



# Information Sheet

## 6. MECHANISATION

### 6.6 Mechanical sugarcane harvesting systems

**M**anual harvesting has dominated the industry, but it may become a less popular way of earning a living in the future. Many growers are therefore searching for a viable mechanical aid or mechanised system suited to local conditions.

Several imported whole stalk and combine chopper harvesters could not operate effectively on steep slopes, in recumbent cane and in fields not specifically prepared for mechanisation.

#### **SEMI-MECHANISED SYSTEMS**

In these systems, cutting, topping and trashing are done manually. The cane is placed in 3-6 ton stacks, or the cane from 4-6 rows is windrowed at right angles to the rows. The stacks are then winched onto tractor drawn trailers. The windrows are loaded by slewing or non-slewing loaders.

The cutting operation can be mechanised by using cutting attachments mounted on standard tractors, or small self-propelled walk-behind cutters.

#### **Hand controlled self-propelled harvesters**

These machines are suitable for small scale growers (less than 5000 tons) or for use in small fields. A range of 'walk behind' machines is available, equipped with a single base cutter and a chain driven windrowing attachment. The machines operate best on a flat culture but cannot handle recumbent cane, and are difficult to control on slopes.

#### **Whole stalk linear windrowing harvesters**

A single base cutter is usually mounted on the front of a tractor, to cut a single row in one pass (topping optional) and lay it down in a windrow. These are manually re-aligned into conventional windrows

made up of 4-6 rows, small 200-400 kg bundles or 3-6 ton stacks. The machines are able to cut both green and burnt cane, but do not remove any trash from the stalks.

Harvesting rates vary between 20 and 60 t/h, depending on cane yield, recumbency and whether the cane has been burnt. It is estimated that 20 of these harvesters have been sold in the industry. Twin base cutter models are also available.

#### **FULLY MECHANISED SYSTEMS**

##### **Whole stalk transverse windrowing harvesters**

*Tractor mounted.* The cutting/windrowing device is often three point mounted on the tractor. These machines cut one row of erect cane per pass, dropping the cane at right angles to the row. Before the next row can be cut the previously cut row has to be retrieved, topped and placed into bundles or a conventional windrow. In green cane the trash is removed manually.



*Grab loader operating in green cane.*

Harvesting rates vary widely depending on cane yield and terrain, but are not readily available.

**High capacity self-propelled.** This type of 'soldier' harvester was designed specifically for use in Louisiana and is suitable only for flat terrain. Single or two row machines cut and top green cane. The cut stalks are carried vertically by chain conveyor either through or along the side of the machines and are piled into windrows containing 3-6 rows of cane, leaving the tops in the interrow. The windrowed cane is burnt and then loaded by high capacity push-pile loaders into the infield transport. In most instances this consists of tractor/multiple basket trailer configurations.

Harvesting rates vary between 50 and 150 t/h.

#### **Whole stalk bundling harvesters**

**Chain conveyance bundle harvesters.** These are tractor drawn, tractor mounted or self-propelled machines, which top a single row with an external topper before the cane is cut by single or twin base cutters. The stalks are carried vertically through or along one side of the machine via a conveyor, and deposited horizontally in a collecting bin at the rear or side of the machine. Cane bundles can be dumped parallel or at right angles to the rows. Grab loaders load the bundles into the infield transport.

This type of machine does not operate successfully in recumbent cane. Harvesting rates vary between 15 and 40 t/h, depending on yield and the condition of the cane. Approximately 25 of these machines have been sold in the industry.

**Up-the-throat bundle harvesters.** These self-propelled, high capacity machines top the cane with an external topper and cut the cane using twin base cutters. The stalks are conveyed by feeder rollers and thrown into a bin at the rear of the machine. When the bin is full the bundles are dumped at intervals either parallel with or at right angles to the cane row. Grab loaders are used to load the bundles into the infield transport.

This type of harvester handles recumbent cane better than the chain conveying harvester. Single and two row machines are available. Harvesting rates vary between 20-40 t/h.

#### **Chopped cane combine harvesters**

**Whole stalk/chopped cane combine harvesters.** The front sections of these machines are similar to the Louisiana 'soldier' harvesters. After being base cut



***Bundle harvester operating in burnt cane.***

the cane is stripped of trash and cut into billets (or in the reverse order) before being conveyed by an elevator system and dumped into infield transport travelling next to the harvester.

Some of these are not commercially available at present.

**Up-the-throat chopper combine harvesters.** Most of these machines operate on the same principle. Stalks are topped by a hydraulically powered topper and then cut by twin base cutters. Rollers feed the cane into chopping blades which cut the stalks into 200-700 mm billets. A primary extractor fan removes much of the extraneous matter as the billets fall into the elevator hopper. From the hopper they are conveyed into the following transport. A second extractor fan at the top of the elevator assists in removing extraneous matter.

Many of these machines harvest cane in both directions on a single cutting face because they are equipped with slewing elevators. Combine harvesters can harvest cane in a wide range of conditions, from erect or recumbent to green or burnt. Harvesting rates can exceed 100 t/h. There are at least seven combine harvesters operating in the industry.

A comprehensive report, *A Review of International Cane Harvesting Machinery and Systems*, is available free of charge through your Extension Officer.

November 1998



Machine / Model	Manufacturer / Agent	Power (kW)	Machine mass (kg)	Machine type	Burnt=B Green=G	Operation			Bundle/bin/bag (kg)	Rows/windrow	Min. row spacing	Rows/pass	Slope (%)	Tolerance to lodging	E.M. (%)	Losses (%)	Output (t/h)	Comment
						Cut	Top	Trash										
<b>WHOLE STALK LINEAR WINDROWING MACHINES</b>																		
FM Cutter	Bocane Cutters & Hydraulics	55	515*	Tm	B & G	Yes	No	No	-	1,0 m	1	20	High	-	-	20-40		
300 Series Cutter	Broussard Cane Equipment	60	6 800	SP	B & G	Yes	No	No	-	1,4 m	1	20	High	-	-	30-60		
Carib Cutter	Carib Agro Industries	55	6 800	TM	B & G	Yes	No	No	-	1,4 m	1	20	High	-	-	30-60		
20-70	DMB Implementos	55	NA	TM	B & G	Yes	No	No	-	1,4 m	1	20	High	-	-	30-40		
CSR 500	Sermag Industria	55	2 500*	TM	B & G	Yes	No	No	-	1,4 m	1	20	High	-	-	30-60		
<b>WHOLE STALK TRANSVERSE WINDROWING MACHINES</b>																		
B 80-11	Automark / Bonel Manufacturing	40	500*	3PM	B & G	Yes	No	No	-	NA	1	15	Low/mod	-	-	20-30		
123	Broussard Cane Equipment	132	7 875	SP	G	Yes	No	No	-	3 or 6	1	10	Low/mod	-	-	30-80		
223	Broussard Cane Equipment	180	10 749	SP	G	Yes	No	No	-	4	2	10	Low/mod	-	-	50-150		
NB 11	Bonmei Noki / Kubota Corp	6	990	MC	B & G	Yes	No	No	-	1,1 m	1	NA	Low/mod	-	-	NA		
S-30 4-wheel	Cameco Industries	123	7 227	SP	G	Yes	No	No	-	1,5 m	1	10	Low/mod	-	-	30-80		
S-32 T 3-wheel	Cameco Industries	168	11 496	SP	G	Yes	No	No	-	1,5 m	2	10	Low/mod	-	-	50-150		
113 SMD 3-wheel	Louisiana Cane Manufacturing	128	7 272	SP	G	Yes	No	No	-	4 to 6	1	10	Low/mod	-	-	30-80		
224 SMD 4-wheel	Louisiana Cane Manufacturing	187	11 790	SP	G	Yes	No	No	-	4	2	10	Low/mod	-	-	50-150		
<b>WHOLE STALK BUNDLING MACHINES</b>																		
J150	Bonel Manufacturing	46	7 500	SP	B & G	Yes	Yes	No	No	200-300	-	10	Low/mod	NA	NA	15-30		
E-7000	Brastoft (Engeagro)	157	9 500	SP	B	Yes	Yes	No	No	500	-	1	Moderate	NA	NA	20-50		
E-14000	Brastoft (Engeagro)	157	11 500	SP	B	Yes	Yes	No	No	500	-	2	Moderate	NA	NA	NA		
Cane Master II	Cane Mech	63	6 200	TM	B	Yes	Yes	No	No	200-300	-	1	Low/mod	NA	NA	20-35		
Centurion	Carib Agro Industries	123	11 000	SP	B & G	Yes	Yes	Yes	No	500	-	1	Low/mod	10	4-6	20-40		
7000 (wheel)	Case Austoft	180	NA	SP	B	Yes	No	No	±500	±500	-	1	Moderate	NA	NA	NA		
7700 (track)	Case Austoft	180	NA	SP	B	Yes	Yes	No	±500	±500	-	1	Moderate	NA	NA	NA		
RCS 1	Coquillat SA	90	4 000*	TM	B	Yes	Yes	No	No	400	-	1	Low/mod	NA	NA	15-20	Experimental	
RCL 4000	Legras Industries	188	13 000	SP	B & G	Yes	Yes	Yes	No	800	-	1	Low/mod	NA	NA	40-50	Experimental	
K80-200PP	Kamol Industry	63	NA	3PM	B	Yes	Yes	No	No	200-300	-	1	Low/mod	NA	NA	NA		
GK 75	Jord Engineers / Moller	45	4 000	SP	B	Yes	Yes	No	No	250	-	1	Low/mod	-	-	20-30		
CM 550i	Motocana Implementos	130	9 800	SP	B	Yes	Yes	No	No	500	-	1	Moderate	NA	NA	20-50		
SSS 750	Orbach Agri	50	1 300*	3PM	B	Yes	Yes	No	No	200	-	1	Low	NA	NA	20-40		

Machine / Model	Manufacturer / Agent	Power (kW)	Machine mass (kg)	Machine type	Burnt=Green=G	Operation			Bundles/bin/bag (kg)	Rows/wind-row	Min. row spacing	Rows/pass	Slope (%)	Tolerance to lodging	E.M. (%)	Losses (%)	Output (t/h)	Comment
						Cut	Top	Trash										
<b>COMBINE CHOPPER HARVESTERS</b>																		
GC Combine	Agronomics Inc	225	NA	SP	B & G	Yes	Yes	Yes	-	140 m	2	NA	Low/mod	NA	NA	60-70	Experimental	
E-16000	Brastofi (Engeagro)	229	15 680	SP	B & G	Yes	Yes	Yes	-	1,4 m	1	15	High	2-6	2-15	20-120		
CT 165	Bonel Manufacturing	NA	NA	SP	B & G	Yes	Yes	Yes	-	1,4 m	1	NA	High	NA	NA	NA	Experimental (chop-throw)	
NB-65CW (track)	Bunmei Noki	NA	4 790	SP	B & G	Yes	Yes	Yes	-	NA	1	NA	High	2-6	2-15	NA	Self contained bag / bin	
HC-100 (track)	Bunmei Noki	NA	6 500	SP	B & G	Yes	Yes	Yes	-	NA	1	NA	High	2-6	2-15	NA	Self contained bag / bin	
HC-200 (track)	Bunmei Noki	NA	10 700	SP	B & G	Yes	Yes	Yes	-	NA	1	NA	High	2-6	2-15	NA	Self contained bag / bin	
7000 (wheel)	Case Austoft	180-248	13 300	SP	B & G	Yes	Yes	Yes	-	1,4 m	1	15	High	2-6	2-15	20-120		
7700 (track)	Case Austoft	180-248	16 300	SP	B & G	Yes	Yes	Yes	-	1,4 m	1	15	High	2-6	2-15	20-120		
TS 3500	Case Austoft	187	10 300	SP	B & G	Yes	Yes	Yes	-	1,2 m	1	NA	High	2-6	2-15	NA	Self contained bag / bin	
TS 3850	Case Austoft	187	13 800	SP	B & G	Yes	Yes	Yes	-	1,2 m	1	NA	High	2-6	2-15	NA	Self contained bag / bin	
TS 2001	Case Austoft	94	5 800	SP	B & G	Yes	Yes	Yes	-	1,2 m	1	NA	High	2-6	2-15	NA	Self contained bag / bin	
CHT-2500 (wheel)	Cameco Industries	186-243	11 340	SP	B & G	Yes	Yes	Yes	-	1,4 m	1	15	High	2-6	2-15	20-120		
CHT-2500 (track)	Cameco Industries	186-243	16 140	SP	B & G	Yes	Yes	Yes	-	1,4 m	1	15	High	2-6	2-15	20-120		
CC-3000	Claas KGaA	170	12 000	SP	B & G	Yes	Yes	Yes	-	0,9-1,4 m	1 or 2	20	High	2-6	2-15	20-120	Fixed elevator	
Ventor I	Claas KGaA	257	14 560	SP	B & G	Yes	Yes	Yes	-	0,9-1,4 m	1 or 2	20	High	2-6	2-15	20-120	Fixed elevator	
Ventor II	Claas KGaA	257	15 700	SP	B & G	Yes	Yes	Yes	-	0,9-1,4 m	1 or 2	20	High	2-6	2-15	20-120	Fixed elevator	
KTP 2M (wheel)	GIMAG Industrial Group	NA	NA	SP	B & G	Yes	Yes	Yes	-	NA	1	15	High	2-6	2-15	20-120		
Gladiator I (wheel)	Inter-American Transport Equip	244	12 700	SP	B & G	Yes	Yes	Yes	-	0,9-1,4 m	1 or 2	15	High	2-6	2-15	20-120		
Gladiator II (track)	Inter-American Transport Equip	281	17 240	SP	B & G	Yes	Yes	Yes	-	0,9-1,4 m	1 or 2	15	High	2-6	2-15	20-120		
204 CMD (wheel)	Louisiana Cane Manufacturing	356	19 000	SP	B & G	Yes	Yes	Yes	-	1,4 m	2	15	NA	2-6	2-15	20->120	4-wheel drive, fixed elevtr	
GK 200 (track)	Moller	153	10 800	SP	B & G	Yes	Yes	Yes	-	1,4 m	1	NA	High	2-6	2-15	NA	Elevtr or self contnd bag	
Amazon	Santa Equipamentos	232	12 320	SP	B & G	Yes	Yes	Yes	-	0,9-1,4 m	1 or 2	15	High	2-6	2-15	20-120	Fixed elevtr (chop-throw)	
UT-120K (track)	Uotani Tekko	93	6 850	SP	B & G	Yes	Yes	Yes	-	NA	1	NA	High	2-6	2-15	NA	Self contained bag / bin	
UT-170A (wheel)	Uotani Tekko	138	7 950	SP	B & G	Yes	Yes	Yes	-	NA	1	NA	High	2-6	2-15	NA	Self contained bag / bin	
UT-200K (tract)	Uotani Tekko	140	12 500	SP	B & G	Yes	Yes	Yes	-	NA	1	NA	High	2-6	2-15	NA	Self contained bag / bin	
Scorpion (wheel)	Walkers-Mizzi	300	NA	SP	B & G	Yes	Yes	Yes	-	NA	2	NA	High	2-6	2-15	NA	Self contained bag / bin	
Scorpion (track)	Walkers-Mizzi	300	NA	SP	B & G	Yes	Yes	Yes	-	NA	2	NA	High	2-6	2-15	NA	Self contained bag / bin	

\* = attachment only SP = self propelled TM = tractor mounted 3PM = tractor 3-point mounted MC = manually controlled