

Integration of forage production in rice-based cropping systems for mitigating forage crisis of ruminant livestock – studies in Bangladesh

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Introduction Intensive rice cropping in Bangladesh is causing alarming shortages of forage and low ruminant productivity. This is also causing degeneration of soil fertility. Therefore it is imperative to identify some approach to integrate fodder production into rice cropping systems on rural farms. The integration of legume forage may improve soil fertility and soil structure, thus enhancing crop yield and may provide high quality feed for livestock (Haque 1992). Studies were done to investigate the effects of rice/forage integration on forage yield, soil fertility and also on milk yield of cows fed on the grown forages.

Materials and methods Several legume forages were tested for yield, nutrient composition and nutritive value. The best two of these, *Sesbania rostrata* and *Lathyrus sativus*, were selected for two seasons (wet and dry, respectively) for application under farm conditions. Studies were carried out for 3 consecutive years, from 1997 to 2000. Yield of forages and effects of feeding them to cows on milk production were studied. Soil nutrient status (nitrogen & OM) and rice yield before and after forage cultivation were monitored simultaneously.

Results Both on-station and on-farm production and nutritive quality of the forages proved promising. On-farm yield of *Sesbania* and *Lathyrus* were 25 and 15 t/ha. Crude protein contents were high, 34.9 and 24.5%, respectively. Soil nitrogen and organic matter were significantly ($P<0.05$) improved due to both of the forage cultivation. Rice yield in both seasons (wet and dry) was also increased ($P<0.01$) due to forage cultivation (Fig. 1). Supplementation of both forages (*Sesbania* and *Lathyrus*) with rice straw diets fed to lactating cows under on-farm conditions significantly ($P<0.01$) increased mean milk yield by 21% and 19%, respectively, over that of control with no supplementation. The results are shown in Table 1.

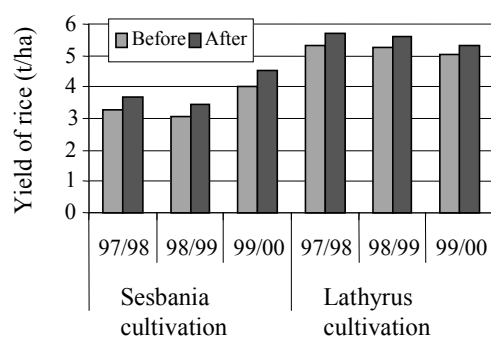


Figure 1 Effect of forage cultivation on rice

Table 1 Feeding forages to cows on milk yield

Year	Milk yield (kg/d)		SEM	Significance
	Supplement			
	None	With		
<i>Sesbania rostrata</i>				
97/98	1.77 ^a	2.00 ^b	0.061	*
98/99	1.58 ^a	1.98 ^b	0.069	**
99/00	1.54 ^a	1.97 ^b	0.058	**
<i>Lathyrus sativus</i>				
97/98	2.10 ^a	2.52 ^b	0.033	**
98/99	1.34 ^a	1.63 ^b	0.052	**
99/00	1.12 ^a	1.28 ^b	0.030	*

Conclusion *Sesbania* and *Lathyrus* are high yielding and high grade forages in terms of nutritional quality. When cultivated under farm conditions they increased soil fertility and rice yield and also improved milk production of dairy cows when fed with straw-based diets. These two forages are promising for cultivation in integration with rice in two seasons to mitigate forage shortage for ruminants in Bangladesh.

References

Haque, I. (1992). Use of legume biological nitrogen fixation in crop/livestock production systems. In: K Mulongoy, I Mueye & DSC Spencer (eds.) *Biological Nitrogen Fixation and Sustainability of Tropical Agriculture*, 423-437.