

Azola for Ecological Agriculture

The conventional chemical farming in India has become completely dependent on fossil fuels in recent years. Overdependence on chemical fertilizers renders the soil barren and, as recent studies show, leads to lower agricultural output. Several initiatives to grow food organically are gaining ground. These initiatives are also closely linked to the traditional method of having cattle as an integral part of Indian agriculture. Even now most of the Indian farmers use cattle for tilling and for manure needs. But recently, the availability of organic inputs has declined because of lack of fodder and shrinkage in community grazing area.

One of the major problems is generating sufficient farmyard manure or enriched biomass. Several innovative methods like rapid compost making have helped. But azola cultivation and vermi-composting have the potential to emerge as the most pivotal alternatives that could help bring back some much needed health to the soil. Vermi-composting is very efficient in adding nourishment to the soil but the worms are too sensitive and vulnerable. Compared to vermi-composting, azola is much easier to cultivate. Additionally, it is probably the only plant that serves both as fodder and manure.

The importance of azola as a sustainable alternative lies in its usage as a nitrogenous input substitute and as nutritious cattle feed.

Azola is very rich in proteins, essential amino acids, vitamins A, B12 and Beta-carotene, growth promoter intermediaries and minerals like calcium, phosphorous, potassium, ferrous, copper, magnesium, etc. On a dry weight basis, it contains 25 to 35 percent protein, 10 to 15 percent minerals and 7 to 10 percent of amino acids, bio-active substances and bio-polymers. The carbohydrate and fat content of azola is very low. Its nutrient composition makes it a highly efficient and effective feed for livestock. Livestock easily digest it, because of its high protein and low lignin content, and they quickly grow accustomed to it. Also, it is easy and economical to grow.

One kilogram (kg) of azola per cattle per day will substitute two kgs of factory-produced feed. Milk yield will also increase by 15 to 20 percent. In real terms, a farmer will save at least Rs.500 on feed and get an additional income of Rs. 300 per month by way of increased milk yield. If azola is grown in paddy fields, it yields around 750 tonnes of biomass per year if properly harvested. Even if it's tried in a quarter of an acre for three months, it can substitute the nitrogenous chemical inputs.

Azola can be grown as a cattle fodder in a very small pond of 2x2x0.15mts, with a plastic sheet cover. This small pond can yield 1kg of azola per day. During the summer, farmers find it difficult to feed the cattle with green manure. Generally they feed them dry stalks of millet or paddy as fodder. Azola can supplement as green fodder even during summer. Farmers who are trying it have found it extremely useful and beneficial.

Considering the fact that India uses over 15 million tonnes of chemical fertilizers, of which around 70 percent is nitrogenous fertilizer, shows the importance of a humble plant like azola as an ecological sieve to reduce the harmful impacts of green house gases. And its importance is further augmented by the very fact that it can be grown in our own backyard with very small quantity of water. Even the water used to cultivate azola can be used as liquid manure. Azola fern even grows in water containing metals like copper, cadmium, zinc, chrome and nickel. It is capable of absorbing and concentrating them in the plant tissues at concentrations up to 500 times the concentration of the metals in the water. It was found that when the dried plant was added to tanks of polluted water, the plant absorbed the metals.

Though the uses of azola are known at academic levels, there is a need to take it to people in a big way.

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