SILVO-PASTURE PRACTICES ON LATERITIC TRACT OF SOUTH WEST BENGAL

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Introduction

The lateritic tract of South Western Bengal covers the districts of Bankura, Purulia, part of Birbhum, Bardhaman and Midnapur.

The climate of the area is characterised by a fairly long and hot summer- maximum 49°-and a short winter. Precipitation of monsoon rains between June and September is also scanty providing annual rainfall from 1000 mm to 1400 mm approximately.

Expansion of agriculture in this part took place without any planning and control in the past. So, the tract bears distinct evidence of moderate to extreme losses of soil, complete disappearance of humus. So large areas of the tract are unproductive so remain barren.

The forests exist as enclaves or borders around the agricultural field. All the forests and shrubs bearing areas were vested to the government by 1955 as per Estate Acquisition Act and were notified enmasse as protected forests under the Indian Forest Act and full control of management was assumed by Forest Department. Unfortunately the management of these forests suffered badly due to illicit felling and uncontrolled grazing. Policing attempt to control grazing and illicit felling caused mistrust between foresters and rural communities.

The people of these areas practice single crop agriculture. Paddy is the principal crop grown during rains. Due to large scale paddy cultivation in rains grazing in most of the village land is not possible. Further, hardly any green grass is available during January to April. So the large number of cattle which the villagers maintain are left to wander finding their food. As a result the pressure of grazing in forests is excessive resulting degradation of forests. These cattle have little value as source of milk. They are mostly maintained as source of manure.

Social Forestry Project was initiated in the State in early eighties to bring the village people formally into the management system and to make production system more responsive to community needs. This has resulted into development of the following approaches for working with rural communities (a) Farm and Group Farm forestry (encouraging farmer to grow plants in their hitherto unutilized wasteland), planting of trees in underutilized public lands (roadside, canal banks, railway side, village commons, etc.), management and protection of natural forests by peoples participation, practice of

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agro-forestry and silvopasture as a means of landuse. This article will focus about silvopasture system developed in the area. This system is practised to get livestock outside forests. So, the Social Forestry Wing is involved in fodder production in South West Bengal on Forestry and private lands through fuelwood and fodder project of Government of India in which 3300 ha were planted over three years (1987-89).

Methodology

Fuelwood species like *Eucalyptus* and *Acacia auriculiformis* fodder tree species like *Sesbania grandiflora*, *Leuceana leucocephala* in South West Bengal are planted at a spacing of 4 m × 1.5 m apart and the fodder species like *Pennisetum pedicellatum* (Dinanath) *P. polystachyan* (thin napier), *Stylosanthum guianensis* CV *Schofield*, *S. scabra*, *S. humilis* and *S. hemata* are planted/ sown in between the lines of tree species. The land is ploughed and manured with 2-3 ton farmyard manure. Diammonium phosphate 50 kg per ha, urea 25 kg per ha are applied. After first year annually 50 kg of urea is applied. In case of Stylo, application of cowdung two tons and one hundred kg of superphosphate is applied.

Thinning : Alternate trees of fuelwood are removed in 3rd year and 5th year and fodder tree are pollared at 1.2 m height after 1st season of growth and repeated upto 5th year.

Felling : The fuelwood species will finally be felled in 7the and 8th year.

Yield : The average yield obtained from grass and legume fodder in various areas of laterite zone is given in Table 1.

Results and Discussion

Generally the farm forestry or group farm forestry plantation created in wasteland is having very little undergrowth after two years of its growth. Whereas due to intercropping with grass and legumes the eroded land surface is covered with thick mat of vegetation. This is preventing soil wash and also improving the moisture and organic matter. This is especially in case of legume fodder like *Stylogenthus guianensis* CV *Schofield*. This legume is providing fodder to the farmers in the pinch period (in rains when the fields are under cultivation and in dry season up to March when green grass is

Table 1

Average yield obtained from grass and legume fodder in various areas of lateritic zone

Species	Soil	Fodder yield Quintal/ha/year		
		1st yr.	2nd yr.	3rd yr.
S. guianensis, CV. *Schofield*	Laterite	170	125	112
S. guainensis, CV. *Scabra*	"	125	118	100
P. pedicellatum	"	250	200	180

not available) Green fodder (legume) is not usually available to the animals in this area. The legumes fodder is rich in protein and can replace the concentrates It has been investigated by the Animal Resources Directorate, Govt of West Bengal that 20 kg of green fodder can replace 2 kg of concentrates as a part of daily diet of milching cow. Similarly, *Pennisetum pedicellatum*, an annual grass which grows well in the lateritic soil, if fed fresh and adlibitum can sustain a milk yield of 5 to 7 liters per day without concentrates Though the practice is promising, but the farmers in most of the areas are not interestad for cut and carry method of feeding in view of their large number of low productive cows. Further grazing of such huge cattle population in the limited pasture area is not practicable.

Research needs

Alley farming : The trees like *Leucaena*, *Gliricidia* or *Sesbania* may be sown in dense hedge rows and herbaceous forage may be grown in between. The leaves of the trees may be used to feed livestock as well for improving soil and moisture.

Underplanting of shrubs : *Desmodium*, a natural component in peninsular sal forests as well as *Leucaena*, *Pueraria*, *Centrosema* may be tried as understorey crops in plantations. Besides selection and improvement of the natural fodder shrubs/grass need to be taken up.

Management of fodder trees : Fodder tree crops like several species of *Ficus* (*C. roxburghii*, *F glomerata*, *F. nemoralis*) *Albizia*, *Trema*, *Bauhinia* species etc. are commonly used as fodder tree in this area. Studies are to be taken up on growth, yield of fodders from these trees under different pollarding regimes.

Nutrient studies of fodder trees : The degestible crude protein and other digestible nutrients of the various trees commonly grown are to be determined and feeding trials need to be carried out. The nutrient content of some of the commonly grown trees of West Bengal carried out by Nag (1990) in collaboration with the Forest Department is given in Table 2. This table indicates that most of the species contain 20 to 38% of crude protein.

Conclusion

There is urgent need for reduction of unproductive cattle population in the State. The figure of last two census indicate increase in 31.2% cattle population in the State against All India average of 6%. In West Bengal total area under crop is 5.6 m ha out of which 0.26% is estimated to be sown as fodder crops. The traditional common lands virtually disappeared due to extension of agriculture and surplus lands unfit for cultivation is gradually being converted into forest plantations. So, animals are greatly restricted in their access to forage and thus forest lands are being subjected to increase pressure of grazing. So, practice of silvo-pasture along with the improvement of cattle and reduction of unproductive cattle is essential to bring socio-economic development of the villagers.

Table 2

Percent Proximate Components (on DM basis) of some Fodder Tree Leaves (Mean ± SE)

Tree Name	Family	Dry Matter	Crude Protein	Total Ash	Acid Insoluble Ash	Crude Fat	Crude Fibre	Nitrogen Free extract
1	2	3	4	5	6	7	8	9
Acacia suma	Legu.	30.82 ± 0.36	22.20 ± 0.12	6.61 ± 0.27	3.40 ± 0.24	17.40 ± 1.06	13.35 ± 0 20	46.00 ± 0.32
Adenanthera pavonina	Legu.	34.50 0.95	22.20 0.12	7.74 0.37	3.87 0 26	16.38 0 86	11.90 0.19	42.00 0 29
Ailanthus excelsa	Simi.	22 62 0.47	20.81 0.23	9.50 0.38	4.53 0 28	18.52 0.22	13.54 0.16	38.30 0.65
Albizia lebbek	Legu.	25.40 0 43	24.64 0.42	6.63 0 38	2.20 0.28	20.53 0.30	25 88 0 21	23.30 0.95
Albizia procera	Legu.	22.62 0 47	26 66 0.18	8.20 0.42	3.60 0.28	25.27 0.26	13.34 0.18	27.11 0.58
Anthocephalous cademba	Rubi.	12.30 0.38	20.54 0.15	5.80 0.35	1.51 0.25	16.32 0.72	13.72 0.15	43.96 0.34
Cassia nodosa	Legu.	22 00 1.47	22.56 0.17	3.93 0.43	1.58 0.29	24.14 0.16	24.35 0.20	25.60 0 54
Cassia siamea	Legu.	24.76 0.38	24 72 0 17	6.45 0.38	3.70 0.17	20.54 0 30	12.94 0 09	35 90 0.55
Cassia tora	Legu.	19.50 0 65	21.75 0.15	7.87 0.35	1.31 0 25	20.45 0.25	13.20 0.18	37.27 0.58
Dalbergia latifolia	Legu.	22.80 0.51	24 69 0.39	8.65 0.48	1.55 0.28	17.72 0.89	21.39 0 22	28.09 0 39

(*Contd*.)

1	2	3		4		5		6		7		8		9	
Dalbergia sissoo	Legu.	20.20 ± 0.39		22.73 ± 0.33		7.77 ± 0.41		2.11 ± 0.25		20.57 ± 0.26		31.54 ± 0.18		28.27 ± 0.88	
Giliricidia maculata	Legu.	17.27	0.43	32.13	0.29	9.99	0.29	2.11	0.24	15.57	0.37	12.30	0.13	30.34	0.19
Moringa oleifera	Mori.	16.73	0.42	25.70	0.32	13.12	0.32	1.65	0.25	20.64	0.38	5.92	0.14	35.28	0.66
Peltophoum pterocarpum	Legu.	28.55	0.22	21.08	0.46	6.50	0.36	1.72	0.28	11.40	0.60	8.08	0.14	53.26	0.34
Pongamia pinnata	Legu.	38.67	0.48	19.71	0.47	11.37	0 28	7.34	0.29	15.08	0.34	15.90	0.11	38.45	0.53
Samanea saman	Legu.	25.95	0.47	33.45	0.36	5.03	0.31	1.89	0.23	19.05	0.15	8.46	0.15	35.71	0.89
Sasbania grandiflora	Legu.	23.43	0.19	33.77	0.29	8.33	0.28	2.72	0.25	18.29	0.17	12.08	0.11	27.54	0.61
Toona ciliata	Meli.	22.66	0.27	20.52	0.24	9.12	0.28	5.54	0.28	18.10	0.36	14.76	0.14	38.19	0.45
Trema orientalis	Urti.	19.33	0.19	25.08	0.29	18.57	0 28	11.80	0 20	12.30	0.31	19.16	0.13	25.60	0.43
Trewia nudiflora	Euph.	16.46	0.21	19.40	0.87	8.90	0.22	2.46	0.26	15.78	0.19	19.23	0.12	37.01	0.41

Legu. = Leguminosae, Sima. = Simaroubaceae, Rubi. = Rubiaceae, Mori. = Moringaceae, Meli = Meliaceae, Urti. = Urticaceae, Euph. = Euphorbiaceae.

SUMMARY

Silvo-pasture practice is carried out in laterite tracts of South West Bengal. Adoption of this practice helps in increasing yield of fodder in the pinch period of the year as well as helps in soil and water conservation. Among the various fodder species tried *Stylogenthus guinansis* CV *Schofield* has shown promise to its maximum extent. Though practice is showing promise but the farmers in most of the areas are not interested for cut and carry method of feeding in view of maintenance of low productive cows. So, the reduction of unproductive cows and maintenance of high yielding cattle will facilitate the adoption of stall feeding and the practice of silvo-pasture will be popular.

दक्षिण-पश्चिमी बंगाल के इष्टकिजोय क्षेत्र में चलाई जा रही वन सवर्धन-गोचारण प्रक्रियाएं

ए०के० लाहिड़ी

सारांश

वन सवर्धन-गोचारण प्रक्रियाएं दक्षिण-पश्चिमी बंगाल के इष्टकिजय क्षेत्रों में चला करती हैं। इन प्रक्रियाओं को अपनाने से वर्ष में चारे की कमी पड़ने वाले समय मे चारे की प्राप्ति बढ़ जाती है और साथ-साथ मृदा और जल सरक्षण भी होता है। इसके लिए परीक्षित कुछ चारा वृक्ष-जातियों में से स्टायलोगेन्थस गिनैंसिस कृषिकृत विभेद शोफील्ड सर्वाधिक सीमा तक उत्साहप्रद रही है। यह प्रक्रिया उत्साहप्रद लग रहा है किन्तु इन अधिकाँश क्षेत्रों में किसानों को कम दूध देने वाली अपनी गायों को खिलाने के लिए इसे काटकर ले जाने में रुचि नहीं है। अतः अनुत्पादक गायें कम करने और अधिक दूध देने वाली गाये बढ़ाने से खूंटे बाँधकर गाय पालने की रीति अपनाने की सुविधा बढ़ेगी और वन सवर्धन-गोचारण प्रक्रिया भी लोकप्रिय बनेगी।

Reference

Nag, A. (1990). Nutrient Content of Fodder trees : (*Personal communication*).