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Smart Farming by Cultivating Azolla – An Innovative Information to Farmers from KVK Chinnasalem

Available arable land is limited and the nitrogenous fertilizers are polluting the environment. Currently the use of biofertilizers in crop production is gaining importance to reduce the pollution. It is important that cropping systems must be developed which do not rely on inorganic nitrogen based fertilizers. The Azolla is a well-known biofertilizer as an alternate source for the nitrogen based fertilizers. Since its rapid growing, N -fixing symbiosis, potential productivity phenomenon helps the farmers to reduce nitrogen based fertilizer application cost. Besides, due to its nutritional property, it can be used as feedstock for the animals such as poultry, pigs, dairy, fish, goat, and sheep.

INTRODUCTION

Azolla is a small aquatic fern with a branched stem and bilobed leaves. The roots which emerge from the stem help to float on water. It is generally found floating on stagnant water bodies. There is a small cavity on the upper most part of the leaf which houses as many as 80,000 cyanobacteria (blue green algae) as a symbiont which has N fixing capacity per ha and make it available to Azolla. When the plant dies and decays in the soil nitrogen becomes available to plants.

AZOLLA CULTIVATION

Cultivation of Azolla, a shallow fresh water pond is ideal. The step by step procedure of Azolla is as follow:

SELECTION OF LOCATION FOR THE POND

It's better to select an area to ensure regular maintenance and monitoring of the pond. It will

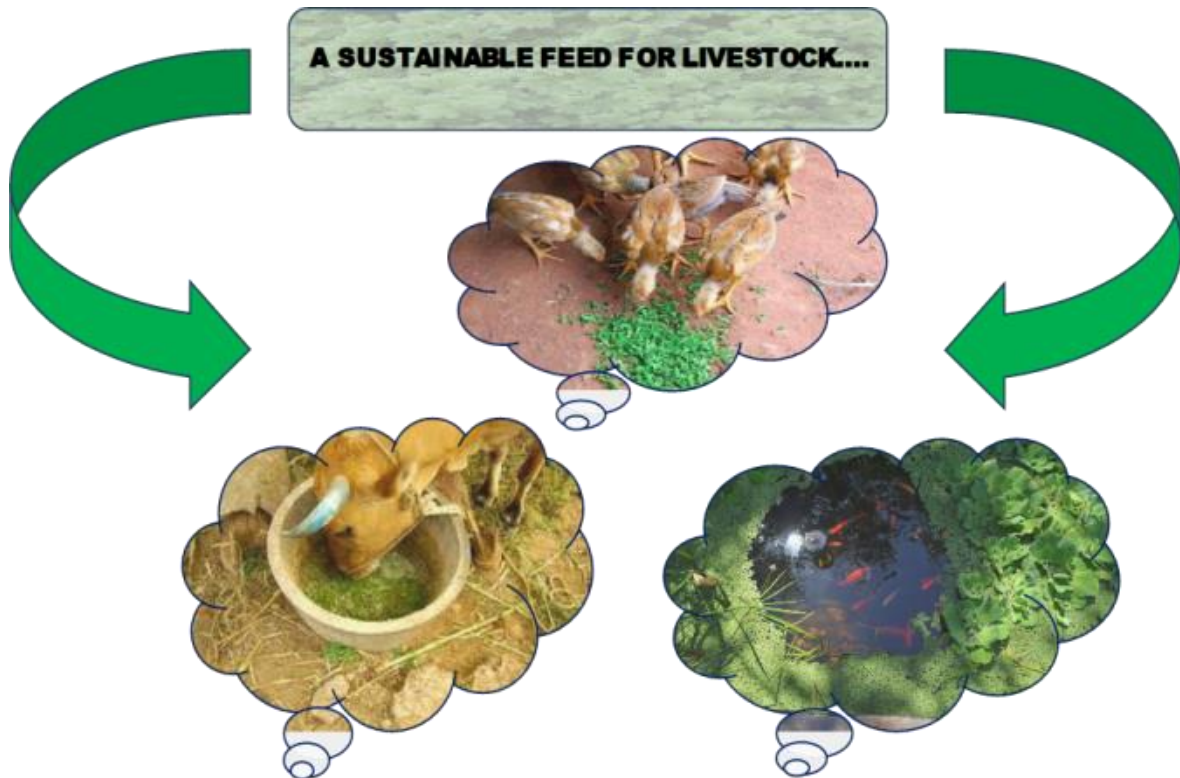


feed required and availability of resources. For small holders, an area of 6 x 4 feet for Azolla cultivation is sufficient to produce about one kg



minimize the evaporation of water and also, ensures better growth of Azolla. The floor area of the pond should be free of pointed stones,

of supplemental feed per day throughout the year. Selected area should be cleaned and leveled. The side walls of the pond can be of



roots and thorns that can puncture the sheet. If that happens, the holes in the sheet will cause leakage of water.

POND SIZE AND CONSTRUCTION

The size of pond depends on factors like number of animals, quantity of supplemented

either bricks or raises 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. The sheet should not have any holes or cracks

to prevent the leakage of water. After the inoculation of culture, the pond needs to be covered with a net to provide partial shade and also, to debris into the pond. Thin wooden poles or bamboo sticks are to be placed over the pond walls to support the shade net.

AZOLLA PRODUCTION

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 and applies uniformly. The depth of water should be maintained up to four to six inches. The bottom of the pond needs to be evenly leveled to ensure uniform depth of water in the entire pond area. During the monsoon season



HARVESTING AND FEEDING OF AZOLLA

Plastics sieves can be used to harvest the biomass from the ponds surface. If any litter is noticed in the pond, it should be removed. One kg of fresh Azolla can easily be produced from an area of 6 x4 feet.

LIVESTOCK FEED

Green plants have long been recognized as the cheapest and most abundant potential source of proteins because of their ability to synthesize amino acids from a wide range of virtually unlimited and readily available primary materials. Azolla is very rich in proteins, essential amino acids, vitamins (vitamin A, vitamin B12, Beta Carotene), growth promoter

intermediaries and minerals including calcium, phosphorous, potassium, ferrous, copper, magnesium. On dry weight basis, azolla has 25-35% protein content, 10-15% mineral content, and 7-10% comprising a combination of amino acids, bio-active substances and biopolymers. Azolla's composition therefore makes it one of the most economic and efficient feed substitutes for livestock.

CATTLE

Fodder is an important requirement for cattle. Even if the animals are fed with commercial feeds from the market, fresh green grass or dry straw is essential as fodder availability greatly reduces the expenditure on commercial feeds. The success of a dairy plant depends

largely on increasing milk production without escalation in feeding cost. Growing fodder grass is a good option. Although the demand for milk and meat has increased in countries such as India, there has also been a substantial decline in fodder production owing to the decreasing forest and grassland areas. The fodder availability from various crops has also

decreased largely due to the introduction of high yielding dwarf varieties. Shortages of fodder are therefore being compensated with commercial feed, resulting in increased cost of meat and milk production. Moreover, as commercial feed is mixed with urea and other artificial milk boosters, it has a deleterious effect on the quality of milk produced and the longevity of the livestock, which in turn leads to degenerative diseases like cancer and coronary ailments in human beings.

FISH

- Availability of nitrogen, which can be a supplement for the livestock. The primary

limiting factor for productivity of tropical aquatic ecosystems is often the bioavailability of Azolla-*Anabaena*.

- Approximately 95% of the cost of formulating an average production diet is related to meeting protein and energy needs of the fish,

CONCLUSION

Azolla is a nutritive feed supplement for the livestock. Azolla is an ideal feed for livestock and it definitely reduces cost on feed and fertilizer. Adequate consideration should be given to the preference of each target fish to particular species of Azolla before they are used as feed. Azolla as a complete diet for high-density cage culture may not be economically viable. However, Azolla may be useful in low

density and low input cage culture. The high rates of decomposition of Azolla make it a suitable substrate for enriching the detrital food chain or for microbial processing such as composting, prior to application in ponds. As fish food in Azolla-fish pond culture, Azolla contributes directly to weight gain of macrophytophagous fish. At the same time, increased production of fish feces from azolla fodder may be directly consumed by bottom dwellers in addition to being used as an organic (nitrogenous) fertilizer to increase overall pond productivity. However, it should be understood that although the contribution of Azolla to aquaculture is interesting, it alone could not ensure high productivity. It can be a useful supplement to natural feed in low-input aquaculture.