Scope of Forage and Fodder Production in the North-eastern State of Tripura, India

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Abstract

Tripura has a large livestock population-a resource that provides livelihood opportunity an employment to over 75% of rural people. In, Tripura different types of forage and fodder crops are grown for the managing livestock feed demands; some of the important fodder crops grown are fodder maize, cowpea, oat, fodder sorghum etc. The shrinking land base and natural resource degradation restricts grazing, forage and fodder availability. In India fodder sub-sector of Agriculture sector's direction for future is vague in nature. Though Government of India through various cells like IGFRI, Fodder cell in animal husbandry department taking innumerable initiatives to change the fodder management status in India. But this organizing effort is not effective enough to change the conditions comparing to other developed countries. The strategies for bridging the gaps in demand and supply of feeds and fodder crops are discussed in relation to the available niches. It is possible to meet the challenge with all round development in the area of fodder, grassland and crop residue production improvement. Hence, this case study is a special attempt to recognize the Indian as well as Tripura Fodder Industry as Public and Private Sector Myopia or vision. This study is mainly based on the secondary data collected from the various sources like published report of Government of India, Government of Tripura, Web Articles, Journals, research report.

Keywords: **C**rop residue, fodder, forage, grassland, Tripura

1. Introduction

Tripura is the second smallest state in north-east comprising a land area of 10494 km^2, which is predominately hilly. More than 75% of the state population are depends on agriculture, in agriculture animal husbandry, fodder, forage and pasture development is integral part. Green fodder is an important component for livestock feed and nutrition but presently India faces a net deficit of 61.1% green fodder, 21.9% dry crop residue and 64% concentrated feeds. The livestock is the sub-sector of agriculture which adds almost 32% of agricultural output (Datta, 2013). India accounts for 15% of the World's livestock population and only 2% of the World's geographical area are resulting into a tremendous livestock pressure on the limited land resources (Kundu et al., 2015). On the other hand cultivated area under fodder crop is about 8.4 mha, which is about only 5% of the total cultivated area and mostly concentrated northern and north-western part of the India. Accordingly, the availability of green and dry fodder is in deficit on an average to the extent of 53% (Hazra, 1998) which may further increase to the extent of 65% in 2025. There are many ways to fulfil the deficit of fodder in India as well as to the Small north-east state Tripura to supply green fodder and hay to the animals.In, Tripura most of the cultivable land is occupied by major and minor cereal, oilseeds, pulses and other crops but still vast land is remain uncultivated. There is huge scope of growing different fodder crop like barseem, lucerne, fodder maize, fodder sorghum, cowpea, oat, combo Napier etc. The forage, fodder and pasture is utilized for the production of milk, meat and their products, which play very important role in food security and nutrition of human being (Chatterjee and Das, 1989).

2. Importance of Forage and Fodder

Elevitch and Wilkinson (2000) pointed out that fodder and forage crops have several applications and uses and hence they serve as good sources of living fence, improved fallow, improved pasture, mulch, bee forage, fuel wood, timber, food, fertility enhancement, soil stabilization, beauty, Oxygen, wildlife habitat, increased self-sufficiency, nutrient cycling, farm diversity.

The projected livestock population estimation in India are based on 10 and 11th five year plan document, Government of India, which shows the increasing rate of livestock population. So it is important to maintain the sustainability in livestock feed and fodder but presently the nation facing the shortfalls of livestock feed and fodder. Domestic animals populace is

just about 500 million and is projected to rise at the rate of 1.23% in the near future (Table 1).

Table1: Projected livestock population estimates (million adult cattle units)

Year	Cattle	Buffalo	Sheep	Goat	Equine	Camel	Total
1995	180.5	82.8	4.0	9.2	0.5	0.9	278.0
2000	187.1	87.7	4.1	9.9	0.4	1.0	290.0
2005	192.2	92.6	4.2	10.5	0.3	1.0	301.0
2010	197.3	97.5	4.3	11.2	0.3	1.0	312.0
2015	202.3	102.4	4.4	11.8	0.1	1.1	322.0
2020	207.4	107.3	4.5	12.5	0.1	1.1	333.0
2025	212.5	112.2	4.6	13.2	0.1	1.1	344.0
2030	217.7	117.3	4.7	13.9	0.1	1.1	354.8

Fodder pedestal cheaper forage and feed techniques are requisite to diminish the charge of superiority livestock produce as the fodder only comprises 70% of the milk creation rate (Singh, 2016). Presently, there is marvellous stress of animals fodder on accessible sum of forage and feed, as cultivated land obtainable for fodder cultivation has been declining. Approximately, India currently is facing a mesh shortfall of 64% feeds, 61.1% green fodder and 21.9% dry crop residues. Supply and demand situation of feed and fodder are mentioned in Table 2. From the Table 2 its appears that if India wants to meet up the existing stage of fodder produce and wants to meet up the prerequisites of the increasing rate

Table 2: Supply and demand scenario of forage and roughage till 2030 (in mt)

Year	Supply		Demand		Deficit as % of demand	
	Green	Dry	Green	Dry	Green	Dry
1995	379.3	421	947	526	59.95	19.95
2000	384.5	428	988	549	61.10	21.93
2005	389.9	443	1025	569	61.96	22.08
2010	395.2	451	1061	589	62.76	23.46
2015	400.6	466	1097	609	63.50	23.56
2020	405.9	473	1134	630	64.21	24.81
2025	411.3	488	1170	650	64.87	24.92
2030	416.7	503.4	1207.1	670.6	65.45	24.90

Source: Based on 10 & 11th five year plan document, Government of India

of livestock population which will meet the requirements of growing human population, tremendous and serious efforts are required. To make a proper balance India has to fulfill the fodder deficit from all corners of fodder including dry crop residues and feed after utilizing uncultivated land, unexploited feed reserves and increasing fodder productivity in mass scale.

As it is revealed that India is facing fodder scarcity, simultaneously Indian feed and fodder for livestock are also having nutrients insufficiency. It is also found out that the fodder qualities are not healthy and does not meet the feeding standards. The deficit and supply in crude protein (CP) and total digestible nutrients (TDN) of livestock feed and fodder in India are given in Table 3 excluding concentrate and in Table 4 including concentrates.

Table 3: Projected availability, requirements and deficit of CP and TDN (excluding concentrate) (mt)

Year	Requirement		Availability		Deficit (%)	
	CP	TDN	CP	TDN	CP	TDN
2000	44.49	321.29	25.02	219.26	43.76	31.76
2005	46.12	333.11	25.70	225.94	44.28	32.17
2010	47.76	344.93	26.12	229.80	45.31	33.38
2015	49.39	356.73	26.79	236.48	45.76	33.71
2020	51.04	368.61	27.18	239.94	46.75	34.91
2025	52.68	380.49	27.85	246.61	47.13	35.19
2030	54.37	392.70	28.53	253.46	47.51	35.47

Source: Based on 10 & 11th five year plan document, Government of India

Table 4: Projected availability, requirements and deficit of CP and TDN (mt) including CP and TDN from concentrates (mt)

Year	Requirement		Availability		Deficit (%)	
	CP	TDN	CP	TDN	CP	TDN
2000	44.49	321.29	30.81	242.42	30.75	24.55
2005	46.12	333.11	32.62	253.63	29.27	23.86
2010	47.76	344.93	34.18	262.02	28.44	24.04
2015	49.39	356.73	35.98	273.24	27.15	23.41
2020	51.04	368.61	37.50	281.23	26.52	23.70
2025	52.68	380.49	39.31	292.45	25.38	23.14
2030	54.37	392.70	41.20	304.11	24.22	23.32

Source: Based on 10 & 11th five year plan document, Government of India

The predictable vitality in the international and domestic economic environment would carry about extensive transformation yet in the dairy segment. These revolution comprise, appearance of great range (more than 200 animals) profitable dairy farmers in numerous supplementary provinces excluding in Punjab, Andhra and Maharashtra, wherever several such profitable ranch are currently situated. In addition, additional increase of information and communiqué expertise would make easyde-intermediation of milk market carrying concerning alteration of the widespread conventional

unorganized milk market scheme into a contemporary planned milk dispensation and marketing arrangement. The beginning estimations of the situation preparation in India accepted out at NDRI illustrate that the split of buffalo pedestal production scheme in entirety milk production will enlarge from present stage of 44% to concerning 49% by 2035 (Table 5). In the

Table 5: Projected demand supply scenario of different dairy production schemes in 2035

Dairy production systems	Milk supply (mt)	Nutritional demand (mt)	Economic demand (mt)	Surplus/ deficit (mt)
Buffalo production system	111.890 (49.36%)	38.990	96.051	+15.839
Cow production system	71.730	61.361	72.426	-0.696
Mixed production system	43.070	34.605	62.703	-19.633
All-India	226.69	134.956	231.18	-4.49

Source: Based on 10 & 11th five year plan document, Government of India

buffalo leading and cow prevailing production organizations, the contribution of milk would moreover exceed its demand or be able to convene the increase in commercial demand for milk and milk food stuffs, as the financial services attached with progress proposals in these provinces would guide to enrichment of the production of dairy animals. However, in the diverse production arrangements, viz., wherever mutually, cows and buffaloes are stern in 40:60 or 60:40 proportion, the demand for milk would far-outshine its supply, as in the nonattendance of obvious center of the dairy expansion program in the province, the enlarge in production of dairy animals is probably to be of inferior scale along with the huge fodder deficit as it mentioned above. Table 5 represent the brief futuristic outlook of Indian diary sector where it can be seen very clearly that in all India dairy production system basis the nation may face milk deficit of -4.49% by 2035.

3. Strategy for bridging the Gap and Anticipated Impact (Pathak, 2003)

I. Establishment of fodder banks. This should be the strategy for drought and flood prone areas of the country and should aim at transporting economically baled dry fodder from surplus areas. Eight major river valleys spread over 40 mha in the country and 40 million populations is affected by floods annually. 74 districts in the country in 14 states and 86 million people are affected annually by droughts.The resource poor livestock owners most often lose their livestock to the fodder scarcity caused by these natural disasters. Establishment of fodder banks will serve the purpose of easing these scarcities. In addition, the surplus forages produced in other parts of the country, currently wasted will also be efficiently utilised and will contribute to reducing regional imbalances.

II. Conversion of fodder into feed blocks.This will support the initiative of setting up fodder banks and will facilitate the economical transport of fodder from surplus areas.

III. Enrichment of straw/stover with urea.This will help in alleviating the nutritional deficiencies to some extent in the absence of availability of adequate quantities of fodder to fulfill the nutritional requirements of thelivestock and contribute to increased production and incomes of the rural populace.

IV. Hay/Silage demonstrations.This will help in easing the fodder scarcities during the lean season and bring about an even distribution of available fodder throughout the year.

V. Use of chaff cutters.This improves the nutritive value of the available fodder and will reduce the wastage currently experienced while feeding.

VI. Fodder seed production-emphasis on seed processing and storage facilities.Quality forage seed in adequate quantities is the key to increasing fodder production in India. This will help in making seed of new cultivars available to the majority of people and aid in extensive adoption of intensive production technologies.

VII. Watershed development programmes.Most watershed programmes have a component of pasture development. There is a need for such programmes to liase with R&D institutions engaged in developing technologies for sylvo-pastoral development to maximise the impact of such efforts.

VIII. Strengthening R&D institutions.The present set-up requires strengthening in manpower and infrastructure at its central and regional levels. Creation/strengthening of infrastructure in North, Eastern and Himalayan Regions and the dry zones of the country.

IX. Setting priorities for forage research.Identification of farmers' needs and preferences and relative importance of various niches, with reference to forages coupled with the database created will help in setting research priorities and will result in need-led technology development and contribute to efficient use of available research resources.

X. Creation of database on forages there is lack of authentic data on area and productivity of forages, which is a major limitation for planning for forage resource improvement. Documentation of such information will help in better focused planning for forage resources improvement.

XI. Transfer of technology – targeting of available technologies for different clientele groups this was found to be the weak link in the technology development-adoption continuum. Intensive efforts at this and creating networks will compound the scope for increasing fodder production in the country. This should go hand in hand with the screening and ex-ante and ex-post evaluation of technologies for social equity, economic

competitiveness and environmental sustainability.

4. Area Which Could be Exploited and Potentiality for Production (Pathak and Kumar, 2004)

I. Bringing larger areas under JFM (Joint Forest Management) -About 10.25 mha of forest area is currently under JFM programmes in the country being managed by the communities, after the government notification in 1990 (Singh, 2008). This trend is likely to continue in the coming years. Enhanced fodder and firewood availability is reported from these communities from different parts of the country where these programmes are in operation. Currently, a dry grass production of 1–2 t ha^{-1} is estimated is these areas.

II. Assuming the trend in expansion of area under JFM continues, the area could be expected to increase by at least 15 mha in the next 25 years. With participatory management and better technical support, a dry grass production of 4 t ha^{-1} can be achieved. This will add about 60 mt of dry fodder each year.

III. Establishment of agro-ecologically suitable sylvo-pastoral systems inthese forest areas will be beneficial both environmentally and economically. The involvement of communities and the modes of usufruct sharing also augurs positively for social equity.

IV. Treatment of cultivable wastelands and area under problem soils-About 13.94 mha of the area in the country is under cultivable wastes and another 11 mha is classified as problem soils being plagued with salinity, alkalinity and waterlogging.

V. Appropriate technologies available if promoted during the efforts to regenerate these areas will enhance fodder production and also contribute to environmental regeneration and sustainability. Treatment of these land classes say even on about 15 mha with improved sylvo-pastoral systems will result in an annual fodder production of 90 mt of Dry Matter $annum^{-1}$.

VI. Promotion of intensive/improved fodder production technologies in cultivated fodder areas-The area under fodder crops has reported to be static for the last 2–3 decades.

VII. Even if improved technologies are adopted only in the area currently under fodder cultivation, the production can be at least doubled. An increase in green fodder production to the tune of 300–350 $mtannum^{-1}$ is possible.

VIII. Scientific utilisation of traditional pastures-About 2.59 mha is under pastures in Western India in the states of Gujarat and Rajasthan. In Himachal Pradesh it is about 1.2 mha, accounting for 35.5% of the total area in the state. These are especially important for the landless livestock keepers, whose livelihoods depend on the health and productivity of these pastures.

IX. If the fodder production from these pastures can be doubled using improved technologies and grazing management, there can be an addition of 36 mt of fodder from these areas.

X. Regulating grazing in tune with the capacities will ensure the sustainability of these pastures. There is a need to upgrade information on grazing lands and grazing resources with the help of remote sensing and GIS approach.

5. Conclusion

By judicious utilizations of the land and natural resources, we can comprehensibly tackle the upcoming forage and fodder shortage for our livestock in the near future. For that, we need joint efforts from the government, public as well as from the private sectors.

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