

Scope and Cultivation of Fodder Crop in Red-Lateritic Zone of West Bengal

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Agriculture development is targeted with livestock rearing and both are inseparable it plays pivotal role in sustainability of this enterprise. Livestock contributes enormously in food and nutritional security apart from livelihood security to rural population all over the world. India has the largest number of livestock, representing over 17% of world population. Availability of forage legumes is essential for better animal health, production and increasing the nutritive value of forage-based rations, besides providing a source of biological nitrogen fixation for enriching soil, reducing land degradation and mitigating climate change. India with only 2.29% of land area of the world, is maintaining nearly 17.4% of world human population and 10.7% of livestock (more than 510 million heads) creating a huge pressure on land, water and other resources. Furthermore, some part of our country is also largely inhabitable due to harsh climate as reflected by very low population density (Roy *et al.*, 2019). In India, West Bengal is a fodder deficient state due to huge population pressure, low land holding capacity and poor extension activity. There exists a huge gap between requirement of fodder and its availability. While the state has surplus of availability over requirement in respect of dry fodder to the tune of 53.4%, it has a nightmare-like situation as far green fodder is concerned. Deficiency of green fodder is 99.60% implying that the state is able to provide only 0.40% of the requirement. Risks in rainfed agriculture has generated narrow range of fodder cultivation in red lateritic belt of West Bengal due to farm distress problem. Less fodder availability become lead to overgrazing problem in Jhargram and its adjoining block as per our personal experience from last two years (2021-2023). Overgrazing reduces the usefulness, productivity and biodiversity of the land and is one cause of desertification and erosion. Overgrazing is also seen as a cause of the spread of invasive species of non-native plants and of weeds (Saha *et al.*, 2023).



Fig 1: Grazing problem in cultivated land



Fig 2: Grazing problem in orchard plantation

India does not have natural pasture land due to climatic conditions. Grazing lands in the country have come up only due to removal of vegetation. This also greatly distort soil fertility and it's economic value (Mukherjee, 2014). To add to the problem, the scope of increasing area under cultivated forage is rather limited because of the preference given to production of "human food". Free grazing of land also causes untold damages to the natural regeneration of the land.

Forage crop and importance

Agricultural, livestock and fodder & forage cum food related interventions were very important for socio-economic uplift of tribal farmers/families particularly in red-lateritic belt. The agricultural economy in this zone is predominantly characterized and supported by the small and fragmented holdings. The average size of holding is less than one ha and per capita availability of land is just 0.16 ha. The

challenges of ushering for fodder for animal feed is now just below 2%, is showing sharp indication of dwindling productivity and becoming more complex with the vagaries of weather reflected through the changing rainfall pattern, distribution of mean temperature and increased frequency of extreme weather phenomenon like cyclone, heat/cold wave, flood and drought etc. Red and Laterite zone mainly covering the districts of Birbhum, Bankura, Purulia, Jhargram and west Medinipur, are list bother about forage crop cultivation. Forages form the main stay of our animal farming to reduce the competition between human beings and animals due to increasing demand for land and other inputs. Sole feeding of green forages to dairy animals is much cheaper than feeding concentrates with crop residues and has the potential of higher level of milk production. Main forage crops gama, rice bean, oat, hybrid napier, para-grass, and lathyrus become very profitable in Binpur I and II block of Jhargram district. However, supply of quality green fodder is extremely precarious, and the gap is huge against demand. The major fodder legume crops which become cultivate in other part of latertici belt are *Medicago sativa*, *Trifolium alexandrinum*, *Vigna unguiculata*, *Vigna umbellate* and range legumes are *Stylosanthes* spp. and *Desmanthus virgatus*.

Fodder crop in crop sequence

More values for below-ground N as a percentage of the total plant N are 22–68% for the pulse and oilseed legumes, *Glycine max*, *Vicia faba*, *Cicer arietinum*, *Vigna radiata*, *Lupinus albus*, *Pisum sativum* and *Cajanus cajan* and 34–68% for the pasture/fodder legumes, subterranean clover, white clover and alfalfa become also very popular in different blocks. Fodder crops are cultivated and harvested for feeding the animals in the form of green forage, silage, hay or other forms. This is not only using as good source of fodder for grazing animals, but also for improvement of soil quality aspect also. Further, more biomass yielding of napier hybrid grass in one of the important perennial forage grasses which can able to increase carbon sequestration through extensive root system and the consequential improvement of soil productivity. Identification of cropping systems introducing forage as a component

crop either as intercrop or a sole crop e.g. rice - fodder oat - sesame; rice -fodder lathyrus- fodder moong; rice bean- fodder oat – fodder moong become good for higher economic output.

Heat stress and crop cultivation

The impacts of climate change are increasingly threatening fodder crop sustainability and food security (Mukherjee, 2022). Particularly, the crops that rely on rainfed cultivation are highly vulnerable to heat and drought stress, affecting plant growth and development. This ultimately affect the livestock farming aspect. Heat stress or exposure of plants to high temperatures during crop growth period is a major impediment to forage crop production in red-lateritic belt of west bengal. Heat stress leads to an array of morphoanatomical, physiological and biochemical changes in plants, which affect plant growth and development eventually reducing economic yield. Heat stress is often the rise in temperature beyond a threshold level for a period of time sufficient to cause irreversible damage to forage plant growth and development. In general, a transient elevation in temperature, usually 10–15°C above ambient, is considered heat shock. High temperature, in general adversely affects photosynthesis, respiration, water relations, membrane stability and production of ROS (Reactive Oxygen Species) and anti-oxidants, accumulation and adjustment of compatible solutes etc. Due to erratic rainfall pattern and early withdrawn of winter, cultivation of green fodder or legume-based fodder production affected significantly and animal bound to graze crop field such as maize, blackgram or mustard field etc.

Strategies to improve fodder availability

- ❖ Optimum utilization of land resources.
- ❖ Improving production by using high yielding fodder varieties.
- ❖ Enhanced fodder seed production and supply of good quality seeds of forage crops to the resource poor farming community.
- ❖ Adopting suitable crop combinations.
- ❖ Forage production for proper utilization of marginal land and conservation of natural

resources, particularly in red and lateritic zone in rice-based cropping sequence.

- ❖ Improvement of grasslands/wastelands and other community lands.

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