Regional evaluation of forages in the Philippines

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In the Philippines, about 90% of the ruminant population belong to the backyard or smallholder sector (Lanting et al. 1995). In this sector, livestock production is a component of an intensive, mixed farming system (Horne, et al. 1997). Most of the smallholders are basically crop farmers; few are specialised livestock producers. Livestock are kept for draft and, at the same time, as source of cash income. Under this system, livestock accounts for more than half of the household income, representing a component that is maintained with minimal inputs and readily converted to cash in times of need.

Ruminants raised in smallholder systems are fed native vegetation and crop residues with minimal or no supplementation. Fattening is not commonly practiced. The major objective is reproduction, as more offspring means more sources of income and less risk. Animals are usually sold on a per head basis, with little incentive for well-fattened stock.

Most of the smallholder farmers in the Philippines have observed poor performance of their animals, which they attribute to insufficient quality and quantity of feed. This is associated with little feed in the dry season and limited area for grazing and has lead to overgrazing. In sloping areas, crop production has declined primarily due to soil erosion.

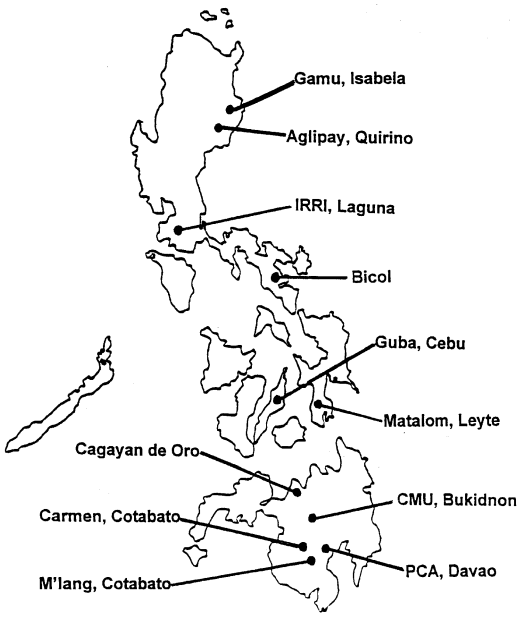

Fig. 1. FSP regional evaluation sites in the Philippines.

The Forages for Smallholders Project (FSP), in collaboration with local agencies, has conducted regional evaluation of forages at different sites in the Philippines. Farmers at these sites have experienced, in varying degrees, the previously mentioned problems. Regional evaluation was done as a first step towards on-farm evaluation of forages by farmers.

Site description

Regional evaluation was carried out at 13 sites in the Philippines (Fig. 1) – four sites in Luzon, three in the Visayas and six in Mindanao. Seven of the sites were located on experiment stations and were managed by local agency collaborators. The rest were located in communal areas volunteered by farmer-groups (Bicol, Guba, Montealegre, Pagalungan, Carmen, and M'lang) and were managed by farmers in consultation with local agency collaborators. These sites doubled as multiplication areas

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of planting materials for later testing by farmers. Some localities have two evaluation sites.

The physical characteristics of the sites are shown in Table 1. Detailed soil analysis results are shown in Appendix 1. Climate information is shown in Appendix 2 (long-term) and Appendix 3 (actual during the evaluation period).

Table 1. Physical characteristics of sites for regional evaluation.

Site	Lat.	Alt. (m)	Annual rainfall (mm)	Wet season	No. wet months (>50mm)	Soil characteristics			Dominant farming system
						pH[a] (% Al sat)	Texture (drainage)[b]	Fertility[c]	
Gamu	17° N	60	1890	May-Dec	10	5.6	Brown, gritty clay-loam, well drained	Moderate low P, S	Moderately extensive upland cropping, *Imperata*-dominated native vegetation
Aglipay	16° N		2530	May-Jan	11	5.1 (3)	Yellow-brown, silty clay-loam, well drained	Moderate low P	Moderately extensive upland cropping, *Imperata*-dominated native vegetation
IRRI	14° N	20	1500	May-Dec	9	6.5 (1)	Brown, clay-loam, well drained	Fertile, low S	Intensive, irrigated lowland rice
Bicol	13° N	20	3900	All year	12	5.6	Brown, clay-loam, well drained	Moderate	Extensive upland agriculture under coconut
Guba	10° N	550	1680	May-Jan	12	4.9 (31)	Yellow brown, clay-loam, well-drained	Fertile, low pH	Intensive upland agriculture (maize, vegetables, fruit trees); cut-and-carry feeding
Matalom: San Salvador	10° N	30	1970	June-Apr	12	4.9 (13)	Brown, clay-loam, well-drained	Moderate low P, K	Moderately intensive upland agriculture; overgrazed and dominated by *Chrysopogon*
Matalom: Montealegre	10° N	300	1970	June-Apr	12	6.0	Brown, clay-loam, well drained	Fertile	Extensive upland agriculture, grazing areas dominated by *Imperata*
Cagayan de Oro: CCC	8° N	150	1500	June-Nov	10	6.5	Brown, clay-loam, well drained	Moderate	Moderately extensive upland cropping, grazing areas invaded by *Chromolaena*
Cag. de Oro: Pagalungan	8° N	180	1500	June-Nov	10	5.8	Brown, clay-loam, well drained	Moderate low S	Moderately extensive upland cropping; grazing areas invaded by *Chromolaena*
CMU	7° N		2200	May-Dec	12	5.5	Brown, clay-loam, well drained	Fertile	Intensive upland agriculture (corn, sugarcane), native vegetation grazed
Carmen	7° N		1590	April-Nov	12	6.5	Brown, clay-loam, well drained	Fertile	Moderately intensive upland agriculture; native vegetation grazed
M'lang	7° N		1590	April-Nov	12	6.5	Brown, clay-loam, area is subsoil-recently scraped off	Infertile	Moderately intensive rainfed lowland rice and maize, native vegetation used for grazing
Davao: PCA)	7° N	120	2210	April-Jan	12	5.1-6.1	Black, clay-loam, well drained	Fertile	Moderately intensive upland agriculture under coconuts

[a] soil pH measured in 1:5 H_2O (% Al saturation in brackets).
[b] drainage (poorly drained, moderate drainage, well drained, seasonally flooded).
[c] major soil fertility deficiencies or problems (eg. low P).

Most of the sites (except IRRI and M'lang) are upland areas with soil fertility varying from moderate to good. The evaluation at M'lang was done in a recently scraped area, thus only the subsoil was left. All sites have clay soils with pH (1:5 H_2O) lower than 7. Annual rainfall varied from 1500 to 3900 mm with most sites having an average of around 2000 mm.

The evaluation did not start at the same time. As such, in some sites, the first year was wetter than normal while in others, it was drier. However, the deviation was not

significant. Rainfall was generally slightly higher than normal in 1995 at all sites except Aglipay, CMU, Carmen, and M'lang. In 1996, rainfall was slightly higher at all sites except Aglipay, IRRI, Cagayan de Oro, Carmen, and M'lang. In 1997, rainfall was lower at all sites due to the *El Niño* phenomenon.

Methodology

Establishment procedures were similar at all sites. Grasses were planted vegetatively, as was the legumes *Arachis pintoi*. The rest of the species were sown by seed, either directly in the plots (herbaceous and shrub legumes) or transplanted as seedlings from a seedbed (tree legumes).

Plot size and planting distance varied between sites and ranged from 1000 m^2 plots with a planting distance of 0.5 x 0.5 m at Gamu and Aglipay to single rows with a planting distance of 0.5 – 1.0 m at other sites. Legume trees and shrubs were usually planted in single rows at a distance of 0.5 m between hills. Some species were established as mixtures (usually grasses for grazing mixed with *Arachis* spp., *Centrosema* spp., *Desmodium heterophyllum,* and Stylo 184). In this case, each species was planted in alternate rows at a closer planting distance (about 25 cm between hills).

During the establishment period missing hills were replanted as necessary. Plots were weeded regularly, except for plots planted with cover crop species (twining legumes) and those for grazing (mixtures of stoloniferous grasses and creeping legumes). The latter were weeded only once or twice during establishment. No fertiliser was applied except to species planted for seed production. Cutting frequency varied from regular harvests at CMU, Bicol and Davao to irregular harvests at Gamu, Aglipay and IRRI.

The forage varieties tested at each site are shown in Table 2. Species performance was visually assessed for a period of at least two years after establishment. The major factors considered in these ratings were establishment success, yield, persistence, seed production, and presence of pests and diseases.

Table 2. Forage varieties tested at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
Erect Grasses													
Andropogon gayanus CIAT 621	-	✔	✔	✔	✔	✔	✔	✔	-	✔	✔	-	✔
Brachiaria brizantha CIAT 16318	-	✔	-	-	-	-	-	-	-	✔	-	-	-
Brachiaria brizantha CIAT 16827	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 16835	-	✔	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 26110	✔	✔	-	✔	✔	-	-	-	-	✔	✔	✔	✔
Brachiaria brizantha CIAT 6387	-	✔	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 6780	✔	✔	✔	✔	✔	✔	✔	✔	-	✔	✔	-	✔
Pennisetum purpureum cv. Capricorn	✔	✔	✔	-	-	✔	-	-	-	✔	✔	-	
Pennisetum purpureum cv. Mott	✔	✔	-	✔	✔	-	-	-	-	✔	✔	-	✔
Pennisetum hybrid 'Florida'	✔	✔	-	-	✔	-	✔	-	-	✔	✔	✔	✔
Pennisetum purpureum 'Local'	✔	✔	-	-	✔	-	-	-	-	✔	✔	✔	✔
Pennisetum hybrid 'King' grass	✔	✔	-	✔	✔	-	-	-	-	✔	✔	-	
Panicum maximum CIAT 6299	✔	✔	✔	✔	✔	-	-	-	-	✔	✔	-	✔
Panicum maximum T58	✔	✔	-	-	-	-	-	-	-	-	-	-	-

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Table 2 (cont.). Forage varieties tested at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
Panicum maximum cv. Tanzania	-	-	-	-	-	✔	-	-	-	-	✔	-	-
Paspalum atratum BRA 9610	✔	✔	-	✔	✔	-	-	-	-	✔	✔	✔	✔
Paspalum guenoarum BRA 3824	-	✔	-	-	-	-	-	-	-	-	✔	-	-
Setaria sphacelata cv. Golden Timothy	✔	✔	-	✔	✔	-	-	-	-	-	-	-	✔
Setaria sphacelata cv. Splenda	-	✔	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata var. *splendida* ex. Indonesia	✔	✔	✔	✔	✔	-	-	-	-	✔	✔	-	✔
Decumbent and Stoloniferous Grasses													
Brachiaria decumbens cv. Basilisk	✔	✔	✔	-	✔	✔	✔	✔	✔	✔	✔	✔	✔
Brachiaria humidicola CIAT 6133	✔	✔	-	-	✔	✔	-	-	✔	✔	✔	✔	✔
Brachiaria humidicola CIAT16886	-	✔	✔	-	-	✔	-	-	✔	✔	-	-	-
Brachiaria humidicola CIAT 26149	-	✔	-	-	-	✔	-	-	-	-	-	-	-
Brachiaria humidicola cv. Tully	✔	✔	-	-	✔	✔	✔	✔	✔	✔	✔	-	✔
Brachiaria ruziziensis	-	✔	-	-	-	✔	-	-	-	-	-	-	-
Cynodon plectostachyus	-	-	-	-	-	✔	-	-	-	-	-	-	-
Stenotaphrum secundatum cv. Floratam	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Shrub/tree Legumes													
Calliandra calothyrsus ex. Indonesia	✔	✔	-	✔	-	-	-	-	-	-	✔	-	-
Calliandra calothyrsus ATF 2014	-	✔	-	-	-	-	-	-	-	-	-	-	-
Cratylia argentea CIAT 18516	-	✔	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus ex. IRRI	-	✔	✔	-	✔	-	-	-	-	✔	✔	-	✔
Desmanthus virgatus CPI 40071	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 52401	-	✔	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 82285 (cv. Bayamo)	-	✔	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 91146	-	✔	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 92803 (=cv. Uman)	-	✔	-	-	-	-	-	-	-	-	-	-	-
Desmodium cinerea ex. MBRLC	✔	✔	✔	✔	✔	-	✔	-	-	✔	✔	✔	✔
Desmodium cinerea CPI 46561	-	✔	-	-	-	✔	-	-	-	-	-	-	-
Desmodium cinerea CPI 76099	-	✔	-	-	-	-	-	-	-	-	-	-	-
Flemingia macrophylla CIAT 17403	-	✔	-	-	-	✔	-	-	-	✔	-	-	-
Gliricidia sepium 'Monterrico'	✔	✔	-	✔	✔	-	✔	-	-	✔	-	-	✔
Gliricidia sepium 'Retalhuleu'	✔	✔	-	✔	✔	-	✔	-	-	✔	-	-	✔
Gliricidia sepium 'Belen Rivas'	✔	✔	-	✔	✔	-	✔	-	-	✔	-	-	✔
Gliricidia sepium 'Local'	✔	-	✔	-	✔	✔	-	-	-	✔	✔	✔	✔
Leucaena diversifolia ex. MBRLC	✔	-	-	✔	✔	-	-	-	-	✔	-	-	✔
Leucaena leucocephala 'Local'	✔	-	✔	-	✔	-	-	-	-	-	✔	-	✔
Leucaena leucocephala K584	-	✔	-	-	-	-	-	-	-	-	-	-	-
Leucaena leucocephala K636	✔	✔	✔	✔	✔	✔	-	-		✔	✔	✔	✔
Leucaena pallida CQ3439	✔	✔	-	-	✔	-	-	-	-	-	-	-	
Sesbania rostrata ex. IRRI	-	-	-	-	-	-	-	-	-	-	-	-	✔
Sesbania grandiflora	-	-	-	-	-	-	-	-	-	-	✔	-	-
Herbaceous Legumes													
Aeschynomene histrix CIAT 9690	-	✔	-	-	-	-	-	-	-	✔	-	-	-
Arachis glabrata cv. Florigraze	-	✔	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata IRFL 3112	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 12121	-	✔	-	✔	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 93483	-	✔	-	✔	-	-	-	-	-	-	-	-	-
Arachis hybrid IRFL 3014	-	✔	-	-	-	-	✔	-	-	-	-	-	-
Arachis pintoi CIAT 17434	-	✔	-	✔	-	✔	-	✔	✔	-	-	-	-
Arachis pintoi CIAT 18744	-	✔	-	-	-	✔	-	✔	-	-	✔	✔	-

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Table 2 (cont.). Forage varieties tested at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
Arachis pintoi CIAT 18747	-	✔	-	-	-	✔	-	-	-	-	-	-	-
Arachis pintoi CIAT 18748	-	✔	-	-	-	✔	-	✔	-	-	-	-	-
Arachis pintoi CIAT 18750	-	✔	-	✔	-	✔	-	✔	✔	-	-	-	-
Arachis pintoi CIAT 22160	✔	✔	✔	✔	✔	-	✔	✔	-	✔	✔	✔	✔
Calopogonium caeruleum CIAT 7304	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 772	-	✔	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 822	-	✔	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 17856	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 20709	-	✔	-	-	-	-	-	-	-	-	-	-	-
Centrosema acutifolium CIAT 5277	✔	✔	✔	-	-	✔	-	-	-	✔	✔	✔	-
Centrosema acutifolium CIAT 5568	-	-	-	-	-	✔	-	-	-	-	-	-	-
Centrosema macrocarpum CIAT 25522	✔	✔	-	✔	-	-	-	-	-	-	✔	-	-
Centrosema macrocarpum CIAT 5713	-	✔	-	-	-	-	-	-	-	-	-	-	-
Centrosema pascuorum cv. Cavalcade	✔	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema pubescens ex. Davao	✔	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema mix (CIAT 5277, 15160, 15470, 438, 442)	-	-	-	-	-	✔	-	-	✔	-	-	-	-
Centrosema pubescens CIAT 15160	✔	✔	-	-	✔	-	✔	✔	-	✔	✔	✔	✔
Centrosema pubescens cv. Cardillo	-	✔	-	-	-	-	-	-	-	-	-	-	-
Clitoria ternatea	-	-	-	-	-	-	-	-	-	-	-	-	✔
Desmodium heterophyllum CIAT 349	✔	✔	-	-	-	-	-	-	✔	-	✔	-	-
Desmodium intortum	✔	-	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 130329	-	-	-	-	-	✔	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 13305	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 350	-	✔	-	-	-	✔	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 3666	-	✔	-	-	-	-	-	-	-	-	-	-	-
Lablab purpureus cv. Highworth	-	-	-	-	-	-	-	-	-	-	-	-	✔
Lablab purpureus cv. Rongai	-	-	-	-	-	-	-	-	-	-	-	-	✔
Macroptilium atropurpureum cv. Aztec	-	✔	-	-	-	-	-	-	-	-	-	-	-
Macroptilium atropurpureum cv. Siratro	-	✔	-	-	-	-	-	-	-	-	-	-	✔
Macroptilium gracile cv. Maldonado	✔	✔	-	-	-	-	-	-	-	-	-	-	✔
Mimosa invisa ex. MBRLC (spineless)	-	✔	-	-	-	-	-	-	-	-	-	-	-
Mucuna pruriens CIAT 9349	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides ex. Davao	✔	-	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 7182	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 8042	✔	✔	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 9900	-	-	-	-	-	-	-	-	-	-	✔	-	-
Pueraria phaseoloides CIAT 32118	-	✔	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT 184	✔	✔	✔	✔	✔	✔	✔	✔	-	✔	✔	✔	✔
Stylosanthes guianensis cv. Cook	-	✔	-	-	-	-	✔	✔	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-1	-	✔	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-2	-	✔	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-3	-	✔	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-1	-	✔	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-2	-	✔	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-3	-	✔	-	-	-	-	-	-	-	-	-	-	-

Results

The performance of forage varieties will be summarised in the following pages (and Tables). More details are provided in Appendices 4 – 8.

Grasses

Among the erect growing grass species (Table 3), *Pennisetum purpureum* and its hybrids as well as *Panicum maximum* CIAT 6299 had the highest yield potentials. However, these species had slow regrowth when subjected to regular cutting under shade at the PCA-Davao site. Fertilisation improved regrowth, implying that these species require considerable fertilisation to improve herbage production. Moreover, there were difficulties in vegetative establishment of *P. maximum*.

Paspalum atratum BRA 9610 and *Setaria sphacelata var. splendida* ex. Indonesia also had very high yields. These species had more leaves and succulent stems than the *Pennisetum* or *Panicum* varieties. Moreover, seed production of *P. atratum* was good. However, *P. atratum* and *S. sphacelata* easily dried up and did not grow well in the dry season and in less fertile sites.

Brachiaria brizantha (CIAT 6780 and CIAT 26110) also had good herbage yield, especially in the wet season. *Brachiaria brizantha* CIAT 26110 produced high seed yields towards the end of the wet season and remained green up to the middle of the dry season. *Brachiaria brizantha* CIAT 6780 was affected by leaf fungal diseases (*Rhizoctonia* or *Cercospera*) and had only moderate seed yields.

Table 3. Performance of erect grasses with broad adaptation at sites in the Philippines.

Species	Strengths	Weaknesses	Potential uses
Pennisetum purpureum and hybrids	• Easy vegetative establishment • Very good yield potential	• Moderate persistence under frequent cutting and under shade • Needs fertilisation for good regrowth when cut frequently	• Cut-and-carry either as blocks or hedgerows
Panicum maximum CIAT 6299	• Very good yield potential • Good seed yield	• Difficult to establish vegetatively • Moderate persistence under frequent cutting and under shade • Needs fertilisation for good regrowth when cut frequently	• Cut-and-carry either as blocks or hedgerows
Paspalum atratum BRA 9610	• Very good yield potential • High leaf yield • Good seed yield	• Highly susceptible to dry periods • Moderate persistence under frequent cutting and under shade	• Cut-and-carry either as blocks or hedgerows
Brachiaria brizantha CIAT 6780, and ' 26110	• Good yield potential • CIAT 26110 has considerable tolerance to dry condition and produces good seed	• Moderate persistence under frequent cutting and under shade • CIAT 6780 affected by fungal diseases during wet periods	• Cut-and-carry either as blocks or hedgerows
Andropogon gayanus CIAT 621	• Good yield potential • Good performance in low pH soils • Excellent dry season tolerance	• Poor seed germination • Difficult to establish vegetatively • Seeds difficult to clean	• Cut-and-carry either as blocks or hedgerows
Setaria sphacelata var. splendida ex. Indonesia	• Very good yield potential • Succulent leaf and stem • Easy establishment (vegetative)	• Highly susceptible to dry periods • Moderate persistence with frequent cutting and under shade • Low performance in poor soil	• Cut-and-carry either as blocks or hedgerows

Andropogon gayanus CIAT 621 grew well at most sites. This was particularly noticeable at sites where pH was so low that performance of other species was severely

affected. It also remained green long into the dry season. Unfortunately, this species had establishment problems both from the seed and vegetative material – because of the seed's fluffiness, seed is difficult to clean and so overall germination tended to be poor. It was also difficult to get good rootstock planting material from mature plants because of their very strong root system.

The evaluation results also showed that, generally, erect growing grasses had only moderate performance under shade in spite of good soil fertility. This was observed at the PCA-Davao site.

Among decumbent and stoloniferous grasses (Table 4), *Brachiaria decumbens* and *B. humidicola*. (CIAT 6133, cv. Tully, CIAT 16886) had good performance, both in the open and under shade. These species also had good regrowth when cut or grazed frequently and when established in mixture with legumes. Among these species, only *B. decumbens* showed some yellowing in soils with poor fertility and during the dry season. These species had low growth habits and were often affected by companion legumes or weeds when grazed only lightly or cut infrequently. Seed production from these species was generally low. *Brachiaria* decumbens and *B. humidicola* cv. Tully had problems with establishment, both from the seed and vegetative material. The seed had low germination while vegetative materials had slow growth and often died. *B. humidicola* CIAT 6133 and CIAT 16886 established much better, especially from stolons since the nodes of these species produced roots and leaves much faster.

Generally for grasses, establishment from vegetative material was a problem with species established from rootstock, especially if the tillers used were not young. This was not a problem for species propagated from cuttings and stolons that already had good roots and young leaves.

All the broadly adapted erect species have good potential for cut-and-carry systems. They can be integrated in the farm as hedgerow or in blocks. On the other hand, decumbent and stoloniferous grasses had good potential as grazing species especially when mixed with legumes. *Brachiaria humidicola* produced very good regrowth even under frequent defoliation.

Table 4. Performance of decumbent and stoloniferous grasses with broad adaptability at sites in the Philippines.

Species	Strengths	Weaknesses	Potential uses
Brachiaria decumbens cv. Basilisk	• Good yield potential	• Turns yellow with frequent defoliation and in dry periods	• Grazing in monoculture or mixtures
Brachiaria humidicola CIAT 6133 cv. Tully CIAT 16886	• CIAT 6133 has good yield potential and is leafy • cv. Tully and CIAT 16886 had moderate yield potential • Good tolerance to frequent defoliation • Moderate seed production only • CIAT 16886 was very easy to establish vegetatively	• Dominated by weeds or companion creeping legumes if not cut/grazed frequently • cv. Tully difficult to establish vegetatively • Low seed production	• Grazing in monoculture or mixtures

Legumes

Only seven of the herbaceous legumes were tested in most sites. Among those tested (Table 5), *Arachis pintoi* (CIAT 18744 and CIAT 22160) and *Stylosanthes guianensis* CIAT 184 consistently performed well. The latter established well, had good yields even

in the dry season, and produced seeds but was found not to persist under grazing pressure and lasted only for 2-3 yr. On the other hand, *A. pintoi* did not tolerate dry periods and was growing better under partial shade compared with open field. This species was also easily dominated by companion grasses or weeds. Among the *A. pintoi* accessions, CIAT 22160 established most easily from cuttings while another accession, CIAT 18748 stayed greener a little longer into the dry season.

Another legume tested in most sites was *Centrosema pubescens* CIAT 15160. This legume had good establishment, persistence and seed production. It did well at moderate and high-fertility sites but not at the low-fertility site at M'lang. This species performed well in the wet season but not during the dry season.

Table 5. Performance of herbaceous legumes with good potential in Philippine sites.

Species	Strengths	Weaknesses	Potential Uses
Stylosanthes guianensis CIAT 184	• Good establishment and yield • Tolerates low-fertility soil • Considerable dry-season tolerance	• Not long-lived • Cannot tolerate heavy grazing	• Weed control • Fallow improvement • Cut-and-carry feed
Arachis pintoi CIAT 18744 CIAT 18748 CIAT 22160	• Tolerates heavy grazing • CIAT 22160 easy to establish vegetatively • CIAT 18748 has some tolerance for dry periods	• Dominated by weeds or companion species in mixtures • Only CIAT 22160 is easy to establish	• Grazing, especially under trees • Mixtures with low-growing grasses
Centrosema pubescens CIAT 15160	• Good establishment and persistence • Good yield in wet season • Good seed yield and easy to harvest	• Low performance in dry season • Low performance in poor soils	• Grazing in mixtures with grasses
Centrosema pubescens cv. Cardillo[a]	• Good establishment and persistence • Good seed yield and easy to harvest • Excellent dry-season performance	• Moderate performance in wet season	• Grazing in mixtures with grasses
Centrosema macrocarpum CIAT 5713 CIAT 25522[b]	• Excellent performance in dry season and under shade • Good herbage yield	• Low seed yield	• Cover crop • Fallow improvement
Calopogonium caeruleum CIAT 7304[b]	• Excellent performance in dry season and under shade • Good herbage and seed yield		• Cover crop • Fallow improvement
Pueraria phaseoloides CIAT 7182[b]	• Good herbage and seed yield • Good performance under shade	• Low performance in dry season	• Cover crop

[a] Evaluation done only at IRRI.
[b] Evaluation done only at PCA-Davao (under coconut) and IRRI (open); both areas have fertile soils.

Among the other herbaceous legumes tested in only a few sites, there were species that did very well in the dry season (much better than the aforementioned species) – *Calopogonium caeruleum* CIAT 7304, *Centrosema macrocarpum* (CIAT 25522 and CIAT

5713), and *C. pubescens* cv. Cardillo. Other species also yielded well in the wet season – *Mucuna pruriens* CIAT 9349 and *Pueraria phaseoloides* CIAT 7182.

Of the herbaceous legumes, only *Arachis pintoi* had establishment problems, basically because they were established vegetatively. *Centrosema macrocarpum* had low seed yields. *Mucuna pruriens* had problems with leaf-cutting insects while *P. phaseoloides* had poor dry season performance.

Herbaceous legumes have good potential as cover crops and as a soil fertility improvement tool aside from being a good source of feed. Most can be used as companions to grasses for grazing while *S. guianensis* CIAT 184 can also be used for cut-and-carry systems.

To date, most of the shrub and tree legumes in the site are still in the establishment stage. As such, the observations obtained were more on establishment and yield at the early stage (Table 6). All the shrub legumes tested (*Desmanthus, Flemingia,* and *Desmodium cinerea – previously called D. rensonii*) had variable performance. *Desmanthus virgatus* generally did not do well in acid soil sites and were also infested to some degree by psyllids (*Heteropsylla cubana*) especially in the dry season. *Desmodium cinerea* had good yields but did not perform well in the dry season.

Among the tree legumes, Gliricidia *sepium* (cv. Retalhuleu, cv. Monterrico and cv. Belen Rivas) consistently had good yields despite slow initial growth. *Calliandra calothyrsus* did very well at high-altitude sites. *Leucaena leucocephala* K636 had good establishment in slightly acidic soil conditions (pH>6.0). In moderately acidic soils, it established only when the soil was very fertile (e.g. at the Guba site). In this case, *L. leucocephala* has shown signs of poor persistence with plants dying in the first dry season. Moreover, it did not do very well under shade and was infested with psyllids.

Table 6. Performance of shrub and tree legumes with good potential at sites in the Philippines.

Species	Strengths	Weaknesses	Potential uses
Desmanthus virgatus ex. IRRI CPI 40071 CPI 52401	• Good herbage and seed yield	• Affected by psyllids (*H. cubana)* • Moderate in dry season • Low performance in poor and acid soil	• Cut-and-carry either as blocks or hedgerows
Desmodium cinerea (prev. D. rensonii) ex. MBRLC = *CPI 46562*	• Good herbage and seed yield	• Moderate in dry season and acid soil	• Cut-and-carry either as blocks or hedgerows
Flemingia macrophylla CIAT 17403	• Good herbage and seed yield	• Coarse and hard herbage	• Cut-and-carry either as blocks or hedgerows
Calliandra calothyrsus	• Good performance in high -altitude sites	• Moderate establishment • Poor regrowth in low -altitude sites	• Cut-and-carry as hedgerows, fence lines or blocks
Gliricidia sepium cv. Retalhuleu cv. Monterrico cv. Belen Rivas	• Good herbage yield • Good performance in acid soil	• Moderate establishment • Low seed production • Sheds leaves in dry season	• Cut-and-carry as hedgerows, fence lines or blocks
Leucaena leucocephala K636	• Good herbage yield	• Low persistence in acid soil • Affected by psyllids (*H. cubana*)	• Cut-and-carry as hedgerows, fence lines or blocks

A major observation with shrub and tree legumes was their relatively slow establishment. This was aggravated by dry spells during the establishment period. Once established, shrub and tree legumes find good potential as cut-and-carry feed especially in the dry season when grasses and shallow-rooted herbaceous legumes dry up. They have potential for integration in smallholder farms as hedgerows or fences. Experience in the Philippines has shown that uncontrolled grazing is a common problem, thus using tree legumes as fences warrants considerable attention.

Conclusions and recommendations

The results of the evaluation yielded considerable information on what species have good chances of performing well in farmers' fields. It also gave insights on the attributes and weaknesses of potential species. This has led to identification of areas and issues for further development.

The evaluation activity was able to point out the need of high yielding grass species (e.g. *Pennisetum* and *Panicum*) for nutrients to sustain production. It has also highlighted the sustained production of stoloniferous *Brachiaria* species despite low nutrient availability. *Stylosanthes guianensis* CIAT 184 was also notable in terms of performance in poor soils while *A. gayanus* performed relatively better than did other erect species in very acid soils.

Another interesting finding was the potential of *Paspalum atratum* BRA 9610 and *Setaria sphacelata var. splendida* ex. Indonesia. These species are very leafy and have succulent stems as well as high yields. Farmers commented that these species were not itchy and were more convenient to cut, providing a good amount of feed from a small area.

Another attribute shown by some species is good performance during dry periods. This is very important since feed availability in the dry season is a major problem of smallholder farmers. Varieties with good dry season performance were *Andropogon gayanus* CIAT 621, *Brachiaria brizantha* CIAT 26110, *Calopogonium caeruleum* and *C. macrocarpum* (CIAT 25522 and CIAT 5713). Finding a way to integrate these species in farmers' fields to provide feed during the dry season will be the next challenge. For example, establishing these species in mixtures with other species that do well in the wet season may be a good option.

Another issue related to forage delivery system is the production of seed and planting material. Some grass species were difficult to establish from seed and vegetative material. An example is *A. gayanus*, which had low seed germination (primarily because the seeds are difficult to clean) and, at the same time had poor vegetative establishment. The species has a very strong root system and preparing rootstocks for planting was rather difficult. In other grasses propagated by rootstock, it was observed that those taken from old tillers had low survival. This therefore warrants development of simple and practical techniques of vegetative propagation.

Seed production and seed collection were difficult especially for grasses. Lack of uniformity in seed ripening was a major constraint and, some species just did not produce enough good seed. This problem has to be addressed to enhance adoption and use of forages by a larger number of farmers.

Some species tested mainly at IRRI showed good potential for seed production. These include *Brachiaria ruziziensis* and *B. brizantha* CIAT 6387. The former have been proven elsewhere to be a good seed producer, with uniform seed ripening and little shedding of ripe seeds. *Brachiaria brizantha* CIAT 6387 was observed to produce seed more than once a year. This is a considerable trait especially with *Brachiaria* species because they produce seed in the Philippines early in the wet season. With *B. brizantha*

CIAT 6387, it is possible to harvest seed in the later part of the wet season, when rainfall is lower making harvesting easier. Another *Brachiaria brizantha* accession that was observed to produce seed late in the dry season was CIAT 26110.

The issue of seed production can also be tackled by improving the methods of seed collection. This is important because aside from seed shedding, there are problems with birds and rats that feed on the seeds even before they are harvestable.

Acknowledgements

We thank our research partners who are based at different sites for carrying out the fieldwork and data collection. The collaborating agencies are the Cagayan Valley Integrated Agricultural Research Centre (UPROS and LES), the Bureau of Animal Industry, FARMI at the Visayas State College of Agriculture, Mag-uugmad Foundation Incorporated, Cagayan de Oro City Veterinary Office, Philippine Coconut Authority-Davao Research Centre, and Philippine Carabao Centre at University of Southern Mindanao. We also thank the farmers in Guba, Matalom, Cagayan de Oro, Carmen, and M'lang for their interest and effort in maintaining their forage plots.

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Appendices

Appendix 1. Results of soil analysis results at regional evaluation sites.

ite	pH (1:5 H_2O)	Organic carbon (%)	N NO_3	P[a]	S	K	Ca	Mg	Al	Na	CEC	Cu	Zn	Mn	Fe	Bo	Al sat. (%)
			––– (ppm) –––			––––––––– (meq/100g) –––––––––						––––––––– (mg/kg) –––––––––					
amu	5.6	1.4	1.3	10	9	0.4	9	5	-	0.09	13.7	2	1	54	38	0.5	-
glipay	5.1	1.2	6.0	7	14	0.2	12	6	0.5	0.19	18.5	3	11	102	38	0.4	3
RRI	6.5	1.4	0.7	105	9	1.1	14	6	-	0.21	21.2	8	3	20	69	0.7	1
icol	5.6	1.7	1.3	18	16	0.2	4	2	-	0.39	6.0	4	3	84	37	0.5	-
uba	4.9	1.2	14.0	23	35	0.8	9	3	6.2	0.38	20.0	17	4	42	109	0.8	31
atalom: San alvador	4.9	1.4	3.1	10	20	0.1	2	1	0.5	0.07	4.0	2	2	97	43	0.4	13
atalom: ontealegre	6.0	1.4	>60.0	42	13	0.9	19	4	-	0.05	23.6	2	2	19	44	0.3	-
agayan de ro: CCC	6.5	1.7	4.7	20	11	0.3	15	9	-	0.12	25.8	5	2	20	27	0.6	-
ag. de Oro: agalungan	5.8	1.5	20.7	24	7	0.6	15	10	-	0.16	25.4	3	1	28	45	0.5	-
MU	5.4	2.4	4.0	17	15	0.2	3	3	0.3	0.06	6.1	6	1	73	54	0.5	4
armen	6.5	1.2	18.2	35	12	1.3	10	4	-	0.08	15.7	6	4	42	23	0.5	-
avao: PCA[a]	5.1-6.1	0.9		13		1.2	10	3	-	0.07	25.0	-	-	-	-	-	-

[a] BSES

[b] Analysis taken from a local laboratory; methods differ from analysis in other sites.

Appendix 2. Long-term climatic data at regional evaluation sites in the Philippines.

Site	Climatic Data	J	F	M	A	M	J	J	A	S	O	N	D	Total
Gamu,	Mean rainfall (mm)	64	47	43	87	140	167	207	246	211	317	218	150	1898
Isabela	No. of rain days	9	7	6	7	9	9	12	11	12	15	15	12	122
	Mean max. temp. (°C)	27	29	32	34	35	35	33	33	32	31	29	27	
	Mean min. temp. (°C)	20	20	22	24	25	25	25	25	24	23	22	21	
Aglipay,	Mean rainfall (mm)	120	38	73	80	430	285	472	140	270	242	214	163	2527
Quirino	No. of rain days	15	8	6	4	13	8	16	13	17	18	16	14	146
	Mean max. temp. (°C)	26	28	30	33	34	34	32	32	31	29	28	25	
	Mean min. temp. (°C)	18	19	20	-	-	-	-	-	22	21	21	18	
Bicol	Mean rainfall (mm)	439	224	244	155	141	243	263	217	234	307	581	854	3902
	No. of rain days	22	15	16	14	15	14	17	17	16	18	22	26	212
	Mean max. temp. (°C)	29	29	30	32	32	32	31	29	31	31	30	29	
	Mean min. temp. (°C)	23	23	23	24	25	25	27	25	24	24	24	23	
IRRI,	Mean rainfall (mm)	41	20	31	52	135	265	320	257	246	320	252	143	2082
Laguna	No. of rain days	6	4	4	6	11	17	18	17	17	17	15	13	145
	Mean max. temp. (°C)	29	31	32	34	34	33	32	32	32	31	30	29	
	Mean min. temp. (°C)	22	22	22	24	24	24	24	24	24	24	23	22	
Guba, Cebu	Mean rainfall (mm)	107	79	72	90	104	191	190	121	182	232	202	111	1680
	No. of rain days	10	7	6	4	7	12	11	8	10	12	11	9	101
	Mean max. temp. (°C)	30	30	31	32	32	32	32	32	32	31	31	30	
	Mean min. temp. (°C)	24	24	24	25	26	25	25	25	25	25	25	24	
Matalom, Leyte	Mean rainfall (mm)	144	214	139	104	58	218	181	197	265	195	198	236	1972
(San Salvador,	No. of rain days	11	13	12	8	7	16	16	13	16	17	16	15	163
Montealegre)	Mean max. temp. (°C)	31	32	32	33	34	33	33	33	32	32	33	32	
	Mean min. temp. (°C)	24	24	23	24	26	26	26	25	25	25	25	24	
Cagayan de Oro	Mean rainfall (mm)	72	46	38	56	77	222	213	171	199	190	126	89	1501
Pagalungan	No. of rain days	10	6	6	6	9	16	18	14	17	14	11	8	135
and CCC	Mean max. temp. (°C)	31	32	32	33	34	34	33	34	33	33	33	32	
	Mean min. temp. (°C)	22	22	23	23	24	24	23	24	23	23	23	23	
CMU, Bukidnon	Mean rainfall (mm)	73	65	64	82	240	327	320	253	278	252	130	117	2201
	No. of rain days	8	3	5	7	13	18	18	14	17	17	10	9	137
	Mean max. temp. (°C)	33	32	33	34	34	33	32	32	32	33	33	33	
	Mean min. temp. (°C)	20	19	20	21	22	21	21	20	20	20	21	21	
PCA, Davao	Mean rainfall (mm)	139	63	96	165	277	247	215	247	243	254	158	110	2215
	No. of rain days	10	7	8	10	15	16	12	15	15	13	12	10	142
	Mean max. temp. (°C)	31	31	32	32	31	31	30	31	31	30	31	31	
	Mean min. temp. (°C)	21	22	21	21	22	20	21	20	20	21	20	20	
Cotabato	Mean rainfall (mm)	68	65	87	101	232	238	173	116	165	126	134	85	1593
(Carmen,	No. of rain days	not available												
M'lang)	Mean max. temp. (°C)	not available												
	Mean min. temp. (°C)	not available												

Appendix 3. Actual climatic data at regional evaluation sites in the Philippines.

Site	Climatic Data	J	F	M	A	M	J	J	A	S	O	N	D	Total
Gamu,	Rainfall (mm)-1995	-	-	-	-	-	92	313	121	304	425	280	545	2078
Isabela	Rainfall (mm)-1996	54	24	7	54	145	47	241	223	209	484	439	57	1984
	Rainfall (mm)-1997	31	71	118	61	102	293	157	133	147	238	196	70	1616
	No. of rain days - 1995	-	-	-	-	-	7	17	14	21	20	17	20	116
	No. of rain days - 1996	5	6	2	6	14	7	13	10	8	19	20	11	121
	No. of rain days - 1997	8	13	6	7	10	10	10	9	10	9	9	13	114
	Mean max. temp. (^{o}C)-1995	-	-	-	-	-	36	33	33	32	29	29	25	
	Mean max. temp. (^{o}C)-1996	28	28	32	33	35	36	30	34	34	32	29	26	
	Mean max. temp. (^{o}C)-1997	27	28	30	32	34	34	33	34	32	32	29	27	
	Mean min. temp. (^{o}C)-1995	-	-	-	-	-	25	25	25	24	25	23	20	
	Mean min. temp. (^{o}C)-1996	20	20	22	23	24	26	26	26	25	25	23	20	
	Mean min. temp. (^{o}C)-1997	20	21	22	24	26	26	25	26	24	24	23	22	
Aglipay,	Rainfall (mm)-1995	84	23	3	2	227	77	264	206	267	351	161	249	1914
Quirino	Rainfall (mm)-1996	68	17	5	102	373	58	238	150	155	151	389	34	1741
	Rainfall (mm)-1997	18	68	54	-	-	-	-	-	-	-	-	-	139
	No. of rain days - 1995	17	8	1	1	14	6	16	17	17	19	17	20	153
	No. of rain days - 1996	14	9	10	2	16	8	22	12	21	13	14	9	150
	No. of rain days - 1997	11	15	12	-	-	-	-	-	-	-	-	-	38
	Mean max. temp. (^{o}C)-1995	27	28	32	35	34	34	31	31	31	29	28	24	
	Mean max. temp. (^{o}C)-1996	27	27	31	32	33	34	32	32	32	31	28	26	
	Mean max. temp. (^{o}C)-1997	27	27	30	-	-	-	-	-	-	-	-	-	
	Mean min. temp. (^{o}C)-1995	18	18	19	21	22	23	22	22	22	21	21	18	
	Mean min. temp. (^{o}C)-1996	17	17	19	21	22	22	21	22	22	21	20	17	
	Mean min. temp. (^{o}C)-1997	25	18	18	-	-	-	-	-	-	-	-	-	
Bicol	Mean max. temp. (^{o}C)-1995	28	29	29	31	32	33	31	31	31	31	-	28	
	Mean max. temp. (^{o}C)-1996	28	28	29	30	32	31	31	32	32	32	30	28	
	Mean max. temp. (^{o}C)-1997	28	29	29	32	32	33	31	32	31	32	30	30	
	Mean min. temp. (^{o}C)-1995	23	23	23	25	25	25	25	24	25	24	-	23	
	Mean min. temp. (^{o}C)-1996	24	24	25	25	26	26	25	25	25	25	25	24	
	Mean min. temp. (^{o}C)-1997	24	23	23	25	26	25	25	26	24	25	24	24	
IRRI,	Rainfall (mm)-1995	11	83	0	5	136	58	262	234	521	274	446	382	2412
Laguna	Rainfall (mm)-1996	46	10	31	68	95	176	461	161	207	196	393	62	1905
	Rainfall (mm)-1997	17	29	5	5	195	225	373	252	252	34	41	31	1459
	No. of rain days - 1995	4	3	0	2	8	14	14	18	21	13	16	20	133
	No. of rain days - 1996	7	4	3	11	12	16	15	10	15	13	18	9	133
	No. of rain days - 1997	2	7	1	2	9	13	22	12	18	10	5	4	105
	Mean max. temp. (oC)-1995	29	30	32	35	34	34	33	32	31	31	31	28	
	Mean max. temp. (^{o}C)-1996	29	29	32	32	34	33	32	33	32	33	30	29	
	Mean min. temp. (^{o}C)-1996	22	22	23	24	25	25	24	24	24	24	24	22	
	Mean min. temp. (^{o}C)-1997	21	22	22	24	24	24	24	24	24	24	24	23	
Guba, Cebu	Rainfall (mm)-1996	-	-	-	-	-	426	41	68	51	372	247	49	1693
	Rainfall (mm)-1997	140	113	34	0	17	40	381	26	333	136	22	37	1278
	No. of rain days - 1996	-	-	-	-	-	21	7	6	10	17	12	10	128
	No. of rain days - 1997	10	10	4	0	3	3	13	2	17	6	4	5	77
	Mean max. temp. (^{o}C)-1996	-	-	-	-	-	32	32	32	33	32	30	29	
	Mean max. temp. (^{o}C)-1997	30	30	30	32	33	32	33	33	33	31	31	30	
	Mean min. temp. (^{o}C)-1996	-	-	-	-	-	25	26	25	25	25	25	24	
	Mean min. temp. (^{o}C)-1997	23	24	24	25	26	25	25	25	25	25	25	24	

(continued next page)

Appendix 3 (cont.). Actual climatic data at regional evaluation sites in the Philippines.

Site	Climatic Data	J	F	M	A	M	J	J	A	S	O	N	D	Total
Matalom, Leyte	Rainfall (mm)-1995	107	32	151	38	62	216	253	257	325	264	167	286	2159
(San Salvador,	Rainfall (mm)-1996	214	355	38	114	33	162	113	157	91	161	389	182	2010
Montealegre)	Rainfall (mm)-1997	85	220	137	7	60	165	141	42	258	116	73	81	1385
	No. of rain days - 1995	14	6	11	6	6	12	20	15	11	17	15	18	151
	No. of rain days - 1996	14	21	12	15	8	16	10	18	14	18	18	15	179
	No. of rain days - 1997	10	13	13	3	8	20	21	5	17	18	15	14	157
	Mean max. temp. (^{o}C)-1995	30	32	32	34	35	34	34	33	33	32	33	32	
	Mean max. temp. (^{o}C)-1996	31	32	32	33	34	34	34	34	34	34	34	34	
	Mean max. temp. (^{o}C)-1997	33	33	33	32	35	35	35	34	32	31	33	32	
	Mean min. temp. (^{o}C)-1995	25	24	24	26	27	27	26	26	26	26	26	25	
	Mean min. temp. (^{o}C)-1996	24	24	24	22	24	23	23	23	23	23	23	22	
	Mean min. temp. (^{o}C)-1997	20	20	19	19	22	23	24	24	24	21	22	22	
Cagayan de Oro	Rainfall (mm)-1995	87	35	48	15	82	258	253	167	273	168	55	288	1727
(Pagalungan	Rainfall (mm)-1996	72	137	20	189	103	126	146	122	163	144	187	21	1429
and CCC)	Rainfall (mm)-1997	100	47	93	25	34	192	208	89	263	163	40	27	1280
	No. of rain days - 1995	10	6	4	4	10	12	27	18	20	13	7	11	142
	No. of rain days - 1996	12	14	2	9	7	11	13	12	13	9	17	5	124
	No. of rain days - 1997	9	8	5	1	5	12	16	5	12	11	5	4	93
	Mean max. temp. (^{o}C)-1995	32	32	33	34	35	34	33	33	32	33	33	32	
	Mean max. temp. (^{o}C)-1996	30	30	33	33	34	34	33	34	34	33	32	32	
	Mean max. temp. (^{o}C)-1997	31	31	32	34	35	34	33	34	34	34	34	33	
	Mean min. temp. (^{o}C)-1995	22	23	23	23	25	24	24	24	24	25	24	23	
	Mean min. temp. (^{o}C)-1996	23	22	23	24	24	24	24	24	24	24	23	23	
	Mean min. temp. (^{o}C)-1997	22	23	23	23	24	24	23	24	24	23	23	22	
CMU, Bukidnon	Rainfall (mm)-1992	6	6	3	31	139	219	372	235	100	257	152	120	1641
	Rainfall (mm)-1993	69	78	152	32	141	350	493	322	388	274	195	197	2691
	Rainfall (mm)-1994	43	80	139	84	452	322	199	301	284	156	10	90	2160
	No. of rain days - 1992	2	2	2	3	11	13	20	13	10	18	8	9	111
	No. of rain days - 1993	5	6	6	6	9	19	19	18	20	15	16	14	153
	No. of rain days - 1994	8	6	10	6	21	27	12	16	21	13	4	9	153
	Mean max. temp. (^{o}C)-1992	33	33	34	36	36	33	33	32	34	32	33	32	
	Mean max. temp. (^{o}C)-1993	33	33	34	33	35	34	33	32	33	33	33	33	
	Mean max. temp. (^{o}C)-1994	33	33	33	35	34	33	32	32	30	33	33	32	
	Mean min. temp. (^{o}C)-1992	19	19	20	21	21	20	20	20	19	19	19	19	
	Mean min. temp. (^{o}C)-1993	21	20	20	20	21	21	21	20	20	20	20	21	
	Mean min. temp. (^{o}C)-1994	20	20	21	21	21	21	20	20	20	20	20	20	
PCA, Davao	Rainfall (mm)-1996	214	92	130	324	289	197	418	318	284	312	201	86	2865
	Rainfall (mm)-1997	557	97	116	302	348	245	229	162	340	331	153	65	2945
	No. of rain days - 1996	19	15	15	18	16	23	17	24	17	19	17	11	211
	No. of rain days - 1997	17	14	9	13	24	15	16	18	15	25	14	12	192
	Mean max. temp. (^{o}C)-1996	30	30	32	31	30	31	31	31	31	31	31	31	
	Mean max. temp. (^{o}C)-1997	30	31	31	32	31	31	28	31	30	30	30	30	
	Mean min. temp. (^{o}C)-1996	20	22	22	21	21	20	20	21	22	21	20	21	
	Mean min. temp. (^{o}C)-1997	21	22	21	21	22	22	24	21	21	20	21	21	
Cotabato	Rainfall (mm)-1996	161	120	107	70	71	79	56	85	137	33	43	61	1024
Carmen, M'lang	Rainfall (mm)-1997	56	35	34	17	48	92	287	15	58	72	46	40	799

Appendix 4. Establishment success of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
A. Grasses for Cut-and-Carry													
Andropogon gayanus CIAT 621	-[a]	2[a]	1	0	0	4	3	4	-	2	3	-	0
Brachiaria brizantha CIAT 16318	-	4	-	-	-	-	-	-	-	3	-	-	-
Brachiaria brizantha CIAT 16827	2	2	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 16835	-	2	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 26110	1	4	-	2	2	-	-	-	-	4	4	4	2
Brachiaria brizantha CIAT 6387	-	3	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 6780	2	2	4	0	2	4	4	4	-	4	4	-	2
Pennisetum purpureum cv. Capricorn	4	4	4	-	-	4	-	-	-	4	4	-	-
Pennisetum purpureum cv. Mott	4	4	-	4	4	-	-	-	-	4	4	-	2
Pennisetum hybrid 'Florida'	4	4	-	-	4	-	4	-	-	4	4	4	2
Pennisetum purpureum 'Local'	4	4	-	-	4	-	-	-	-	4	4	4	2
Pennisetum hybrid 'King' grass	4	4	-	4	-	-	-	-	-	4	4	-	-
Panicum maximum CIAT 6299	2	4	4	4	3	-	-	-	-	3	4	-	1
Panicum maximum T58	3	4	-	-	-	-	-	-	-	-	-	-	-
Panicum maximum cv. Tanzania	-	-	-	-	-	4	-	-	-	-	4	-	-
Paspalum atratum BRA 9610	4	4	-	4	4	-	-	-	-	4	4	4	4
Paspalum guenoarum BRA 3824	-	2	-	-	-	-	-	-	-	-	0	-	-
Setaria sphacelata cv. Golden Timothy	4	4	-	4	4	-	-	-	-	-	-	-	1
Setaria sphacelata cv. Splenda	-	2	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata var. splendida ex. Indonesia	4	4	3	4	3	-	-	-	-	4	4	-	2
B. Grasses for Grazing													
Brachiaria decumbens cv. Basilisk	2	4	3	-	2	4	3	3	4	3	4	4	2
Brachiaria humidicola CIAT 6133	3	4	-	-	2	4	-	-	4	3	4	4	2
Brachiaria humidicola CIAT16886	-	4	4	-	-	4	-	-	4	4	-	-	-
Brachiaria humidicola CIAT 26149	-	2	-	-	-	4	-	-	-	-	-	-	-
Brachiaria humidicola cv. Tully	0	3	-	-	2	4	4	4	4	2	4	-	2
Brachiaria ruziziensis	-	4	-	-	-	4	-	-	-	-	-	-	-
Cynodon plectostachyus	-	-	-	-	-	4	-	-	-	-	-	-	-
Stenotaphrum secundatum cv. Floratam	3	3	-	-	-	-	-	-	-	-	-	-	-
C. Shrub/tree Legumes													
Calliandra calothyrsus ex. Indonesia	4	1	-	4	-	-	-	-	-	-	3	-	-
Calliandra calothyrsus ATF 2014	-	2	-	-	-	-	-	-	-	-	-	-	-
Cratylia argentea CIAT 18516	-	3	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus ex. IRRI	-	2	4	-	4	-	-	-	-	2	3	-	1
Desmanthus virgatus CPI 40071	3	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 52401	-	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 82285 (=cv. Bayamo)	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 91146	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 92803 (=cv. Uman)	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmodium cinerea ex. MBRLC	4	4	4	4	4	-	2	-	-	4	3	3	1
Desmodium cinerea CPI 46561	-	4	-	-	-	4	-	-	-	-	-	-	-
Desmodium cinerea CPI 76099	-	4	-	-	-	-	-	-	-	-	-	-	-
Flemingia macrophylla CIAT 17403	-	4	-	-	-	4	-	-	-	4	-	-	-
Gliricidia sepium 'Monterrico'	4	2	-	4	4	-	3	-	-	3	-	-	1
Gliricidia sepium 'Retalhuleu'	4	2	-	4	4	-	3	-	-	3	-	-	1
Gliricidia sepium 'Belen Rivas'	4	2	-	4	4	-	3	-	-	3	-	-	1
Gliricidia sepium 'Local'	3	-	3	-	4	3	-	-	-	3	2	2	1
Leucaena diversifolia ex. MBRLC	1	-	-	4	3	-	-	-	-	1	-	-	1
Leucaena leucocephala ' Local'	1	-	4	-	3	-	-	-	-	-	3	-	1
Leucaena leucocephala K584	-	4	-	-	-	-	-	-	-	-	-	-	-
Leucaena leucocephala K636	2	4	2	4	3	4	-	-	-	1	2	2	1
Leucaena pallida CQ3439	0	4	-	-	3	-	-	-	-	-	-	-	-
Sesbania rostrata ex. IRRI	-	-	-	-	-	-	-	-	-	-	-	-	2
Sesbania grandiflora	-	-	-	-	-	-	-	-	-	-	3	-	-

[a] Rating scale: 0=did not emerge, 1=poor, 2=moderate, 3=good, 4=excellent.

(continued next page)

Appendix 4 (cont.). Establishment success of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
D. Herbaceous Legumes													
Aeschynomene histrix CIAT 9690	-[a]	4[a]	-	-	-	-	-	-	-	4	-	-	-
Arachis glabrata cv. Florigraze	-	3	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata IRFL 3112	2	2	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 12121	-	2	-	1	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 93483	-	2	-	1	-	-	-	-	-	-	-	-	-
Arachis hybrid IRFL 3014	-	3	-	-	-	-	2	-	-	-	-	-	-
Arachis pintoi CIAT 17434	-	2	-	3	-	4	-	3	1	-	-	-	-
Arachis pintoi CIAT 18744	-	3	-	-	-	4	-	3	-	-	4	3	-
Arachis pintoi CIAT 18747	-	3	-	-	-	4	-	-	-	-	-	-	-
Arachis pintoi CIAT 18748	-	3	-	-	-	4	-	3	-	-	-	-	-
Arachis pintoi CIAT 18750	-	3	-	3	-	4	-	3	1	-	-	-	-
Arachis pintoi CIAT 22160	4	4	3	4	1	-	3	4	-	3	4	4	1
Calopogonium caeruleum CIAT 7304	4	4	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 772	-	4	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 822	-	2	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 17856	4	4	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 20709	-	2	-	-	-	-	-	-	-	-	-	-	-
Centrosema acutifolium CIAT 5277	4	4	3	-	-	4	-	-	-	4	4	3	-
Centrosema acutifolium CIAT 5568	-	-	-	-	-	4	-	-	-	-	-	-	-
Centrosema macrocarpum CIAT 25522	4	4	-	0	-	-	-	-	-	-	2	-	-
Centrosema macrocarpum CIAT 5713	-	4	-	-	-	-	-	-	-	-	-	-	-
Centrosema pascuorum cv. Cavalcade	2	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema pubescens ex. Davao	1	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema mix (CIAT5277, 15160, 15470, 438, 442)	-	-	-	-	-	4	-	-	4	-	-	-	-
Centrosema pubescens CIAT 15160	4	4	-	-	3	-	3	4	-	4	4	4	2
Centrosema pubescens cv. Cardillo	-	4	-	-	-	-	-	-	-	-	-	-	-
Clitoria ternatea	-	-	-	-	-	-	-	-	-	-	-	-	2
Desmodium heterophyllum CIAT 349	3	2	-	-	-	-	-	-	3	-	1	-	-
Desmodium intortum	2	-	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 130329	-	-	-	-	-	4	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 13305	3	2	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 350	-	2	-	-	-	4	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 3666	-	2	-	-	-	-	-	-	-	-	-	-	-
Lablab purpureus cv. Highworth	-	-	-	-	-	-	-	-	-	-	-	-	1
Lablab purpureus cv. Rongai	-	-	-	-	-	-	-	-	-	-	-	-	1
Macroptilium atropurpureum cv. Aztec	-	4	-	-	-	-	-	-	-	-	-	-	-
Macroptilium atropurpureum cv. Siratro	-	4	-	-	-	-	-	-	-	-	-	-	3
Macroptilium gracile cv. Maldonado	2	3	-	-	-	-	-	-	-	-	-	-	2
Mimosa invisa ex. MBRLC (spineless)	-	4	-	-	-	-	-	-	-	-	-	-	-
Mucuna pruriens CIAT 9349	4	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides ex. Davao	3	-	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 7182	4	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 8042	4	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 9900	-	-	-	-	-	-	-	-	-	-	2	-	-
Pueraria phaseoloides CIAT 32118	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT 184	4	4	4	4	3	4	4	4	-	4	4	4	4
Stylosanthes guianensis cv. Cook	-	4	-	-	-	-	4	4	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-1	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-2	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-3	-	2	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-1	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-2	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-3	-	4	-	-	-	-	-	-	-	-	-	-	-

[a] Rating scale: 0=did not emerge, 1=poor, 2=moderate, 3=good, 4=excellent.

Appendix 5. Yield of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
A. Grasses for Cut-and-Carry													
Andropogon gayanus CIAT 621	-[a]	4[a]	2	-	-	4	3	4	-	3	2	-	-
Brachiaria brizantha CIAT 16318	-	4	-	-	-	-	-	-	-	3	-	-	-
Brachiaria brizantha CIAT 16827	2	3	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 16835	-	3	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 26110	2	4	-	4	3	-	-	-	-	3	4	4	2
Brachiaria brizantha CIAT 6387	-	4	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 6780	2	4	4	-	3	3	4	4	-	3	4	-	2
Pennisetum purpureum cv. Capricorn	4	4	4	-	-	4	-	-	-	3	4	-	-
Pennisetum purpureum cv. Mott	4	3	-	4	4	-	-	-	-	3	4	-	4
Pennisetum hybrid 'Florida'	4	4	-	-	4	-	4	-	-	4	4	3	4
Pennisetum purpureum 'Local'	4	4	-	-	4	-	-	-	-	4	4	3	3
Pennisetum hybrid 'King' grass	4	4	-	4	-	-	-	-	-	3	4	-	-
Panicum maximum CIAT 6299	3	4	4	4	3	-	-	-	-	3	4	-	3
Panicum maximum T58	3	3	-	-	-	-	-	-	-	-	-	-	-
Panicum maximum cv. Tanzania	-	-	-	-	-	4	-	-	-	-	3	-	-
Paspalum atratum BRA 9610	4	4	-	4	3	-	-	-	-	4	3	4	4
Paspalum guenoarum BRA 3824	-	2	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata cv. Golden Timothy	4	2	-	3	3	-	-	-	-	-	-	-	2
Setaria sphacelata cv. Splenda	-	2	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata var. splendida ex. Indonesia	4	4	4	4	3	-	-	-	-	4	3	-	2
B. Grasses for Grazing													
Brachiaria decumbens cv. Basilisk	4	4	4	-	4	4	4	4	3	4	4	4	4
Brachiaria humidicola CIAT 6133	3	4	-	-	3	4	-	-	3	4	4	4	3
Brachiaria humidicola CIAT16886	-	4	4	-	-	3	-	-	3	3	-	-	-
Brachiaria humidicola CIAT 26149	-	1	-	-	-	2	-	-	-	-	-	-	-
Brachiaria humidicola cv. Tully	-	3	-	-	3	3	4	4	3	3	4	-	3
Brachiaria ruziziensis	-	4	-	-	-	3	-	-	-	-	-	-	-
Cynodon plectostachyus	-	-	-	-	-	3	-	-	-	-	-	-	-
Stenotaphrum secundatum cv. Floratam	2	2	-	-	-	-	-	-	-	-	-	-	-
C. Shrub/tree Legumes													
Calliandra calothyrsus ex. Indonesia	4	1	-	4	-	-	-	-	-	-	4	-	-
Calliandra calothyrsus ATF 2014	-	2	-	-	-	-	-	-	-	-	-	-	-
Cratylia argentea CIAT 18516	-	3	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus ex. IRRI	-	4	3	-	3	-	-	-	-	3	2	-	
Desmanthus virgatus CPI 40071	3	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 52401	-	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 82285 (=cv. Bayamo)	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 91146	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 92803 (=cv. Uman)	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmodium cinerea ex. MBRLC	4	3	4	4	3	-	2	-	-	3	4	3	-
Desmodium cinerea CPI 46561	-	4	-	-	-	2	-	-	-	-	-	-	-
Desmodium cinerea CPI 76099	-	3	-	-	-	-	-	-	-	-	-	-	-
Flemingia macrophylla CIAT 17403	-	4	-	-	-	2	-	-	-	3	-	-	-
Gliricidia sepium 'Monterrico'	4	4	-	-	4	-	3	-	-	-	-	-	-
Gliricidia sepium 'Retalhuleu'	4	4	-	-	4	-	3	-	-	-	-	-	-
Gliricidia sepium 'Belen Rivas'	4	3	-	-	4	-	3	-	-	-	-	-	-
Gliricidia sepium 'Local'	3	-	4	-	4	4	-	-	-	3	3	4	-
Leucaena diversifolia ex. MBRLC	2	-	-	4	4	-	-	-	-	-	-	-	-
Leucaena leucocephala 'Local'	1	-	4	-	3	-	-	-	-	-	3	-	-
Leucaena leucocephala K584	-	4	-	-	-	-	-	-	-	-	-	-	-
Leucaena leucocephala K636	2	4	3	4	4	4	-	-	-	-	3	2	-
Leucaena pallida CQ3439	-	4	-	-	4	-	-	-	-	-	-	-	-
Sesbania rostrata ex. IRRI	-	-	-	-	-	-	-	-	-	-	-	-	2
Sesbania grandiflora	-	-	-	-	-	-	-	-	-	-	4	-	-

[a] Rating scale: 1=poor, 2=moderate, 3=good, 4=excellent.

(continued next page

Appendix 5 (cont.). Yield of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
D. Herbaceous Legumes													
Aeschynomene histrix CIAT 9690	-[a]	4[a]	-	-	-	-	-	-	-	2	-	-	-
Arachis glabrata cv. Florigraze	-	3	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata IRFL 3112	2	3	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 12121	-	3	-	2	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 93483	-	3	-	2	-	-	-	-	-	-	-	-	-
Arachis hybrid IRFL 3014	-	3	-	-	-	-	2	-	-	-	-	-	-
Arachis pintoi CIAT 17434	-	4	-	3	-	3	-	4	2	-	-	-	-
Arachis pintoi CIAT 18744	-	4	-	-	-	3	-	4	-	-	4	3	-
Arachis pintoi CIAT 18747	-	3	-	-	-	3	-	-	-	-	-	-	-
Arachis pintoi CIAT 18748	-	3	-	-	-	3	-	3	-	-	-	-	-
Arachis pintoi CIAT 18750	-	4	-	3	-	4	-	4	2	-	-	-	-
Arachis pintoi CIAT 22160	4	4	4	3	3	-	3	3	-	3	4	3	2
Calopogonium caeruleum CIAT 7304	4	4	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 772	-	3	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 822	-	2	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 17856	3	2	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 20709	-	2	-	-	-	-	-	-	-	-	-	-	-
Centrosema acutifolium CIAT 5277	3	3	2	-	-	2	-	-	-	2	3	2	-
Centrosema acutifolium CIAT 5568	-	-	-	-	-	2	-	-	-	-	-	-	-
Centrosema macrocarpum CIAT 25522	4	4	-	-	-	-	-	-	-	-	4	-	-
Centrosema macrocarpum CIAT 5713	-	4	-	-	-	-	-	-	-	-	-	-	-
Centrosema pascuorum cv. Cavalcade	2	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema pubescens ex. Davao	1	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema mix (CIAT5277, 15160, 15470, 438, 442)	-	-	-	-	-	3	-	-	3	-	-	-	-
Centrosema pubescens CIAT 15160	4	4	-	-	4	-	3	4	-	3	4	3	2
Centrosema pubescens cv. Cardillo	-	4	-	-	-	-	-	-	-	-	-	-	-
Clitoria ternatea	-	-	-	-	-	-	-	-	-	-	-	-	4
Desmodium heterophyllum CIAT 349	3	2	-	-	-	-	-	-	2	-	1	-	-
Desmodium intortum	2	-	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 130329	-	-	-	-	-	3	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 13305	3	3	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 350	-	2	-	-	-	3	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 3666	-	2	-	-	-	-	-	-	-	-	-	-	-
Lablab purpureus cv. Highworth	-	-	-	-	-	-	-	-	-	-	-	-	3
Lablab purpureus cv. Rongai	-	-	-	-	-	-	-	-	-	-	-	-	3
Macroptilium atropurpureum cv. Aztec	-	4	-	-	-	-	-	-	-	-	-	-	-
Macroptilium atropurpureum cv. Siratro	-	4	-	-	-	-	-	-	-	-	-	-	4
Macroptilium gracile cv. Maldonado	2	3	-	-	-	-	-	-	-	-	-	-	4
Mimosa invisa ex. MBRLC (spineless)	-	4	-	-	-	-	-	-	-	-	-	-	-
Mucuna pruriens CIAT 9349	4	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides ex. Davao	3	-	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 7182	4	3	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 8042	2	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 9900	-	-	-	-	-	-	-	-	-	-	2	-	-
Pueraria phaseoloides CIAT 32118	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT 184	4	4	4	3	4	4	4	4	-	4	4	4	4
Stylosanthes guianensis cv. Cook	-	4	-	-	-	-	3	3	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-1	-	3	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-2	-	3	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-3	-	2	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-1	-	3	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-2	-	2	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-3	-	3	-	-	-	-	-	-	-	-	-	-	-

[a] Rating scale: 1=poor, 2=moderate, 3=good, 4=excellent.

Appendix 6. Persistence of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
A. Grasses for Cut-and-Carry													
Andropogon gayanus CIAT 621	-[a]	4[a]	3	-	-	4	3	4	-	4	2	-	-
Brachiaria brizantha CIAT 16318	-	3	-	-	-	-	-	-	-	3	-	-	-
Brachiaria brizantha CIAT 16827	1	4	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 16835	-	4	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 26110	1	4	-	-	3	-	-	-	-	3	4	4	3
Brachiaria brizantha CIAT 6387	-	4	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 6780	1	4	4	-	3	4	4	4	-	3	4	-	3
Pennisetum purpureum cv. Capricorn	1	4	4	-	-	4	-	-	-	2	4	-	-
Pennisetum purpureum cv. Mott	1	4	-	4	3	-	-	-	-	3	3	-	3
Pennisetum hybrid 'Florida'	1	4	-	-	3	-	4	-	-	3	3	3	3
Pennisetum purpureum 'Local'	1	4	-	-	3	-	-	-	-	3	3	3	3
Pennisetum hybrid 'King' grass	1	4	-	3	-	-	-	-	-	3	3	-	-
Panicum maximum CIAT 6299	1	4	4	4	3	-	-	-	-	3	3	-	3
Panicum maximum T58	1	3	-	-	-	-	-	-	-	-	-	-	-
Panicum maximum cv. Tanzania	-	-	-	-	-	3	-	-	-	-	3	-	-
Paspalum atratum BRA 9610	1	4	-	4	3	-	-	-	-	3	4	4	3
Paspalum guenoarum BRA 3824	-	2	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata cv. Golden Timothy	1	3	-	4	3	-	-	-	-	-	-	-	3
Setaria sphacelata cv. Splenda	-	3	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata var. splendida ex. Indonesia	1	4	3	4	3	-	-	-	-	4	3	-	3
B. Grasses for Grazing													
Brachiaria decumbens cv. Basilisk	1	4	3	-	3	4	4	4	4	3	4	4	3
Brachiaria humidicola CIAT 6133	1	4	-	-	3	4	-	-	4	3	4	4	3
Brachiaria humidicola CIAT16886	-	4	4	-	-	4	-	-	4	4	-	-	-
Brachiaria humidicola CIAT 26149	-	2	-	-	-	3	-	-	-	-	-	-	-
Brachiaria humidicola cv. Tully	-	4	-	-	3	3	4	4	4	3	4	-	3
Brachiaria ruziziensis	-	4	-	-	-	2	-	-	-	-	-	-	-
Cynodon plectostachyus	-	-	-	-	-	4	-	-	-	-	-	-	-
Stenotaphrum secundatum cv. Floratam	1	2	-	-	-	-	-	-	-	-	-	-	-
C. Shrub/tree Legumes													
Calliandra calothyrsus ex. Indonesia	3	1	-	4	-	-	-	-	-	-	4	-	-
Calliandra calothyrsus ATF 2014	-	-	-	-	-	-	-	-	-	-	-	-	-
Cratylia argentea CIAT 18516	-	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus ex. IRRI	-	4	4	-	3	-	-	-	-	2	1	-	-
Desmanthus virgatus CPI 40071	3	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 52401	-	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 82285 (=cv. Bayamo)	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 91146	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 92803 (=cv. Uman)	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmodium cinerea ex. MBRLC	4	4	4	2	3	-	2	-	-	3	4	3	-
Desmodium cinerea CPI 46561	-	4	-	-	-	3	-	-	-	-	-	-	-
Desmodium cinerea CPI 76099	-	4	-	-	-	-	-	-	-	-	-	-	-
Flemingia macrophylla CIAT 17403	-	4	-	-	-	3	-	-	-	3	-	-	-
Gliricidia sepium 'Monterrico'	3	4	-	-	3	-	3	-	-	3	-	-	-
Gliricidia sepium 'Retalhuleu'	3	4	-	-	3	-	3	-	-	3	-	-	-
Gliricidia sepium 'Belen Rivas'	3	4	-	-	3	-	3	-	-	3	-	-	-
Gliricidia sepium 'Local'	2	-	4	-	3	3	-	-	-	4	4	3	-
Leucaena diversifolia ex. MBRLC	2	-	-	4	3	-	-	-	-	-	-	-	-
Leucaena leucocephala 'Local'	2	-	4	-	3	-	-	-	-	-	4	-	-
Leucaena leucocephala K584	-	4	-	-	-	-	-	-	-	-	-	-	-
Leucaena leucocephala K636	2	4	3	3	3	4	-	-	-	1	4	3	-
Leucaena pallida CQ3439	-	1	-	-	3	-	-	-	-	-	-	-	-
Sesbania rostrata ex. IRRI	-	-	-	-	-	-	-	-	-	-	-	-	2
Sesbania grandiflora	-	-	-	-	-	-	-	-	-	-	4	-	-

[a] Rating scale: 1=poor, 2=moderate, 3=good, 4=excellent.

(continued next page)

Appendix 6 (cont.). Persistence of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
D. Herbaceous Legumes													
Aeschynomene histrix CIAT 9690	-[a]	1[a]	-	-	-	-	-	-	-	1	-	-	-
Arachis glabrata cv. Florigraze	-	4	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata IRFL 3112	3	4	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 12121	-	4	-	2	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 93483	-	4	-	2	-	-	-	-	-	-	-	-	-
Arachis hybrid IRFL 3014	-	4	-	-	-	-	2	-	-	-	-	-	-
Arachis pintoi CIAT 17434	-	4	-	4	-	2	-	3	1	-	-	-	-
Arachis pintoi CIAT 18744	-	4	-	-	-	3	-	3	-	-	4	4	-
Arachis pintoi CIAT 18747	-	4	-	-	-	2	-	-	-	-	-	-	-
Arachis pintoi CIAT 18748	-	4	-	-	-	2	-	3	-	-	-	-	-
Arachis pintoi CIAT 18750	-	4	-	4	-	2	-	4	1	-	-	-	-
Arachis pintoi CIAT 22160	3	4	4	4	3	-	3	3	-	3	4	4	3
Calopogonium caeruleum CIAT 7304	4	4	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 772	-	3	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 822	-	3	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 17856	2	3	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 20709	-	2	-	-	-	-	-	-	-	-	-	-	-
Centrosema acutifolium CIAT 5277	4	2	2	-	-	2	-	-	-	2	3	2	-
Centrosema acutifolium CIAT 5568	-	-	-	-	-	2	-	-	-	-	-	-	-
Centrosema macrocarpum CIAT 25522	4	4	-	-	-	-	-	-	-	-	4	-	-
Centrosema macrocarpum CIAT 5713	-	4	-	-	-	-	-	-	-	-	-	-	-
Centrosema pascuorum cv. Cavalcade	1	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema pubescens ex. Davao	1	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema mix (CIAT 5277, 15160, 15470, 438, 442)	-	-	-	-	-	2	-	-	4	-	-	-	-
Centrosema pubescens CIAT 15160	3	4	-	-	3	-	3	4	-	3	4	2	3
Centrosema pubescens cv. Cardillo	-	4	-	-	-	-	-	-	-	-	-	-	-
Clitoria ternatea	-	-	-	-	-	-	-	-	-	-	-	-	3
Desmodium heterophyllum CIAT 349	1	2	-	-	-	-	-	-	4	-	1	-	-
Desmodium intortum	1	-	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 130329	-	-	-	-	-	2	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 13305	2	2	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 350	-	2	-	-	-	2	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 3666	-	2	-	-	-	-	-	-	-	-	-	-	-
Lablab purpureus cv. Highworth	-	-	-	-	-	-	-	-	-	-	-	-	3
Lablab purpureus cv. Rongai	-	-	-	-	-	-	-	-	-	-	-	-	3
Macroptilium atropurpureum cv. Aztec	-	4	-	-	-	-	-	-	-	-	-	-	-
Macroptilium atropurpureum cv. Siratro	-	4	-	-	-	-	-	-	-	-	-	-	3
Macroptilium gracile cv. Maldonado	2	3	-	-	-	-	-	-	-	-	-	-	3
Mimosa invisa ex. MBRLC (spineless)	-	3	-	-	-	-	-	-	-	-	-	-	-
Mucuna pruriens CIAT 9349	1	3	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides ex. Davao	3	-	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 7182	2	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 8042	2	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 9900	-	-	-	-	-	-	-	-	-	-	2	-	-
Pueraria phaseoloides CIAT 32118	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT 184	2	4	3	3	3	3	4	4	-	3	3	3	3
Stylosanthes guianensis cv. Cook	-	2	-	-	-	-	1	2	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-1	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-2	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-3	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-1	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-2	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-3	-	4	-	-	-	-	-	-	-	-	-	-	-

[a] Rating scale: 1=poor, 2=moderate, 3=good, 4=excellent.

Appendix 7. Seed yield potential of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
A. Grasses for Cut-and-Carry													
Andropogon gayanus CIAT 621	-[a]	4[a]	2	-2	-	2	2	3	-	3	2	-	-
Brachiaria brizantha CIAT 16318	-	3	-	-	-	-	-	-	-	3	-	-	-
Brachiaria brizantha CIAT 16827	0	2	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 16835	-	2	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 26110	0	4	-	-	-	-	-	-	-	3	4	3	-
Brachiaria brizantha CIAT 6387	-	3	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 6780	0	2	2	-	-	2	1	2	-	3	4	-	-
Pennisetum purpureum cv. Capricorn	0	-	-	-	-	-	-	-	-	-	-	-	-
Pennisetum purpureum cv. Mott	0	-	-	-	-	-	-	-	-	-	-	-	-
Pennisetum hybrid 'Florida'	0	-	-	-	-	-	0	-	-	-	-	-	-
Pennisetum purpureum 'Local'	0	-	-	-	-	-	-	-	-	-	-	-	-
Pennisetum hybrid 'King' grass	0	-	-	-	-	-	-	-	-	-	-	-	-
Panicum maximum CIAT 6299	3	4	2	-	-	-	-	-	-	3	2	-	-
Panicum maximum T58	3	-	-	-	-	-	-	-	-	-	-	-	-
Panicum maximum cv. Tanzania	-	-	-	-	-	3	-	-	-	-	2	-	-
Paspalum atratum BRA 9610	0	4	-	-	-	-	-	-	-	2	-	-	-
Paspalum guenoarum BRA 3824	-	2	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata cv. Golden Timothy	0	-	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata cv. Splenda	-	-	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata var. splendida ex. Indonesia	0	-	-	-	-	-	-	-	-	-	-	-	-
B. Grasses for Grazing													
Brachiaria decumbens cv. Basilisk	1	2	2	-	-	-	1	2	-	2	3	3	-
Brachiaria humidicola CIAT 6133	1	3	-	-	-	-	-	-	-	2	2	2	-
Brachiaria humidicola CIAT16886	-	2	2	-	-	-	-	-	-	2	-	-	-
Brachiaria humidicola CIAT 26149	-	1	-	-	-	-	-	-	-	-	-	-	-
Brachiaria humidicola cv. Tully	-	2	-	-	-	-	1	2	-	2	1	-	-
Brachiaria ruziziensis	-	4	-	-	-	-	-	-	-	-	-	-	-
Cynodon plectostachyus	-	-	-	-	-	-	-	-	-	-	-	-	-
Stenotaphrum secundatum cv. Floratam	0	-	-	-	-	-	-	-	-	-	-	-	-
C. Shrub/tree Legumes													
Calliandra calothyrsus ex. Indonesia	1	1	-	4	-	-	-	-	-	-	1	-	-
Calliandra calothyrsus ATF 2014	-	3	-	-	-	-	-	-	-	-	-	-	-
Cratylia argentea CIAT 18516	-	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus ex. IRRI	-	4	3	-	4	-	-	-	-	3	2	-	-
Desmanthus virgatus CPI 40071	4	3	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 52401	-	3	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 82285 (=cv. Bayamo)	-	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 91146	-	4	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 92803 (=cv. Uman)	-	3	-	-	-	-	-	-	-	-	-	-	-
Desmodium cinerea ex. MBRLC	3	4	4	4	4	-	-	-	-	3	3	3	-
Desmodium cinerea CPI 46561	-	3	-	-	-	1	-	-	-	-	-	-	-
Desmodium cinerea CPI 76099	-	4	-	-	-	-	-	-	-	-	-	-	-
Flemingia macrophylla CIAT 17403	-	4	-	-	-	-	-	-	-	3	-	-	-
Gliricidia sepium 'Monterrico'	0	1	-	-	-	-	-	-	-	-	-	-	-
Gliricidia sepium 'Retalhuleu'	0	1	-	-	-	-	-	-	-	-	-	-	-
Gliricidia sepium 'Belen Rivas'	0	1	-	-	-	-	-	-	-	-	-	-	-
Gliricidia sepium 'Local'	0	-	-	-	-	-	-	-	-	2	-	-	-
Leucaena diversifolia ex. MBRLC	0	-	-	4	2	-	-	-	-	-	-	-	-
Leucaena leucocephala 'Local'	0	-	4	-	3	-	-	-	-	-	-	-	-
Leucaena leucocephala K584	-	4	-	-	-	-	-	-	-	-	-	-	-
Leucaena leucocephala K636	0	4	3	4	2	2	-	-	-	-	2	-	-
Leucaena pallida CQ3439	-	4	-	-	1	-	-	-	-	-	-	-	-
Sesbania rostrata ex. IRRI	-	-	-	-	-	-	-	-	-	-	-	-	3
Sesbania grandiflora	-	-	-	-	-	-	-	-	-	-	2	-	-

[a] Rating scale: 1=poor, 2=moderate, 3=good, 4=excellent.

(continued next page)

Appendix 7 (cont.). Seed yield potential of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
D. Herbaceous Legumes													
Aeschynomene histrix CIAT 9690	-[a]	4[a]	-	-	-	-	-	-	-	4	-	-	-
Arachis glabrata cv. Florigraze	-	1	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata IRFL 3112	1	1	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 12121	-	1	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 93483	-	1	-	-	-	-	-	-	-	-	-	-	-
Arachis hybrid IRFL 3014	-	1	-	-	-	-	0	-	-	-	-	-	-
Arachis pintoi CIAT 17434	-	4	-	-	-	-	-	-	-	-	-	-	-
Arachis pintoi CIAT 18744	-	4	-	-	-	-	-	-	-	-	-	-	-
Arachis pintoi CIAT 18747	-	4	-	-	-	-	-	-	-	-	-	-	-
Arachis pintoi CIAT 18748	-	3	-	-	-	-	-	-	-	-	-	-	-
Arachis pintoi CIAT 18750	-	1	-	-	-	-	-	-	-	-	-	-	-
Arachis pintoi CIAT 22160	3	3	3	-	1	-	0	-	-	3	-	-	1
Calopogonium caeruleum CIAT 7304	2	4	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 772	-	3	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 822	-	2	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 17856	1	3	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 20709	-	3	-	-	-	-	-	-	-	-	-	-	-
Centrosema acutifolium CIAT 5277	1	3	2	-	-	2	-	-	-	2	2	1	-
Centrosema acutifolium CIAT 5568	-	-	-	-	-	2	-	-	-	-	-	-	-
Centrosema macrocarpum CIAT 25522	1	2	-	-	-	-	-	-	-	-	2	-	-
Centrosema macrocarpum CIAT 5713	-	2	-	-	-	-	-	-	-	-	-	-	-
Centrosema pascuorum cv. Cavalcade	2	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema pubescens ex. Davao	1	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema mix (CIAT 5277, 15160, 15470, 438, 442)	-	-	-	-	-	2	-	-	-	-	-	-	-
Centrosema pubescens CIAT 15160	1	4	-	-	2	-	3	4	-	3	2	-	3
Centrosema pubescens cv. Cardillo	-	3	-	-	-	-	-	-	-	-	-	-	-
Clitoria ternatea	-	-	-	-	-	-	-	-	-	-	-	-	2
Desmodium heterophyllum CIAT 349	1	2	-	-	-	-	-	-	-	-	-	-	-
Desmodium intortum	1	-	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 130329	-	-	-	-	-	3	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 13305	2	2	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 350	-	2	-	-	-	3	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 3666	-	2	-	-	-	-	-	-	-	-	-	-	-
Lablab purpureus cv. Highworth	-	-	-	-	-	-	-	-	-	-	-	-	1
Lablab purpureus cv. Rongai	-	-	-	-	-	-	-	-	-	-	-	-	1
Macroptilium atropurpureum cv. Aztec	-	4	-	-	-	-	-	-	-	-	-	-	-
Macroptilium atropurpureum cv. Siratro	-	4	-	-	-	-	-	-	-	-	-	-	2
Macroptilium gracile cv. Maldonado	2	4	-	-	-	-	-	-	-	-	-	-	1
Mimosa invisa ex. MBRLC (spineless)	-	4	-	-	-	-	-	-	-	-	-	-	-
Mucuna pruriens CIAT 9349	2	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides ex. Davao	1	-	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 7182	1	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 8042	2	4	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 9900	-	-	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 32118	-	4	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT 184	3	4	3	4	3	3	3	4	-	3	3	3	3
Stylosanthes guianensis cv. Cook	-	4	-	-	-	-	-	4	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-1	-	3	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-2	-	3	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-3	-	3	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-1	-	2	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-2	-	2	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-3	-	3	-	-	-	-	-	-	-	-	-	-	-

[a] Rating scale: 1=poor, 2=moderate, 3=good, 4=excellent.

Appendix 8. Pest and disease damage of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
A. Grasses for Cut-and-Carry													
Andropogon gayanus CIAT 621	-[a]	0[a]	0	-	-	0	0	0	-	0	0	-	-
Brachiaria brizantha CIAT 16318	-	0	-	-	-	-	-	-	-	0	-	-	-
Brachiaria brizantha CIAT 16827	1	0	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 16835	-	0	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 26110	1	0	-	0	0	-	-	-	-	2	0	0	0
Brachiaria brizantha CIAT 6387	-	0	-	-	-	-	-	-	-	-	-	-	-
Brachiaria brizantha CIAT 6780	1	0	2	-	0	0	0	0	-	1	0	-	0
Pennisetum purpureum cv. Capricorn	1	0	0	-	-	0	-	-	-	1	0	-	-
Pennisetum purpureum cv. Mott	1	0	-	0	0	-	-	-	-	2	0	-	0
Pennisetum hybrid 'Florida'	1	0	-	-	0	-	0	-	-	1	0	0	0
Pennisetum purpureum 'Local'	1	0	-	-	0	-	-	-	-	0	0	0	0
Pennisetum hybrid 'King' grass	1	0	-	0	-	-	-	-	-	1	0	-	-
Panicum maximum CIAT 6299	1	0	0	0	0	-	-	-	-	1	1	-	0
Panicum maximum T58	1	0	-	-	-	-	-	-	-	-	-	-	-
Panicum maximum cv. Tanzania	-	-	-	-	-	0	-	-	-	-	1	-	-
Paspalum atratum BRA 9610	1	0	-	0	0	-	-	-	-	0	0	0	0
Paspalum guenoarum BRA 3824	-	0	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata cv. Golden Timothy	1	0	-	0	0	-	-	-	-	-	-	-	0
Setaria sphacelata cv. Splenda	-	0	-	-	-	-	-	-	-	-	-	-	-
Setaria sphacelata var. splendida ex. Indonesia	1	0	0	0	0	-	-	-	-	0	0	-	0
B. Grasses for Grazing													
Brachiaria decumbens cv. Basilisk	1	0	1	-	0	0	0	0	1	1	0	0	0
Brachiaria humidicola CIAT 6133	1	0	-	-	0	0	-	-	1	0	0	0	0
Brachiaria humidicola CIAT16886	-	0	0	-	-	0	-	-	1	0	-	-	-
Brachiaria humidicola CIAT 26149	-	0	-	-	-	0	-	-	-	-	-	-	-
Brachiaria humidicola cv. Tully	-	0	-	-	0	0	0	0	1	0	0	-	0
Brachiaria ruziziensis	-	0	-	-	-	0	-	-	-	-	-	-	-
Cynodon plectostachyus	-	-	-	-	-	0	-	-	-	-	-	-	-
Stenotaphrum secundatum cv. Floratam	1	0	-	-	-	-	-	-	-	-	-	-	-
C. Shrub/tree Legumes													
Calliandra calothyrsus ex. Indonesia	0	0	-	0	-	-	-	-	-	-	0	-	-
Calliandra calothyrsus ATF 2014	-	0	-	-	-	-	-	-	-	-	-	-	-
Cratylia argentea CIAT 18516	-	0	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus ex. IRRI	-	0	0	-	0	-	-	-	-	0	1	-	0
Desmanthus virgatus CPI 40071	1	2	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 52401	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 82285 (=cv. Bayamo)	-	2	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 91146	-	0	-	-	-	-	-	-	-	-	-	-	-
Desmanthus virgatus CPI 92803 (=cv. Uman)	-	0	-	-	-	-	-	-	-	-	-	-	-
Desmodium cinerea ex. MBRLC	0	0	1	0	1	-	0	-	-	0	4	0	0
Desmodium cinerea CPI 46561	-	0	-	-	-	0	-	-	-	-	-	-	-
Desmodium cinerea CPI 76099	-	0	-	-	-	-	-	-	-	-	-	-	-
Flemingia macrophylla CIAT 17403	-	0	-	-	-	0	-	-	-	0	-	-	-
Gliricidia sepium 'Monterrico'	0	0	-	0	0	-	0	-	-	0	-	-	0
Gliricidia sepium 'Retalhuleu'	0	0	-	0	0	-	0	-	-	0	-	-	0
Gliricidia sepium 'Belen Rivas'	0	0	-	0	0	-	0	-	-	0	-	-	0
Gliricidia sepium 'Local'	0	-	0	-	0	0	-	-	-	1	0	0	0
Leucaena diversifolia ex. MBRLC	1	-	-	0	2	-	-	-	-	0	-	-	0
Leucaena leucocephala 'Local'	2	-	0	-	2	-	-	-	-	-	2	-	0
Leucaena leucocephala K584	-	3	-	-	-	-	-	-	-	-	-	-	-
Leucaena leucocephala K636	2	2	0	0	2	2	-	-	-	0	1	0	0
Leucaena pallida CQ3439	-	0	-	-	0	-	-	-	-	-	-	-	-
Sesbania rostrata ex. IRRI	-	-	-	-	-	-	-	-	-	-	-	-	0
Sesbania grandiflora	-	-	-	-	-	-	-	-	-	-	1	-	-

[a] Rating scale: 0=no pest/diseases, 1=little damage, 2=moderate damage, 3=severe damage, 4=plants killed.

(continued next page)

Appendix 8 (cont.). Pest and disease damage of forages at regional evaluation sites in the Philippines.

Species	Davao-PCA	IRRI	Montealegre	Guba	Carmen	CMU	Gamu	Aglipay	Bicol	San Salvador	CCC	Pagalungan	M'lang
D. Herbaceous Legumes													
Aeschynomene histrix CIAT 9690	-[a]	0[a]	-	-	-	-	-	-	-	1	-	-	-
Arachis glabrata cv. Florigraze	-	0	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata IRFL 3112	1	0	-	-	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 12121	-	0	-	0	-	-	-	-	-	-	-	-	-
Arachis glabrata CPI 93483	-	0	-	0	-	-	-	-	-	-	-	-	-
Arachis hybrid IRFL 3014	-	0	-	-	-	-	0	-	-	-	-	-	-
Arachis pintoi CIAT 17434	-	0	-	0	-	0	-	0	0	-	-	-	-
Arachis pintoi CIAT 18744	-	0	-	-	-	0	-	0	-	-	0	1	-
Arachis pintoi CIAT 18747	-	0	-	-	-	0	-	-	-	-	-	-	-
Arachis pintoi CIAT 18748	-	0	-	-	-	0	-	0	-	-	-	-	-
Arachis pintoi CIAT 18750	-	0	-	0	-	0	-	0	0	-	-	-	-
Arachis pintoi CIAT 22160	2	0	1	0	0	-	0	0	-	0	0	1	1
Calopogonium caeruleum CIAT 7304	2	0	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 772	-	0	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 822	-	0	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 17856	2	0	-	-	-	-	-	-	-	-	-	-	-
Calopogonium mucunoides CIAT 20709	-	0	-	-	-	-	-	-	-	-	-	-	-
Centrosema acutifolium CIAT 5277	2	0	1	-	-	3	-	-	-	0	1	3	-
Centrosema acutifolium CIAT 5568	-	-	-	-	-	3	-	-	-	-	-	-	-
Centrosema macrocarpum CIAT 25522	2	0	-	-	-	-	-	-	-	-	1	-	-
Centrosema macrocarpum CIAT 5713	-	0	-	-	-	-	-	-	-	-	-	-	-
Centrosema pascuorum cv. Cavalcade	4	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema pubescens ex. Davao	1	-	-	-	-	-	-	-	-	-	-	-	-
Centrosema mix (CIAT5277, 15160, 15470, 438, 442)	-	-	-	-	-	2	-	-	1	-	-	-	-
Centrosema pubescens CIAT 15160	2	1	-	-	1	-	0	0	-	0	1	0	1
Centrosema pubescens cv. Cardillo	-	0	-	-	-	-	-	-	-	-	-	-	-
Clitoria ternatea	-	-	-	-	-	-	-	-	-	-	-	-	1
Desmodium heterophyllum CIAT 349	1	0	-	-	-	-	-	-	1	-	3	-	-
Desmodium intortum	3	-	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 130329	-	-	-	-	-	1	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 13305	2	0	-	-	-	-	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 350	-	0	-	-	-	1	-	-	-	-	-	-	-
Desmodium ovalifolium CIAT 3666	-	0	-	-	-	-	-	-	-	-	-	-	-
Lablab purpureus cv. Highworth	-	-	-	-	-	-	-	-	-	-	-	-	1
Lablab purpureus cv. Rongai	-	-	-	-	-	-	-	-	-	-	-	-	1
Macroptilium atropurpureum cv. Aztec	-	1	-	-	-	-	-	-	-	-	-	-	-
Macroptilium atropurpureum cv. Siratro	-	1	-	-	-	-	-	-	-	-	-	-	1
Macroptilium gracile cv. Maldonado	3	1	-	-	-	-	-	-	-	-	-	-	1
Mimosa invisa ex. MBRLC (spineless)	-	0	-	-	-	-	-	-	-	-	-	-	-
Mucuna pruriens CIAT 9349	1	3	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides ex. Davao	1	-	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 7182	1	1	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 8042	1	1	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 9900	-	-	-	-	-	-	-	-	-	-	-	-	-
Pueraria phaseoloides CIAT 32118	-	1	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT 184	1	0	0	0	0	0	0	0	-	0	0	0	1
Stylosanthes guianensis cv. Cook	-	3	-	-	-	-	4	4	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-1	-	0	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-2	-	0	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM05-3	-	0	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-1	-	0	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-2	-	0	-	-	-	-	-	-	-	-	-	-	-
Stylosanthes guianensis CIAT FM07-3	-	0	-	-	-	-	-	-	-	-	-	-	-

[a] Rating scale: 0=no pest/diseases, 1=little damage, 2=moderate damage, 3=severe damage, 4=plants killed.