water can be harvested from the roof tops and used for cultivation of Azolla, it will ensure excellent and faster growth of Azolla. If the total salt content of the water used for growing Azolla is high, it will adversely affect the growth.

Application of about one kg of cow dung and about 100 grams of super phosphate once in two weeks will ensure better growth of Azolla. Any litter or aquatic weeds seen in the pond should be removed regularly. The pond needs to be emptied once in six months and cultivation has to be restarted with fresh Azolla culture and soil.

Harvesting and feeding of Azolla

Depending on the initial quantity of culture added, environmental conditions and nutrition, Azolla's growth in the pond will be complete in about two to three weeks time. It can be harvested daily after the full growth. Plastic sieves can be used to harvest the biomass from the pond's surface. About 800 to 900 grams of fresh Azolla (mean yield per day in a season) can be produced from an area of 6 X 4 feet. Azolla can be fed to the livestock either in fresh or dried form.

It can be given directly or mixed with concentrates to cattle, poultry, sheep, goats and rabbits. Studies revealed that feeding of Azolla @ 800 grams (fresh weight) on an average per day, improved the monthly milk yield by at least 10 liters per cow and 5% Azolla (dry matter basis) in the diets of broiler chicken is more profitable. It takes a few days for the animals to get used to the taste of Azolla. So, it is better to feed it along with the concentrates in the initial stages. Azolla has to be washed thoroughly with fresh water to remove the smell of dung.