

# Integrated Forage - Livestock Systems under Coconuts in the Philippines

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## Abstract

The Philippines has 3.2 million ha of coconut plantations which are predominantly owned by smallholders with an average farm size of 3.3 ha. Grazing cattle and buffalo on improved or unimproved pastures is a traditional practice among farmers, and higher animal and coconut production from improved pastures indicate the value of integrating forages with coconuts. Government policies and programs are focused on smallholder farms where prospects for integrating forages into plantation crops are good. The adoption of new practices is restricted by socio-economic and technical constraints.

## Coconut Production

AN estimated 3.2 million ha of the total land area (30 million ha) of the Philippines is planted to coconuts (1989 statistical data). Coconut plantations in Mindanao account for more than 50% of this area, and the remaining areas are located mainly in Southern Luzon and Visayas.

Average nut production is estimated at a low 49 nuts/tree/year or about 4649 nuts/ha/year. There are marked regional differences in production ranging from 64 nuts/tree/year in Southern Mindanao to 38 nuts/tree/year in Central Luzon. Approximately 25% of the 401 million trees planted are non-bearing or unproductive.

In a survey of coconut plantations, the Philippine Coconut Authority (1978) reported that only 33% of the coconut area was occupied by small farms of less than 5 ha but that these comprised 91% of the total coconut farm holdings (Table 1).

The majority (71%) of coconut farms are owner-operated with an average area of 3.3 ha/farm. Share-tenanted farms comprise the second largest group (22.3%). The remaining farms are either partly owned, tenanted or managed.

## Ruminant Population and Productivity

The Philippine Medium-term Development Plan (1987-1992) has a goal to develop a viable livestock industry with active involvement of the smallholder

Table 1. Area, number and size of coconut farms.

Farm (ha)	Total area		Coconut holdings	
	('000 ha)	(%)	(No.)	(%)
<5	915	33	653 380	91
5-20	629	22	50 300	7
>20	1256	45	14 300	2
Total	2800	100	718 000	100

Source: Philippine Coconut Authority (1978).

fanners. Smallholders own 99% of the 2.9 million buffalo and 2.1 million goats, and 87% of the 1.6 million cattle. Between 1980 and 1988 the buffalo population increased at an annual rate of 0.3%, the cattle population declined at 1.9%, and the goat population increased at 3.1%.

The reduction in large ruminant numbers occurred despite a shortfall in beef production, particularly in Metro Manila. To overcome this shortage, 3200 to 4800 cattle per month are imported for fattening. The implementation of the Comprehensive Agrarian Land Reform Law (CARL) is likely to result in a shift from hill-beef ranching to smallholder cattle production systems which include small breeding herds and backyard feedlot fattening projects.

The very high demand for milk and milk products provides smallholder livestock-raisers with an opportunity to increase their incomes by integrating dairy animals into their farming enterprises.

A complementary program on small ruminants to augment meat production is being encouraged by the government. CARL will further expand the number of smallholder farms which are suitable for goat and sheep raising. Sheep and goats are multi-purpose animals which can be slaughtered for home use, sold

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for slaughter or breeder animals or can be raised for milk production. The government, in cooperation with selected private farms, is producing quality breeding stocks for upgrading the native animals owned by smallholders. The production of small ruminants under plantations, i.e. coconut, orchards and rubber, is being encouraged through researcher-managed and farmer-implemented pilot projects. In addition, support services, i.e. credit, health services, provision of planting materials of various forages and market facilities, are being developed jointly by the government and private sectors. The price of goats and sheep is relatively high despite the current disorganised marketing system.

### Present Levels of Integration of Livestock in Coconut Plantations

In 1983, it was estimated that about 400 000 ha of coconut land were stocked with cattle, buffalo or goats. A survey of two villages in Santa Cruz, Laguna showed that 67% of farmer-respondents integrated either cattle, buffalo, sheep or goats with coconut production.

In large coconut plantations, cattle are grazed on both improved and unimproved pastures. For example, a large coconut plantation in Albay grazes cattle on fertilised carabao grass (*Paspalum conjugatum*) to fatten and finish beef animals. These are grazed for 60-180 days and gain 0.7-1.0 kg/head/day at a stocking rate of 1 beast/ha. In Davao, fertilised para grass (*Brachiaria mutica*) and guinea grass (*Panicum maximum*) pastures can support 3 breeder cows/ha/year.

A recent study conducted in Sorsogon found that the liveweight gain in buffalo was only 53 kg/ha/year on mature native pasture stocked at 1 head/ha. On native pastures containing centre (*Centrosema pubescens*) animal production was 93 kg/ha/year at a stocking rate of 1 head/ha, and 151 kg/ha/year at 2 head/ha.

In small farms, cattle and buffalo are normally tethered in the plantation. Goats are usually not tethered, unless they are in areas where food crops are intercropped.

### Forage Resources under Coconuts

#### Native vegetation

Observations indicate that the native vegetation under coconuts varies according to location and the intensity of utilisation. In a study of the botanical composition of native vegetation under the coconuts in Sorsogon before and after three years of heavy grazing by buffalo (Table 2) it was found that pasture composition changed from

*Imperata cylindrica* and *Pueraria phaseoloides* (puero) domination to one dominated by weeds. Control of stocking pressure and modest fertilizer applications are required to obtain and maintain a desired pasture composition.

A recent survey of native pastures in Santa Cruz, Laguna showed that grasses (48%) and broadleaved weeds (40%) dominated the pastures. Legumes (11%) and shrub/tree leaves (1%) were minor components of the pastures. The major grass species were *Axonopus compressus* and *Cyrtococcum* spp. and the legumes were mainly *Calopogonium mucunoides*, *Centrosema pubescens*, *Moghania strobilifera* and *Pueraria phaseoloides*. The broadleaved weeds present were *Hyptis rhomboides*, *Mikania cordata*, *Borreria laevis*, *Ageratum conyzoides* and *Borreria repens*.

**Table 2.** Botanical composition (%) of native pasture before and after three years of grazing by buffalo under coconuts in Sorsogon.

Species	Botanical composition (%)	
	Before grazing	After grazing
<i>Imperata cylindrica</i>	40	1
<i>Paspalum</i> and <i>Digitaria</i> spp.	6	22
<i>Pueraria phaseoloides</i>	33	0
Weeds	21	77

Source: Moog et al. (unpublished data).

### Improved pastures

Guinea grass and para grass are the most common species grown under coconuts in the Philippines. Extensive areas of para grass pastures are grown in Mindanao, particularly in the Davao area. Guinea grass is more popular in Quezon province among smallholder farms which use a cut-and-carry system. However, nut pickers and gatherers complain that when the grass is allowed to grow tall they have difficulty locating and picking nuts, and that they suffer from skin irritations and cuts from the sharp blades and hairs on the grass. Signal grass (*Brachiaria decumbens*) is becoming popular under coconuts in Sorsogon where it is considered to be more productive than para or guinea grass.

Initially there was some apprehension concerning the growing of improved pastures under coconuts because of the fear that grazing may reduce coconut yields. Recent experience has allayed this fear. Nut yields were found to be 10-30/tree/year in ungrazed areas compared to 30-50 in grazed natural pasture and 80-100 in grazed improved pasture areas.

## **Limitations to Improving Forages under Coconuts**

Lack of experience in animal and pasture management is the major constraint to increased integration. Further, the lack of availability of seeds and planting material of improved pastures restricts the commercial use of recommended forages. Plant evaluation and seed production of promising species need to be undertaken simultaneously.

There are also a number of social and socio-economic constraints to the integration of animals and coconuts. Most coconut plantation owners are absentee landlords who visit their farms only during nut harvest. Seldom do these owners seek opportunities to maximise land use through the introduction of forages and livestock. Coconut farmers with an average land holding of only 3.3 ha have an estimated net income of only 4290 pesos/year which is insufficient to invest in animals or forage improvement. The development and payback period of livestock projects is generally longer than with other agricultural projects and the return on investment is often low. Because of this, credit institutions and entrepreneurs are not attracted, or put low priority on these projects.

The low level of education of most farmers makes extension and development work difficult, slow and expensive since a person-to-person approach has to be used.

However, there is a great need to identify alternative enterprises. since the productivity of many coconut plantations is declining rapidly due to the old age of plantations. Since native vegetation already can support a low number of livestock, the integration of livestock should be encouraged in new areas and enhanced at existing sites. However, providing animals will be difficult because the cattle population is decreasing. Although population growth rates of buffalo and goats were positive up to 1988, numbers have recently been decreasing. Unless there is a vigorous development program to increase the national herd, vast areas under coconuts will remain understocked or unutilised.

The Comprehensive Agrarian Reform Law (CARL) of the government intends to subdivide land into smaller lots, and this will also include coconut plantations. Once the tenants become farmer-owners they will have more interest in making decisions for improvement. The first priority is likely to be the production of food crops. but this will require animals for draught. Once a farmer has animals, he is likely to consider their nutrition, as improvements in the feed offered to animals improves their draught capabilities and their fertility. A grazing trial in Bicol indicated that with livestock integration in coconuts an additional annual income of 1800-4500 pesos can be obtained from buffalo-raising.

The national forage and pasture development program has been concerned with livestock production systems under plantations. The two sites in this program (Bicol and Southern Mindanao) evaluate forages under plantations and develop technologies for integrating forages into plantations. The Philippine Coconut Authority also encourages the integration of livestock under coconuts in its development programs. The improvement of forages, particularly in replanting programs, is an important component of their program.

## **Conclusion**

The integration of forages into coconut plantations has great potential in the Philippines. Plantation areas are underutilised in spite of the capability of the native vegetation to support grazing animals. Experience with guinea grass, para grass and centre-based pastures under coconuts has shown the potential for increasing animal production with the use of improved pasture species.

With agrarian reform in coconut plantations, individual landowners are likely to have more incentive to develop their land, intensify crop production, and more efficiently produce and utilise biomass through the integration of forages and livestock under coconuts.

## **Reference**

Philippine Coconut Authority, 1978. A conceptual approach to the agrarian reform in the coconut sector. Report by the Corplan Office Office, PCA.