Table 2. Major contour-hedgerow farming systems on sloping lands in Vietnam.

Alley crops	Hedgerow species
Upland rice	*Tephrosia candida*
Cassava	*Tephrosia candida* + *Crotolaria*
Maize-bean/peanut	*Tephrosia candida* + Tea
Maize-Peanut/bean	Tea
Maize-peanut	*Leucaena leucocephala*
Coffee/tea/fruit trees	*Leucaena leucocephala* + *Tephrosia candida*
Coffee	*Leucaena leucocephala* + *Crotolaria striata*
Maize-bean(peanut)/cassava	*Leucaena leucocephala* + *Cajanus cajan*
Annual crops	*Cajanus cajan*, *Flemingia congesta*, *Tithonia diversifolia*, Lemon grass
Annual crops/fruit trees	Natural grasses, Vetiver grass, Pineapple

Table 3. Application of inorganic fertilisers to the alley crops.

Research sites	Alley crops		Input levels
All sites with annual crops	Upland rice peanut/bean-maize cassava	No input	No fertiliser applied, herbage returned to soil (Farmers' practice)
		Low input	Half basal application of N, P_2O_5, K_2O and CaO (15–45–30–500 kg/ha) with peanut/soybean herbage returned to soil
		High input	Full basal application of N, P_2O_5, K_2O and CaO (30–90–60–1000kg/ha) with peanut/soybean herbage returned to soil
All sites with perennial crops	Coffee, fruit trees	No input	No fertiliser applied, no intercropping (Farmers' practice)
		Low input 1	No fertiliser. Leguminous crops as intercropping, herbage returned to soil
		Low input 2	Half basal rate of fertilisers used for annual crops and intercrops
		High input	Full basal rate of fertilisers used for annual crops and intercrops

The hedgerows were planted at the start of the experiments/on-farm research. They were spaced at 6–8 m intervals; the double hedgerows were about 1 m wide, and the single hedgerows 0.5 m. The hedgerows were trimmed regularly every 60 days after the first cutting in the rainy season, and the prunings returned to the soil as mulch.

Performance of the hedgerow species

The mean herbage yields of the hedgerow species are presented in Table 4.

Nutrient return

One of the factors that influences crop yields and the sustainability of agricultural systems is soil fertility. Since most of the plant nutrients are contained in the upper 15 cm soil layer, the loss of this soil by erosion is detrimental to crop production. By the same argument, minimising soil loss and returning organic residues to the soil may improve its productivity.

Table 4. Average herbage yield (t/ha/yr) of hedgerows in some tested sites on sloping lands.

Hedgerow	No input	Low input	High input
Tephrosia	4.5	5.8	6.5
Tephrosia	—	6.5	—
Flemingia	4.2	5.5	6.8
Flemingia	—	6.6	—
Leucaena	3.5	4.7	6.6
Leucaena	—	5.1	—
Leucaena	—	4.5	—
Cajanus	—	6.5	—
Tephrosia + *Cajanus*	3.8	5.3	5.8
Tephrosia + *Leucaena*	3.5	4.7	5.0
Tephrosia + *Crotolaria*	4.0	5.7	6.8

The hedgerow pruning returned to the soil between 3.5 and 6.8 t/ha for mulching, erosion control and improvement of soil fertility. Based on the nutrient content of hedgerow species (Table 5), and assuming one-tenth of the area is occupied by hedgerows, the amount of nutrient returned from hedgerow species should be of the order of 30 kg N, 3 kg P, and 25 kg K/ha/year.

Table 5. Average nutrient content (% of dry matter) of some hedgerow species.

Species	Nutrient		
	N	P	K
Tephrosia candida	2.30	0.40	2.77
Leucaena leucocephala	2.52	0.37	2.00
Cajanus cajan	1.62	0.37	1.40
Flemingia congesta	2.41	0.25	2.30
Crotolaria anagyroides	3.36	0.23	2.10

Soil erosion

Alley cropping reduced soil erosion at all experiment sites (Table 6) with soil losses all being 50%–60% less than the control.

Formation of terraces

Terrace formation was observed at the study sites between 1990 and 1992. The terraces resulted from filtration and accumulation by the hedgerow plants of runoff sediments. This was enhanced by the cultivation in the alleys. In the experiment site at Hoa Son, the slopes developed a distinctive profile after three years. An abrupt drop of about 10–20 cm was observed a few centimetres downslope from each hedgerow. Below this point, the slope was uniform until 50–70 cm above the next hedgerow, where the upslope limit of an accumulation wedge of soil was seen. The accumulation wedge showed evidence of layering, with each layer presumably representing the accumulated soil drop by the runoff of an individual storm as it was slowed down by the hedgerow.

Similar results were observed from experiment sites in IBSRAM ASIALAND-Sloping Lands Network in Thailand, Philippines, China, and Indonesia.

Changes in soil properties

As much as 60–80 kg/ha/year of N, 25–35 kg P_2O_5, and 20–30 kg K_2O can be lost under the farmers' practice of no hedgerow cultivation. This is more than two or three times the amount of nutrient applied to the crops in the same period. This can drastically reduce the fertility of the topsoil and its capacity to produce crops economically. With alley cropping, the amount of nutrients lost is reduced by the prunings returned to the soil. If the crop residues are also returned, soil fertility will be improved even further.

Observations at the research sites showed that soil moisture contents in the plots with hedgerows were consistently higher than in the plots without hedgerows and bare plots.

With these results, however, there is still a need for further evaluation as there were also observations suggesting possible competition between the hedgerows and the alley crops for nutrients, sunlight, and water. Plants nearer the hedgerows were relatively less vigorous than those at the middle of the alleys.

Yield of the alley crops

The effects of alley cropping on crop yields, when compared to those of the farmers' practice, are presented in Table 7. In general, alley cropping gave equal or even higher yields of crops than those from the farmers' practice despite the reduction in the effective cropping area of 10%–15%, although the response varied across sites and among species. Maize and cassava had the greatest absolute increases in yield.

The positive effect of alley cropping on the yield of crops increased with time. In some experimental sites, an increasing yield difference between the alley

Table 6. Comparison of soil loss between the farmers' practices (control) and alley cropping.

Site	Slope (%)	Mean soil loss (t/ha/yr)		Soil loss reduction (%)
		Control	Alley cropping	
Ba Vi	10–12	2.3	1.1	52
Hoa Son	39–42	20.0	8.0	60
Dong Rang	15–20	30.4	12.3	60
Thai Ninh	18–30	43.1	15.9	63
Phuong Linh	20–25	44.2	17.4	61
Phu Quy	18–30	38.4	14.3	63
Eakmat	10–12	8.2	4.1	50
Eakchucap	28–30	85.2	38.6	55

Table 7. Mean yield of alley crops in farmers' practice (control) and alley cropping.

Site	Crop	Average yield (kg/ha)		
		Control	Alley cropping	Effect (%)
Hoa Son	Black bean	445	556	+25
	Peanut	463	656	+42
	Vigna sinensis	364	436	+20
	Maize	1181	1916	+63
	Cassava	11130	12150	+9
	Cassava	11940	14500	+21
Dong Rang	Peanut	660	850	+29
	Peanut	780	790	+1
	Cassava	18700	19000	+2
	Cassava	12850	11930	−7
Phuong Linh	Peanut	1171	1200	+2
	Peanut	1012	916	−9
	Cassava	16900	17000	+1
	Cassava	14600	15100	+3
Phu Quy	Peanut	986	1126	+14
	Maize	1450	1568	+8
Eakmat	Coffee (fresh)	12100	16100	+33
	Mungbean	1200	1090	−9
	Peanut	1520	1530	+1
	Maize	4500	4500	0

cropping and the farmers' practice treatments was observed over the three-year period of the research. This was observed even if the alley cropping area was only four-fifths of the farmers' practice treatment. Although there was no consistent trend in yield (partly complicated by seasonal change in climate), it was obvious that the alley cropping technique could yield sustainable agriculture on sloping lands. The beneficial effects will be more obvious in later years when most of the surface soil from the farmers' practice (no soil conservation measure) is eroded and its fertility is depleted.

The observations from the field validation experiments on the sloping lands showed the technical adaptability of the contour-hedgerow and alley-cropping technologies in a wide range of environments. The results have shown the beneficial effects of alley cropping in soil and water conservation and in maintaining and increasing crop production. They corroborate the results of earlier studies indicating the positive effects of alley cropping. In relation to these observations, some general recommendations may be considered to improve further the effectiveness of the contour-hedgerow farming system.

The effectiveness of the alley cropping technology should not be evaluated only for its beneficial effects on soil conservation. Of equal importance are the benefits to farmers from the increased yield of the crops. Although alley cropping is unlikely to produce crop yields comparable to yields that can be obtained using optimum inorganic applications with conventional cultivation, the benefits could be enhanced by the application of inorganic fertilisers. These would benefit not only the alley crops but also the hedgerow crops, as shown in the results from the experiments.

Conclusions

L. leucocephala together with other shrubby leguminous cover crops can be used in hedgerow farming systems on sloping lands. These species can contribute to soil erosion control, improvement of soil fertility, and increase crop yields in the alleys.

Management of hedgerow crops and alley crops is vitally important for the benefit of the cultivated systems. Under a systems approach, the compatibility of the hedgerow species with the alley crops planted should also be subject to tests and verification. Aspects of shading, provision of organic matter, and crop yields for sustaining the agricultural systems on sloping lands, need to be investigated.

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An Overview of *Leucaena* Usage in the Southern Philippines: The Mindanao Baptist Rural Life Center (MBRLC) Experience

J.J. Palmer[1]

Abstract

Leucaena leucocephala has been known in the Philippines since the sixteenth century. Extensive research during the 1970s was slowed by the advent of the psyllid. The Mindanao Baptist Rural Life Center (MBRLC) has demonstrated the usefulness of *L. leucocephala* in corn production and as a feed source for dairy goats. MBRLC has also developed sloping agricultural land technologies for corn production using hedgerows of nitrogen-fixing trees and shrubs for soil erosion control and soil amelioration. Whereas *L. leucocephala* was used exclusively for these hedgerows, its popularity has declined due to the psyllid, and it is now being replaced by *L. diversifolia*, *Desmodium rensonii* and *Flemingia macrophylla*.

THE MINDANAO Baptist Rural Life Center (MBRLC) is a rural development ministry of the Philippine Baptist Mission, International Board, USA. The centre is located on a 19 ha demonstration farm at Davao del Sur on the island of Mindanao, Philippines, and is dedicated to the betterment of upland farmers in the Philippines as well as the rest of Asia.

A high emphasis has been given to trees such as *Leucaena* spp. and their role in sustainable farming systems for small landholders. Several internationally known technologies and demonstrations using *Leucaena* and other nitrogen fixing trees/shrubs (NFT/S) have been developed by the MBRLC and extended to the numerous upland farming communities throughout the southern Philippines and the rest of Asia. These are primarily the sloping agricultural land technologies, known generally as SALT.

SALT is a soil conservation-oriented farming system, basically attuned to the corn production of small sloping-land farmers. It makes use of nitrogen fixing trees/shrubs planted thickly as a double hedgerow on contour lines and spaced about 3 to 5 metres apart for soil erosion control and soil amelioration. Every third alley is planted to a locally used permanent crop while the other two alleys are used for food/cash crops.

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This paper looks at the development and use of *Leucaena* in the southern Philippines. It traces the progress of *L. leucocephala* from its promotion as a 'miracle tree' to the post-psyllid era and its resurgence as an integral use in farming systems at the MBRLC and surrounding areas of southern Mindanao.

Leucaena use in Philippines

The original introduction of *L. leucocephala* into the Philippines is thought to have been by the Spanish in the sixteenth century, probably as a forage for their animals. By 1973, largely because of interest aroused by the 'Hawaiian Giant' *L. leucocephala* (K lines from Hawaii), a nation-wide comprehensive research program was in place devoted to exploiting the multiple uses of *L. leucocephala*, the 'miracle tree'. Giant ipil-ipil was widely promoted and tested throughout the Philippines until the mid-1980s when the psyllid (*Heteropsylla cubana*) attacked. *L. leucocephala*, once touted as the miracle tree, was defoliated by the psyllid and research interests as well as local users turned to other species.

MBRLC use of *Leucaena*

Prior to 1985, *L. leucocephala* was the primary focus of MBRLC's NFT/S-based farming systems. It was used as an erosion control and for soil amelioration, as fodder for goats, reforestation and fuelwood production, and fresh composting for production of garden vegetables and fruits.

Initially, the MBRLC SALT models were exclusively built upon *L. leucocephala* as the foundation of the double contour hedgerow system. The original Demonstration SALT, first planted in 1978 on a 40% slope (and still productive today), was solely a *L. leucocephala*-based system. However, due to the psyllid, hedgerow species utilised in the SALT farming systems have been diversified to include *Desmodium rensonii, Flemingia macrophylla, Gliricidia sepium, Leucaena diversifolia, Indigofera tyesmani* and *Calliandra calothyrsus* along with some of the original *L. leucocephala*. Most of the earlier *L. leucocephala* species used for SALT and distributed to local farmers were the 'Hawaiian giants' such as K6, K8, and K28. However, continued testing of *L. leucocephala* and monitoring of its slow but sure recovery have been watched closely by MBRLC.

A complete list of *Leucaena* species tested and used by MBRLC as well as abbreviated results of testing is given in Table 1.

SALT corn production using *L. leucocephala*

The potential of *L. leucocephala* was evaluated as a sole-source of fertility input for corn production in a SALT system. The plot was located on a 30% slope but within the double contour hedges of SALT. Continuous corn was planted on the plots and 23 harvests were recorded in the 11-year period of the test giving, an average of two croppings per year.

The results showed that if *L. leucocephala* hedges can be maintained as productive sources of nitrogen-rich biomass, significantly higher yields of corn can be obtained than those using natural fertility only. Even though sole plots fertilised with *L. leucocephala* do not yield as much as the ones with commercial fertiliser, there is no cost of application outside of the farmer's labor to apply the freshly trimmed leaves.

Dairy goat production using *Leucaena*

L. leucocephala was evaluated as a sole source of fodder for dairy goat production versus two other popular fodder species: rensonii (*Desmodium*

Table 1. List of *Leucaena* species tested and utilised by MBRLC. Biomass production is categorised into high when more than 20 tons/ha/year based on SALT 5-metre double hedges, and low when less than 20 tons/ha/year.

Species	Origin	Date	Characteristics	Biomass yield	Psyllid tolerance
L. diversifolia	Manila seed bank	1985	Fast growing	High	High
L. leucocephala	NFTA	1986	Fast growing	High	Medium
L. leucocephala K614	NFTA	1986	Fast growing	High	Medium
L. leucocephala K636	NFTA	1986	Fast growing	High	Medium
L. leucocephala K584	NFTA	1986	Fast growing	High	Medium
L. glauca	Vietnam	1986	Slow growing	Low	Low
L. diversifolia	CSIRO	1987	Slow growing	High	High
Leucaena hybrid KX2	Hawaii	1989	Fast growing	High	Medium
Leucaena hybrid KX3	Hawaii	1989	Coppice well	High	High
Leucaena hybrid KX3a	Hawaii	1989	Good in coppicing	High	High
L. leucocephala K584 composite	Hawaii	1989	Slow growing	Low	Low
Leucaena hybrid KX1 composite	Hawaii	1989	Slow growing	Low	Low
Leucaena hybrid	Hawaii	1989	Slow growing	Low	Medium
L. diversifolia K156	Hawaii	1989	Fast growing, good in coppicing	High	High
L. lanceolata K393	Hawaii	1989	Fast growing, good in coppicing	High	High
Hybrid KX1 × *L. leucocephala F2*	Hawaii	1989	Fast growing	High	High
L. pallida K376	Hawaii	1989	Fast growing	High	High
L. leucocephala K636	Hawaii	1989	Fast growing	High	Medium
L. leucocephala	Hawaii	1990	Fast growing	High	High
L. pallida K817	Hawaii	1990	Fast growing	High	High
L. diversifolia	Hawaii	1990	Fast growing	High	High
L. retusa	Australia	1990	Slow growing	Low	Medium
L. macrophylla	Australia	1991	For reforestation	Low	Medium
L. shannonii	Australia	1991	Slow growing	Low	Medium
L. pulverulenta	Australia	1991	Slow growing	Low	Medium
L. pallida K376	Australia	1992	Fast growing	High	Medium
L. lanceolata	Hawaii	1992	Fast growing	High	Medium
Three-way hybrid	MBRLC	1994	Slow growing	Low	Medium

rensonii) and flemingia (*Flemingia macrophylla*). The test was run over a five-month period (one lactation). Milk production was higher from *L. leucocephala* (2.25 kg/day) than from either of the other two legumes. If *L. leucocephala* can be produced in large quantities without psyllid interference, the potential is still great to exploit this species as a primary source of animal feeds for both fresh fodder and leaf meal inputs.

MBRLC psyllid predators

In the late 1980s and early 1990s, it appeared that *L. leucocephala* was recovering from the psyllid plague. This observation seemed to be truer in the drier zones of Mindanao around Sarangani Province and the Alip mountain range which receives much less total rainfall as well as fewer wet months per year than other areas of Mindanao. Observations of psyllid activity in the Arakan valley in central Mindanao which also has lower rainfall due to a rain shadow effect of the surrounding mountains seemed to indicate a lower incidence of the pest.

About mid-1995, MBRLC staff began observing certain predator activity against the psyllid with corresponding *L. leucephala* growth. Thus a simple test was set up to monitor and identify the observed activity of psyllid predators on site at the MBRLC. Two beetles were found, one of which was identified as *Curinus coeruleus*, previously introduced specifically into the Philippines to combat the psyllid. The other has not been identified but is suspected to be closely related. Two unidentified spiders have also been observed to be very aggressive in their psyllid consumption. None of these predators by themselves or even in combination with the others are sufficient to wipe out the psyllid or prevent damage to the *L. leucocephala* when an outbreak occurs.

Current Uses of *Leucaena* by Farmers in the Magsaysay Impact Area — A Short Case Study of *Leucaena*

Brief history of Magsaysay IMPACT area and usage

The village development work of the MBRLC is based on the 'Impact' philosophy of working in a small area (usually defined by a geographical community with 15 to 50 families) for approximately 3 years (one year introduction, one year implementation and one year phase down). One such MBRLC Impact area is Purok 1, Bacungan, Magsaysay, Davao del Sur. This village has a history of work with leucaena through contact with MBRLC and serves as a good example of the spread of *L. leucocephala* usage as well as adaptation.

The Bacungan area is very steep, rolling mountains with little or no forest cover. The average slopes are 60% with slope lengths up to 300 feet. The forest slopes of these mountains were logged out in the late 1950s and early 1960s and were thereafter predominantly covered with cogon grass (*Imperata cylindrica*).

In mid-1984, the implementation of 100 hectares of *Leucaena*-based SALT began as a pilot project with a goal of 1000 total hectares expected from a 'radiating' effect. Farmers were provided with enough *L. leucocephala* seed to plant a one-hectare SALT project each. They were given a week of training at the MBRLC as well as a per metre cash incentive to plant contour hedgerows.

In all, a total of 100 hectares of SALT contour hedgerows were established on an average 5-metre spacing which equalled 2000 linear metres of double *L. leucocephala* hedges per hectare for a project total of 200 000 linear metres of contour hedgerows established. This was accomplished over a three year period with approximately one ton of *L. leucocephala* seed being distributed and planted. The leucaena used was primarily a mixture of the 'Hawaiian giants' K6, K8 and K28.

In retrospect, many of these original SALT projects were planted by farmers in order to obtain the cash incentives provided by the program. Thus, after a few years, a majority of the projects were 'abandoned' and left to grow into small reforested areas on the slopes of the Alip mountains.

Upon re-entering the area in 1993, MBRLC noted the local peoples' high priority placed on the old *L leucocephala* growths as well as their integration into the local farming systems. Even though the MBRLC SALT programs had by this time diversified to utilising alternative NFT/S besides *L. leucocephala*, an effort was made to build upon the local farmers' experience and knowledge of *L. leucocephala* and its uses.

After almost 10 years of planting the first original *L. leucocephala*-based SALT farms, the local farmers' usage of leucaena revolved around three areas:

Forage

Local people have long valued the 'native' ipil-ipil as a source of animal feed. The introduction of the giant varieties only made the tree more valuable as a fodder. MBRLC in its Impact work in Bacungan has promoted raising goats for milk, meat and income primarily utilising old *L. leucocephala* stands as the main fodder. To date, over 80 small goat projects (usually consisting of four to five head) have been established in the Magsaysay area. Most of these animals are being raised solely on freshly cut *L. leucocephala* with little or no concentrate given.

Fuelwood

One of the highlights of *L. leucocephala* usage in the Bacungan area is its utilisation for fuelwood and the development of a local market for the firewood. The sale of the fuelwood has been extremely beneficial to the residents of Bacungan during the prolonged dry seasons.

Erosion control/soil amelioration

Some of the farmers who adopted SALT as their primary farming system still farm with *L. leucocephala* based hedgerows today even though many of the old hedges are giving way to *Desmodium rensonii* and *Flemingia macrophylla* hedges. A modification of the original SALT has been implemented by the local farmers. Generally they utilise a long-rotation cycle of where the one hectare *Leucaena*-based SALT would be allowed to grow up for fuelwood harvest. After harvesting for fuelwood, the farmers then plant maize in the alleyways for two to three croppings utilising the natural fertility generated by the *L. leucocephala* hedges and then allow the hedges to re-grow into a small forest to be harvested once again for fuelwood. This creates a continuous cycle of fuelwood harvesting followed by corn cropping. Thus, what had appeared to be abandonment of SALT projects was later verified to be a form of fallowing and long rotations which fit into traditional farming systems.

The Bacungan area, even though situated only a few kilometers from the MBRLC base, has been extremely lightly hit by the psyllid in contrast with the immediate areas surrounding the MBRLC. One explanation is that the area is considerably drier with a longer pronounced dry season (typically January to June).

MBRLC'S Future Plans for Use of *Leucaena*

Leucaena spp. is still a staple NFT/S of the MBRLC but instead of being the main species used as in the pre-psyllid days, it is only one of many possible choices. The days of viewing it as the 'miracle tree' are over but it will continue to play an important role in the southern Philippines as a source of high quality animal feed, soil enricher and sustainable fuelwood production species.

MBRLC and local farmers are still heavily utilising *L. leucocephala* as a multi-purpose species. As an animal feed, it is fed fresh as a fodder and in the form of leaf meal. Currently, about 30 tons of *L. leucocephala* leaf meal per year are utilised through the MBRLC Feed Room as a protein amendment.

Leucaena leucocephala continues to be a popular tree for reforestation primarily targeting light building materials as well as a renewable source of fuelwood. Even though *L. leucocephala* is continuing to be plagued by the psyllid in southern Mindanao (especially the young growth), it is relatively unaffected if left to grow into a large tree.

MBRLC promotion of *L. leucocephala* for use as a contour hedgerow species has ceased. The only exceptions to this are the small leafed *Leucaena* species which are proven to be psyllid tolerant such as *L. diversifolia*. Even though remnants of the original *L. leucocephala* lines exist in the MBRLC hedgerows and surrounding farms, no new promotion is happening for this particular use. The main reason is that the constant coppicing of the hedges encourages growth of young tender shoots which in turn attracts the psyllid attack.

Over 500 kg of *Leucaena* seeds have been produced and distributed to local farmers through the MBRLC Seed Department since 1994. Half of those seeds are *L. diversifolia* with the other half being the older strains of *L. leucocephala*. Moreover, MBRLC will continue a testing and screening program of new species and their various cultivars, especially those which show tolerance to psyllid attack.

Promoting the Adoption of *Leucaena* in Central Queensland

J. Chamberlain[1]

Abstract

Leucaena is well adapted to the Central Queensland environment, and successful establishment techniques exist. Good establishment practices, particularly weed control, were promoted to provide incentive for adoption. A group of 20 prospective *Leucaena* growers was put in contact with successful *Leucaena* growers and on-farm demonstrations identified appropriate strategies, machinery and techniques. Five group members planted *Leucaena* in 1995, three successfully. Eight planted *Leucaena* in 1996 with reasonable establishment.

LEUCAENA (*Leucaena leucocephala*) is a highly productive rain-grown tropical pasture plant capable of producing more than 800 g live weight gain (LWG)/animal/day once established. It is well adapted to clay soils (brigalow, softwood scrub and open downs), and the potential for *Leucaena* on these soils in Central Queensland is considerable.

In the Nogoa/Belyando catchment alone, approximately 600 000 hectares are potentially suitable for *Leucaena* production. Currently, this country runs about 160 000 head of cattle on approximately 150 properties.

The adoption of *Leucaena* in inland areas where there is no serious psyllid problem has been restricted by a succession of low rainfall summers and inadequate attention given to cultural practices prior to, during and after planting. Either singly or in combination, these have led to most establishment failures. It is a priority task that every incentive is provided for *Leucaena* adoption by addressing the establishment issue.

The Meat Research Corporation partially funds Producer Demonstration Site (PDS) groups to increase the rate of adoption of beef industry technology by beef producers and to promote producer involvement in the conduct of 'on-farm' demonstrations. This has been achieved by demonstrating that *Leucaena* is adapted to Central Queensland (600–650 mm monthly average rainfall), demonstrating that successful *Leucaena* establishment techniques exist and promoting the importance of good establishment practices, particularly weed control.

A PDS group was formed from 20 graziers in the Clermont, Kilcummin and Capella grazing/farming districts of Central Queensland. These were all keen to incorporate *Leucaena* in their beef production system.

Through consultation with successful *Leucaena* growers in the Central Highlands (Banana, Blackwater, Rolleston, Clermont) and on-farm visits, the following issues were addressed:

- seedbed preparation;
- planting moisture;
- seeding rate;
- planting depth and seed coverage;
- seed/soil contact and presswheel type;
- post plant weed control (herbicide and cultivation);
- soil insect control.

The enthusiasm generated among the PDS was such that positive feedback is still forthcoming. Five group members planted *Leucaena* late summer (February–March) 1995, with three successfully establishing 500 ha. Summer 1996 provided a further opportunity for planting.

Establishment was generally good but seedlings were ravaged by spur throated locusts and badly affected by lack of rain for 3 months.

The enthusiasm generated in 1994 is still present despite the setbacks although the cattle market slump will delay proposed activity.

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