and-carry forages in smallholder farms - Six farms were selected in village gang, Camalig, Albay. Farmers meeting, seminars and study tour to Ligao Farms conducted. Responsibilities of farmers of establishing pasture were emphasized e planting materials and technical assistance were provided. The choice of forapecies to plant was left to the farmers themselves. All of the 6 farmers planted ier (*Pennisetum purpureum*) but three of them also planted Signalgrass and nidicola (*B. humidicola*) along with Napier mixed with Centrosema (*Centro- pubescens*). Pastures were established as early as 18 months before forages regularly harvested. Eleven Brahman cross cattle (5 steers and 6 heifers) were ributed at random, except for one received a steer and a heifer as loan. Five of farms utilized their pastures on cut-and-carry system only, while one combined th occasional grazing.

SULTS AND DISCUSSION

tle liveweight gains on Signalgrass at different stocking rates - Table 1 ws the liveweight gains of cattle or Signalgrass pastures under coconuts at different cking rates. Results showed that total liveweight gain (LWG) per hectare was iest at 3 AU/ha with 390 kg followed by 2 AU/ha and 1 AU/ha with 316.2 and .5 kg, respectively. The difference in LWG/ha between 2 AU/ha and 3 AU/ was significant but that of 1 AU/ha was significantly lower compared to 2 AU/ha 3 AU/ha (P 0.05). However, in terms of financial return, the best stocking rate 2 AU//ha. After deducting the costs of pasture establishment and maintenance oth pasture and cattle from the value of liveweight gains, it is estimated that an litional anual income of 8,500 pesos (US$1 =41 pesos) can be earned from 2 /ha compared to 4,500 pesos 1 AU/ha. At 3 AU/ha, 8,800 pesos can be earned will require higher additional investment compared to 2 AU/ha. It was also erved that there were no reduction in yields of coconuts from any treatment.

With the results of the study the management of Ligao Farm expanded the area nted to Signalgrass, but lately has preference for Humidicola. In addition, the m has set up and maintains a 3.5 ha demonstration area with Signalgrass which grazed continuously at 2 AU/ha. The demonstration area is strategically located ng the highway, and its prominence readily draws attention and generates interest ong farmers. The demonstration area also provides the opportunities to bring mers from neighborhood to the farm and show them the value of raising cattle th improved pastures under coconuts.

ble 1 - Mean liveweight gains of cattle grazing on Signalgrass pastures at different stocking rates (December 1991 to May 18, 1993)

riables	Stocking Rate (A.U./ha)		
	1.0	2.0	3.0
o. of Animals	6	6	6
razing days (#)	533	533	533
itial weight (kg)	164.2	165.6	164.7
nal weight (kg)	343.7	323.7	294.7
verage daily gain (kg)	0.34	0.30	0.24
iveweight gain/head (kg)	179.5	158.1	130.0
iveweight gain/ha (kg)	179.5 a	316.2 b	390.0b
iveweight gain/ha/yr (kg)	124	219	263

igures followed by same letters are not significantly different (P>0.05).

iveweight gains of and income from cattle in smallholder farms - Table 2 hows the liveweight gains of cattle and income derived from raising cattle in small arms on cut-and-carry forages. Liveweight gain production varies among farmers. iveweight gains and average daily gains per head ranged from 22 kg to 142 kg nd 0.06 kg to 0.38 kg, respectively. Liveweight performance of cattle was directly elated to feeding regimes of farmers. Farms 1 and 5 had the best animal performane attributed to corn bran and tree legumes (*Leucaena* and *Gliricidia*) supplementations, respectively. Though Farmer 5 had the smallest landholding of 1.5 ha, his animals performed best because he made sure that they were fed enough grasses and were given supplemental feeds. Animals of farmer 6 did better because of fodder tree supplementation in the dry season. These observations indicate that good animal performance depended both on the amount and quality of feeds offered by farmers which incidentally also reflects the industriousness of individual farmers.

The relative income contribution of cattle in integrated livestock-coconut system with 2 head of cattle ranged from 7 to 28 percent, depending on farm size. Total farm income is directly related to farm size, but with only 2 head of cattle per farm, the proportion of income derived from cattle was higher in smaller farms. However, larger farms have better opportunities to raise more cattle than smaller farms. Both studies showed overwhelming evidence that raising cattle under coconuts increases the productivity of coconut areas per unit of land as well as providing additional income to farmers, more so with improved pastures.

Considering the 3.2 M ha of coconut land in the Philippines, if one half of the area is used for raising cattle, about 3.2 M head could be raised (at a stocking rate of 2 head per ha). Assuming an average daily gain of 0.4 kg/head, 467 thousand tons of annual liveweight production can be obtained which is equivalent to 233.5 thousand tons of beef with an estimated value of 8.5 billion pesos.

One of the constraints to the integration of livestock under coconuts is that most coconut plantation owners are absentees who visit their farms only during nut harvest, thus, the coconut industry has been termed a "lazy man's business", exaggeratedly. But since the productivity of many coconut plantations is declining rapidly due to old age of the plants, the integration of livestock with improved pastures should be encouraged as one of the alternatives to improve land productivity.

Table 2 - Liveweight gains of and income derived from cattle in smallholder coconut farms in village Baligang, Albay, Philippines (December 6, 1996 to December 10, 1997)

Farm No.	Area (ha)	Animal No. & Sex	LWG (kg)	ADG (kg)	Net Income (weight)		Contribution from Cattle (%)
					From Cattle	From Cattle & Coconut	
1	3.2	1 (M)	142	0.38	12,675	64,271	20
		2(F)	72[1]	0.31			
2	7.0	3 (M)	72	0.19	9,385	114,101	7
		4 (F)	77	0.20			
3	2.0	5 (M)	55	0.15	5,565	23,445	24
		6 (F)	22	0.06			
4	4.0	7 (F)	52	0.14	3,015	80,484	4
5	1.5	8 (M)	142	0.38	12,785	47,1152	28
		9 (F)	77[2]	0.33			
6	3.0	10 (M)	118	0.32	11,965	77,386	16
		11 (F)	81	0.22			

[1]Until July 31, 1997, animals bred July 01, 1997
[2]Until July 31, 1997, animals bred July 10, 1997

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Performance of steers in *Brachiaria decumbens* pastures, permanent and in rotation with soybean

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ABSTRACT
The integration agriculture/pasture is an alternative that allows countless benefits to the rural producer. At Embrapa Agricultural West four production systems were studied and two of them involved animal production. The systems Soybean/Pasture Rotation and Permanent Pasture were compared from september/98 to may/99. The availability and residue of dry matter of green leaves blades (DMGLB), stems (SDM) and senescent material, the gain/animal and gain/area was evaluated. The availability was monthly assessed. Herbage residue was higher in the Soybean/

Pasture Rotation system. This system allowed gain/animal and gain/ha of 0.814 kg/day and 582 kg/ha, respectively, whereas the Permanent Pasture system the gain was 0.749kg/day and 515 kg/ha.

KEYWORDS: Rotation soybean/pasture, gain/animal, gain/ha, availability, forage residue.

INTRODUCTION

The integration of the agricultural and livestock activities is an important alternative because it guarantees the production stability, andd income for the producer. In the Southeast and Center-west of Brazil this integration was very much used when opening new agricultural areas, the pasture grass being sowed close to cultures such as corn and rice. Now, integration is used in order to reform degraded pastaures, mainly through the so-called "Barreirão" system (Kichel et al., 1996).

The no till system (soybean – *Glicyne max*) on the signalgrass (*Brachiaria decumbens*), is a recent practice that allowed the rotation agriculture/pasture. Besides the economic aspect, there is also, an environmental gain, as the pasture residues keep the soil covered during the agricultural cycle. On the other hand, the pasture benefits from the fertilizer residues left in the soil, by the annual crops. This system allows a great increment in the soybean and beef revenue (Broch et al., 1997).

Embrapa Agricultural West has been working on the development of agricultural production systems since 1996. In the research project "Environmental Impact of Intensive and Integrated Systems of Production of Grains and Beef, in the West of Brazil", among other experiments, pastures is being used in the following systems: a) Soybean/Pasture Rotation; and, b) Permanent Pasture.

MATERIAL AND METHODS

This research was carried out on a Red Dusky Latosol (Haplorthox), at an experimental area of Embrapa Agricultural West, Dourados, Brazil. In the treatment Soybean/Pasture Rotation, the pasture area dis replaced for soybean and soybean for pasture, every two years. The stripe of land evaluated with pasture was established in november/97 with *Brachiaria decumbens*. The Permanent Pasture treatment was sowed in november/95 with *Brachiaria decumbens*, in a cultivated area of 3.1 ha, where farming grains had been sown for several years. Each area was subdivided in 9 plots, in order to allow the handling of pasture and animals. Fertilizers were applied only in the crops prior to the grass sowing and fertilizers were not used neither in the implantation nor the maintenance of the pasture.

Castrated ½ nelore x ½ hereford steers were used, aging from 12 to 19 months, at the beginning and at the end of the evaluation, respectively. The rotational grazing observed a 27 days grazing cycle of 24 days of rest and 3 days of grazing period. The forage availabilities before each grazing and the residue after the grazing were determined in one of the plots. The methodology of variable stock was used: during the whole assessment period eight testers animals were placed at the Permanent Pasture and ten at the Soybean/Pasture Rotation. Put-and-take animals were used to adjust the grazing pressure. The stock was adjusted, when necessary, to maintain an offer of dry matter of sheets of green leaves from 6 to 8%.

RESULTS AND DISCUSSION

For both systems, the herbage availability was higher at the beginning of the experimental period. The medium availability of dry matter of green leaves blades (DMGLB), at the beginning of each grazing period was higher at the Soybean/Pasture Rotation system thatn at the Permanent Pasture. This could be attributed to the residues of fertilizers used in the soybean crop, in the system Soybean/Pasture Rotation (Figure 1).

The forage availability and residue in the Permanent Pasture system can be considered high for the species *Brachiaria decumbens*, when compared to the reality

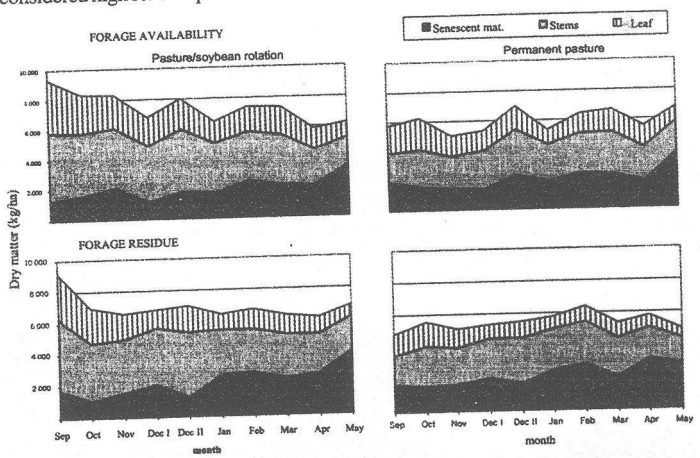

Figure 1 - Forage availability and residue and their component in the soybean/pasture rotation and permanent pasture systems.

Table 1 – Available and residual forage and animal performance accor ture grazing systems

	Soybean/Pasture Rotation		Permanen
	DMGLB[1]	SDM[2]	DMGLB
Availability (kg/ha)	1,948	3,492	1,439
Residue (kg/ha)	1,483	3,251	982
Disappearance rate *	1.74	1.15	1.81
Stock (kg/ha)	1043.2		9
Gain/animal (kg/an./day)	0.814		0.
Gain/ha (kg/ha)	582.0		5

* kg dry matter disappearance/100 kg of body weight/day
[1] DMGLB - dry matter of green leaves blades
[2] DMS - stems dry matter

of the region. This high availability was due to the handling of the past periodic adjustment of the stocking rate to maintain constant herbage Thus, thee animals were allowed to consume great amount of forage, monthly disappearance rate of approximately 450 kg/ha of available h gardless system, and the daily disappearance rate varied from 1.74 to Soybean/Pasture Rotation and Permanent Pasture systems, respectiv

The results on the rate of forage disappearance (DMCLB + SDM this work were similar to those of Wendling et al. (1997), who obs consumption of 2.48 and 2.42 of dry matter of forage/day/100kg of bc body weight by 500 kg live weight dairy cows on signalgrass pastur offer 4 and 8%, respectively.

The daily average gain was slightly higher in the Soybean/Pas system. Even though the Permanent Pasture system showed deficienc especially of nitrogen, the average daily gain was relatively high d herbage allowance. The gain/ha was higher in the Soybean/Pasture Ro The difference between the systems was not greater because he Perm it was also established on farming area, where the fertility of the soil w It is possible that this difference would increase as time goes by and th returns to its original level.

The daily average gain, for both systems, was higher than thos Leite & Euclides (1994) who report a gain of 20 to 700 g/animal/diaay *decumbens*, on september and may, respectively. It was also higher t animal observed by Valle et al. (1996) that obtained 464 g/animal/ *cumbens* in the rainy season. Regardless of system gain per animal a were higher than those obtained by Euclides et al. (1993) who report day and 343 kg gain/ha/year, during the rainy season, for signalgras soybean/pasture rotation is a system with potencial for improving a tion from pastures.

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