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# Fodder Policy for Andhra Pradesh State

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Dairy farming is one of the major contributors in transforming livelihoods and socio-economic status of rural poor for the past 4 decades. Dairy in Andhra Pradesh (AP) is mostly in smallholders hand with an average holding of 2.5 animals per household. Income from dairy represents around 12-25% of the rural household which figured out to be ₹ 12,840/- per annum. With breedable bovine population of 5.4 million, AP state is producing 8.8 million tons of milk per annum (AHFS, 2013). However, the average milk yield per animal in milk still hovers around 5-7 l/d in crossbred cow and improved buffaloes in Andhra Pradesh which was considered to be very low. Main constraints for low productivity in improved cattle and buffaloes in A.P. were shortage of feed/fodder to an extent of 32.9 million tons (NIANP report, Bangalore), poor quality of crop residues, price of fodder and imbalanced feeding. In fact high demand for, shortage of crop residues is reflected on the price of crop residues (straws, stovers etc.) which approach now about 50% that of grain price in the market.

Main feed resources for dairy animals include, crop residues, greens from cultivated fodders, forests, permanent pastures, fallows etc. and by-products from agriculture based industries. Inventory of feed and fodder base in AP at district level based on land utilization and cropping pattern in the year 2009-10 revealed that dry matter from crop residues, greens and concentrates was available to an extent of 15.05, 6.61 and 1.97 million tons whereas requirements were 22.69, 20.10 and 11.76 million tons, respectively indicating deficit of 7.64 million tons crop residues, 13.49 million tons green fodder and 9.79 million tons of concentrate dry matter. When calculations are made based on the available feed base in AP, crop residues constitute 61% of the ruminant diets, about 6% by concentrates and the remaining 33% from planted fodders and public lands. The advantage with crop residues production system is crop residues can be produced without additional allocation of land and water. Hence, targeting crop residues and their improvement should be first priority followed by green fodder and agro-industrial by-products.

Crop residues, particularly, cereal crops are often considered to be of qualitatively low nutritional feeds since their digestibility was poor. Approaches for upgrading the nutritional value of crop residues by physical, chemical and biological means have been developed in the past but haven't been widely adopted due to various reasons. But multi-dimensional crop improvement program resulted in identification and release of superior dual purpose cereal and legume crops popularly known as food-feed crops with higher quality of crop residues without compromising on grain/pod yields and stover/straw/haulms yield. Quality sorghum stover with 5 units higher digestibility with value addition through fortification (concentrates) and densification (block making) resulted in 41% increase in milk production with cost benefit ratio of 1:6 and doubled the weight gain in sheep. With such superior sorghum stover a milk production level of 16.5 l in buffaloes and 20 l per day in crossbred cows can be supported. Similarly maize stover from a superior cultivar replaced a superior sorghum stover with higher digestibility without affecting the performance of milk and meat producing animals.

Plant breeders working on development of new variety or hybrid of green fodder

(annual/perennial) they are focusing on biomass yield neglecting the nutritional quality (digestibility) of them. Whether the feed base is crop residues or green fodder it's not only biomass yields but also digestibility needs to be targeted when developing a new variety/hybrid/cultivar. Just by targeting 3% improvement in the digestibility of existing cereal and legume crops as well as cultivated fodders 45 lakh liters per day (LLPD) additional milk can be produced in Andhra Pradesh without much investment. By changing the cultivar with higher digestibility without compromising on grain/stover yields, an additional milk production of 500 l from stover biomass of 1 ha can be achieved without any additional investment and the bonus is reduction of methane emission by 24 kg (approx. 600 kg carbon dioxide equivalent) per ha of stover biomass.

Processing of crop residues have impact on intake and performance of dairy animals. Simple chopping and feeding increased the milk production by 0.4 l/d. Advanced processing methods like mashing, blocking and pelleting can also be employed for better performance but when examined in terms of economics they work context specifically but not generally. If the crop residues are used locally simple chopping is economical whereas if needs to be translocated (100 km distance) mashing may be economical.

Bringing additional land under green fodder cultivation is excellent and production cost can be minimized. However, Green fodder cultivation needs additional allocation of natural resources such as land and water. If land and water allocation cost is included will green fodder based production system is economical or not needs to be examined. Further, increase in human and livestock population, urbanization industrialization causing change in land utilization pattern. This may be an issue in the near future. In the context of above issues promoting green fodder based production system needs to be rationalized. The other important factor needs to be considered with green fodder is development of water economy forage crops and promoting them as cash crop in areas where demand is there for green fodder. Fodder markets (both for green fodders and stovers) may be developed in areas where dairy farming is practiced commercially. Development of organized fodder markets influence livelihoods of rural farmers. In addition, promoting edible cactus cultivation in waste lands needs to be considered to uplift the feed base status in AP since it withstands in harsh semiarid environments and produces 20 times more than maize grain energy per unit of land. Finally integrating the livestock in farming systems and looking at whole farm productivity economics is going to be helpful in future for fodder policy making by the State government.

In the recent fast frequent drought spells due to climate change are drastically affecting the productive and reproductive performance of dairy animals. Under these circumstances development of fodder banks/fodder grids and animal hostels may be the need of hour. However, at what level (state/district/mandal/village) and in which mode (public/private/public-private) these fodder banks/grids needs to be established has to be evaluated keeping economics as main factor.

**Short term approach**

1. Inventory of feed and fodder base at the mandal level to plan feed and fodder policy at district and State level by the policy makers.

2. Examining the existing cultivars of cereal, legume and green fodder crops and identifying ones with superior fodder quality without compromising on grain and stover or biomass yield for dissemination in large area by making available seed. Making available a good variety of seed to the farmers makes difference in their livelihoods to a great extent.
3. Improving the utilization of crop residues through context specific fortification and densification approach for economic milk and meat production.

4. Development of small scale business models around feed and fodder not only to provide

service to the livestock farmers by encouraging rural youth and women SHGs but also a kind of livelihood activity for the rural youth and women SHGs.

5. Cultivation of high yielding grass-legume pastures and fodder trees on bunds need to be promoted to mitigate the shortage of fodder to the extent possible.

6. Intercropping of cereal food crops with fodder legumes wherever possible to promote nutritionally balanced fodder production and soil fertility.

7. Knowledge sharing and capacity building of line department staff on cultivars, fortification and densification, small scale business models around feed and fodder and balanced feeding will percolate the knowledge to the gross root level very effectively.

**Long term approach**

1. Nutritional quality of biomass needs to be made as one of the criteria by the plant breeders while developing a new cultivar (variety/hybrid) in addition to grain/stover/biomass yield while developing a new cultivar (variety/hybrid) in cereal, legume and green fodder crops.

2. Research on water economy forage crops and edible cactus needs to be initiated by the State government involving State, National and International research organizations.

3. Different models of establishing fodder banks needs to be evaluated and suitable economic model under different modes needs to be identified and scaled up in the State.

4. Development of fodder markets in an organized manner in and around commercial livestock farming areas and linking rural farmers to sell fodder in the fodder markets as a source of income while strengthening fodder base in the State.

5. Research on whole farm productivity under different cropping systems by integrating livestock involving different research institutes is important for future fodder policy making.

6. Regulatory mechanism on quality control of feed ingredients and finished feeds in the State so as to ensure quality feed ingredients and finished availability to the livestock farmers.

7. Establishment of a separate 4 tier institutional mechanism to promote feed and fodder activities through seed production, distribution, saplings, quality feed ingredients and finished feeds supply besides extension activities on livestock.

8. Development of weather forecast based system for assessing the feed and fodder base and accordingly advising the State Government to take measures to overcome feed/fodder deficit during the year of adverse climatic conditions.