

**TECHNICAL BULLETIN  
NO. 211**

**GROSS MARGIN  
BUDGETS FOR FIELD  
CROPS IN THE  
KATHERINE REGION  
1993-94**

Northern Territory Department of  
Primary Industry and Fisheries

**GROSS MARGIN BUDGETS FOR FIELD CROPS  
IN THE KATHERINE REGION  
1993-94**

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## **SUSTAINABLE AGRICULTURE**

### **THE DEPARTMENT OF PRIMARY INDUSTRY AND FISHERIES IS COMMITTED TO THE PRINCIPLES AND PRACTICES OF SUSTAINABLE AGRICULTURE**

#### **Definition:**

Sustainable agriculture is the use of practices and systems which maintain or enhance:

- the economic viability of agricultural production;
- the natural resource base; and
- other ecosystems which are influenced by agricultural activities.

#### **Principles:**

1. Agricultural productivity is sustained or enhanced over the long term.
2. Adverse impacts on the natural resource base of agricultural and associated ecosystems are ameliorated, minimised or avoided.
3. Harmful residues resulting from the use of chemicals for agriculture are minimised.
4. The nett social benefit (in both dollar and non-dollar terms) derived from agriculture is maximised.
5. Agricultural systems are sufficiently flexible to manage risks associated with the vagaries of climate and markets.

**SUSTAINABLE AGRICULTURE IN THE NORTHERN TERRITORY**

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## INTRODUCTION

This handbook contains guidelines for the calculation of gross margins for the various field crops grown in the Katherine District. It is designed to assist farmers in making decisions on which crops to grow and the area to plant.

### 1.1 What is a Gross Margin?

The gross margin of a farm enterprise is the difference between its gross income (i.e. total receipts which depend on yield and current prices) and its variable costs (i.e. those costs which vary in proportion to the size of the enterprise - costs such as fertilisers, fuel, cartage).

$$\text{GROSS MARGIN} = \text{GROSS INCOME} \text{ minus } \text{VARIABLE COSTS}$$

Gross margins are commonly calculated on a per hectare basis although they may also be expressed in terms of other limiting resources such as labour units, or per \$100 of capital invested. Comparisons of gross margins for different crops are only valid if they have been calculated on the same basis.

Gross margins may be used to:

- (a) Compare costs and returns for different crops provided overhead expenses are similar.
- (b) Show the effect on enterprise income of a change in yields, prices, or cultivation methods.
- (c) Show where money is being spent.

### 1.2 Limitations of Gross Margins

The gross margin for an enterprise is a good guide to the profitability of that enterprise under the conditions of crop production costs, yields and prices specified. Those farmers who have been operating in the district for a number of years should use the costs of their own production methods when preparing gross margins for existing or planned farm enterprises. Records of previous crops should be used to predict yields, to determine the quantities of physical inputs required and the crop yields that can be expected. Changes in fertiliser inputs required as a result of previous cropping on an area can be checked with the local crops agronomist. Current costs of materials should be checked with suppliers.

A gross margin is not the same as farm profit. The sum of all enterprise gross margins for a particular farm represents the whole farm gross margin. In order to derive total farm profit from this figure, fixed or overhead costs must be deducted. Overhead costs are those costs not directly related to the size of the farm enterprise, e.g., telephone, permanent labour and interest. The sum of the gross margins from each enterprise together with any other farm income must be sufficient to cover these overhead expenses if the farm is to remain viable.

**NOTE:** The breakeven yields and prices mentioned in this publication do not take into account fixed costs.

## **FARMING IN THE KATHERINE REGION**

### **2.1 Location**

Areas have been cleared for cropping on fourteen farms in the Katherine Region. While most farms are close to Katherine, the local commercial centre and site of a NT Grain Marketing Board terminal, some are situated up to 300 km away.

### **2.2 Rainfall**

Rainfall is a primary constraint to agricultural development in the area. Daily rainfall records have been recorded at Katherine since 1873 (see Agnote No. 214). Mean annual rainfall is 972 mm but has ranged from a low of 365 mm in 1951/52 to 1923 mm in 1897/98. In 87% of years rainfall was between 600 mm and 1300 mm.

Rainfall in the Katherine area is strongly seasonal. About 92% of annual rainfall occurs in the five month period November to March while June, July and August experience no rainfall in most years. In 90% of years rainfall for the November - March period was 627 mm or more. However it has been amply demonstrated in the past few years that although total rainfall during the cropping period should be adequate for crop production, the incidence of dry spells during the growing period, or an early finish to the Wet can result in less than viable crops unless scheduled sowing dates for individual crops is adhered to.

### **2.3 Land Prices and Availability**

Properties with land suitable for cropping come onto the market from time to time. However the cleared area is usually a very small proportion of the total area and therefore is not necessarily reflected in the purchase price.

Prices paid for properties in the region during 1993 have risen, reflecting the increase in the market for cattle for live export and the demand for mixed farming properties. Recent sales of pastoral properties with large areas of uncleared arable land suitable for subdivision have realised \$4.50 to \$5.00 per hectare.

In addition to the value of the unimproved land, a cost of \$250-400 per hectare will be incurred in clearing and preparing areas for intensive land use. This cost will vary with the time of year that the operations are carried out, the type of vegetation, the property location, the length of the clearing period and whether the work is done by a contractor or by the farmer.

## 2.4 Machinery and Improvements

Local conditions determine the type and range of equipment used for cropping. The cost of new machinery is used in calculating gross margin budgets. Machinery values, together with values for some crop-related improvements, are given below. The assumptions used in calculating the machinery work rates and the costs of fuel and repairs are set out in Appendix A.

Machinery & improvements	Approximate new value (landed in Katherine)
Tractor 75kw - 2wd	\$57,000
Chisel Plough - 5m wide	\$25,000
Tyned Cultivator - 6.97m	\$25,000
Trash Culti Drill - 5m wide	\$30,000
Coulters for above drill	\$10,000
Fertiliser Spreader	\$9,000
Boom Spray - 2000L 12m boom	\$12,500
Grain Harvester - 175kw 9.1m front	\$210,000
Mower-conditioner, roller	\$24,000
Round Baler	\$26,500
Mobile Bins	\$20,000
Elevator	\$7,000
Tools	\$10,000
Machinery Shed	\$45,000
Weldmesh Silos	\$8,000
Fencing, say 10 km @ \$3,000/km	\$30,000

## 2.5 Finance and Government Assistance

The Commonwealth Bank of Australia, Westpac and the ANZ Bank all have branches in Katherine and there is a Branch of the Commonwealth Development Bank in Darwin. The Commonwealth Rural Adjustment Scheme is managed in the NT by the NT Department of Primary Industry & Fisheries.

The NT Government provides financial assistance under the Stockfeed Grain Price Support Scheme to assist with the supply of local grain for stockfeed manufacture in the NT. A fertiliser freight subsidy of up to \$95 per tonne is also available to help defray the cost of bringing fertilisers to the NT. In addition there are Commonwealth and NT fuel tax rebate schemes to lower the duty on diesel fuel used for agriculture. Further information on these schemes are available from Crops Extension Officers of this Department.



## 2.6 Marketing

The NT Grain Marketing Board has grain storage, grading and marketing facilities at Katherine. These are at present managed by a private contractor, NT Grain. The functions of the Board are to acquire, process, treat, market and generally deal with commodities grown or produced in the N.T. and to administer the Marketing Scheme for commodities declared and vested in the Board. The crops currently declared and vested in the Board are grain sorghum and maize. Arrangements should be made with NT Grain for delivery of grain to the Katherine Grain Receiving Depot (telephone 722886) or other points as agreed. Delivery is the responsibility of the farmer. The grain is weighed and the quality assessed on delivery.

The Board announces indicative prices for sorghum and maize prior to the beginning of the cropping season. Payments for vested crops is made in instalments. The first advance, based on the indicative price, is paid soon after delivery and the final adjustment, including interest charges, is paid when the grain is sold.

## **BASIS FOR STANDARD GROSS MARGIN BUDGETS**

### **3.1 Farm Size**

The variable costs in the following examples are calculated for a farm in the Katherine District with an annual cropping area of 300-400 hectares. The costs are calculated on a per hectare basis. No labour costs are included as labour has been considered as a fixed cost.

### **3.2 Cultural Practices**

The technical inputs are based on recommendations by Departmental Agronomists. Further agronomic information is available from the Extension Officer (Crops) for the Katherine Region (telephone 738739).

The prices of materials such as seed, fertiliser and twine are based on Katherine retail prices at September, 1993.

### **3.3 Machinery Operating Costs**

Machinery work rates are based on Queensland figures modified where applicable to suit conditions in the Katherine Region. The workrate will vary with the size and age of the machinery, the soil conditions and the experience of the operator.

The cost of farm operations (\$/ha) is equal to the hourly operating cost of the machinery divided by the number of hectares worked in an hour (i.e. the workrate).

Machinery operating costs in these budgets include only fuel, oil, repairs and maintenance. Other overhead costs (e.g. labour, depreciation, interest on capital invested, insurance) are not included.

Most operations such as cultivating, planting and spraying involve a tractor and hitched implement. The operating costs therefore are equal to the sum of the tractor running costs (fuel, oil, repairs and maintenance) plus repairs and maintenance on the implement.

## GROSS MARGIN BUDGET SUMMARY

	GRAIN SORGHUM Conventional	GRAIN SORGHUM Zero-till	MUNGBEANS Zero-till	MUNGBEANS (Stockfeed)	SESAME	HAY
Yield (t/ha)	2.0	2.5	0.85	0.85	0.75	7.0
Price (\$/t)	230	230	500 x 80% 300 x 20%	300	900	120
<b>GROSS INCOME (\$/ha)</b>	<b>460</b>	<b>575</b>	<b>405</b>	<b>255</b>	<b>675</b>	<b>840</b>
Land preparation	13	20	24	24	13	13
Planting	47	47	26	24	10	43
Fertiliser	83	83	26	26	104	65
Weed Control	17	17	-	-	8	-
Insect Control	-	-	18	-	52	-
<b>PRE-HARVEST COSTS</b>	<b>160</b>	<b>167</b>	<b>95</b>	<b>74</b>	<b>187</b>	<b>120</b>
<b>HARVESTING COSTS</b>	<b>13</b>	<b>13</b>	<b>24</b>	<b>24</b>	<b>20</b>	<b>59</b>
Wrap	-	-	-	-	-	74
Cartage @ \$35/t	70	88	30	30	26	-
Clean, Grade, Bag	-	-	55	-	56	-
Handling	24	30	10	10	9	-
<b>POST-HARVEST COSTS</b>	<b>94</b>	<b>118</b>	<b>95</b>	<b>40</b>	<b>92</b>	<b>74</b>
<b>TOTAL VARIABLE COSTS (\$/ha)</b>	<b>267</b>	<b>297</b>	<b>214</b>	<b>138</b>	<b>298</b>	<b>252</b>
<b>GROSS MARGIN (\$/ha)</b>	<b>193</b>	<b>278</b>	<b>191</b>	<b>117</b>	<b>377</b>	<b>588</b>

#### 4.1 GRAIN SORGHUM - Conventional tillage

ENTERPRISE NAME: Grain Sorghum  
 ENTERPRISE UNIT: 1 hectare

REGION: Katherine  
 DATE: September 1993

INCOME		\$/ha	Your Estimate
Yield	2.0 t/ha @ \$230/tonne at Katherine	460	
Other Income	Fertiliser subsidy 195 kg/ha @ \$95/tonne	19	
<b>A. TOTAL INCOME</b>		<b>479</b>	
<b>VARIABLE COSTS</b>			
Land Preparation			
1 Trashwork	2.8 ha/h @ \$14.60/h	5	
2 Cultivations	5.6 ha/h @ \$14.60/h	3	
	3.2 ha/h @ \$15.01/h	5	
Planting			
Seed	10 kg/ha @ \$4.25/kg	43	
Planting	3.2 ha/h @ \$15.01/h	5	
Fertilisers			
CL 19:13	120 kg/ha @ \$529/tonne	63	
Urea	75 kg/ha @ \$487/tonne	37	
1 Spreading	8.4 ha/h @ \$14.76/h	2	
Weed Control			
Atrazine	3 L/ha @ \$5.10/L	15	
1 Spraying	9.4 ha/h @ \$15.64/h	2	
Harvesting	6.1 ha/h @ \$76.01/h	13	
Marketing			
Cartage to Depot	@ \$35/tonne	70	
Handling	@ \$12/tonne	24	
<b>B. TOTAL VARIABLE COSTS</b>		<b>285</b>	
<b>C. GROSS MARGIN PER HECTARE (A-B)</b>		<b>193</b>	

#### Notes:

An additional net value for sorghum stubble and regrowth as fodder, hay or mulch can be included, dependent upon the farming system used.

### Sensitivity of Sorghum Gross Margin (\$/ha) to Varying Yields and Prices

Price (\$/t)	Yield (tonnes per hectare)				
	1.0	2.0	3.0	4.0	5.0
190	-30	113	256	399	542
200	-20	133	286	439	592
210	-10	155	316	479	642
220	0	173	346	519	692
230	10	193	376	559	742

### Breakeven Analysis

Using the above gross margin budget the breakeven yield and prices are:

Breakeven Yield at a price of \$230 t/ha = 0.94 t/ha

Breakeven Price at a yield of 2.0 t/ha = \$133/tonne

Additional returns (i.e. over the breakeven yield or price) are required to meet the costs of overheads and management.

### Grain Sorghum historical data

SORGHUM (Katherine)	1988-89	1989-90	1990-91	1991-92	1992-93
Area sown (ha)	2351	1190	1212	1210	695
Highest paddock yield	2.84	n.a.	n.a.	1.77	4.00a
Paddock size (ha)	50	n.a.	n.a.	300	2.00a
Average yield	0.67	0.55	1.78	0.77	1.70

a = yield on test strip

n.a. = not available

Note: Refers only to non-irrigated crops.

## 4.2

## GRAIN SORGHUM - Zero tillage

ENTERPRISE NAME: Grain Sorghum  
 ENTERPRISE UNIT: 1 hectare

REGION: Katherine  
 DATE: September 1993

INCOME		\$/ha	Your Estimate
Yield	2.5 t/ha @ \$230/tonne at Katherine	575	
Other income	Fertiliser subsidy 195 kg/ha @ \$95/tonne	19	
<b>A. TOTAL INCOME</b>		<b>594</b>	
<b>VARIABLE COSTS</b>			
Roundup CT	1.6 L/ha @ \$11.00/L	18	
Knock down spray	100 ml/ha @ \$ 7.25/L	1	
Planting	9.4 ha/h @ \$15.64/h	2	
Seed			
Planting (incl. fertiliser)	10 kg/ha @ \$ 4.25/kg 3.8 ha/h @ \$15.85/h	43 4	
Fertilisers			
CL 19:13			
Urea	120 kg/ha @ \$529/tonne	63	
1 Spreading	75 kg/ha @ \$487/tonne 8.4 ha/h @ \$ 14.76/h	37 2	
Weed Control			
Atrazine			
1 Spraying	3 L/ha @ \$5.10/L 9.4 ha/h @ \$15.64/h	15 2	
Harvesting	6.1 ha/h @ \$76.01/h	13	
Marketing			
Cartage to depot			
Handling	@ \$35/tonne @ \$12/tonne	88 30	
<b>B. TOTAL VARIABLE COSTS</b>		<b>315</b>	
<b>C. GROSS MARGIN PER HECTARE (A-B)</b>		<b>278</b>	

## Notes:

An additional net value for sorghum stubble and regrowth as fodder, hay or mulch can be included, dependent upon the farming system used.

An increasing number of grain sorghum crops in the Katherine Region are now grown using conservation tillage systems.

### Sensitivity of Sorghum (Zero till) Gross Margin (\$/ha) to Varying Yields and Prices

Price (\$/t)	Yield (tonnes per hectare)					
	1.0	2.0	2.5	3.0	4.0	5.0
190	-36	107	178	250	393	536
200	-26	127	203	280	433	586
210	-16	147	228	310	473	636
220	-6	167	253	340	513	686
230	4	187	278	370	553	736

### Breakeven Analysis

Using the above gross margin budget the breakeven yield and price are:

Breakeven Yield at a price of \$230 t/ha = 0.98 t/ha

Breakeven Price at a yield of 2.5 t/ha = \$119/tonne



## 4.3

## MUNGBEANS - ZERO TILLAGE

ENTERPRISE NAME: Mungbeans

REGION: Katherine

ENTERPRISE UNIT: 1 hectare

DATE: September 1992

INCOME		\$/ha	Your Estimate
Yield	0.85 t/ha ex harvester		
	80% @ \$520/tonne	354	
Other Income	20% @ \$300/tonne	51	
	Fertiliser subsidy		
	110 kg/ha @ \$95/tonne	10	
<b>A. TOTAL INCOME</b>		<b>415</b>	
<b>VARIABLE COSTS</b>			
Land Preparation			
Roundup CT	2.0 L/ha @ \$11.00/L	22	
Wetting agent	100 ml/ha @ \$7.25/L	1	
Spraying	9.4 ha/h @ \$15.64	2	
Planting			
Seed (Putland)	12 kg/ha @ \$1.75/kg	21	
Planting	3.2 ha/h @ \$15.01/h	5	
Fertilisers			
Superphosphate (applied at planting)	110 kg/ha @ \$332/tonne	37	
Insect Control			
Thiodan	2 L/ha @ \$8.30/L	17	
1 Spraying	9.4 ha/h @ \$15.64/h	2	
Harvesting	3.2 ha/h @ \$76.01/h	23	
Marketing			
Cartage to depot	@ \$35/tonne for 0.85 tonne	30	
Clean grade and bag	@ \$65/tonne for 0.85 tonne	55	
Handling	@ \$12/tonne for 0.85 tonne	10	
<b>B. TOTAL VARIABLE COSTS</b>		<b>214</b>	
<b>C. GROSS MARGIN PER HECTARE (A-B)</b>		<b>191</b>	

## Notes:

Departmental time-of-sowing trials show that as sowing dates progress from mid-January to early February, yield of mungbeans decline. Late rains can affect sprouting quality but the additional yields of early-sown mungbeans should compensate for any decline in quality.

An additional net value for stubble hay can be included in some farming systems.

Lower yields should be included in budgets for conventional tillage.



**Sensitivity of Mungbean Gross Margin (\$/ha) to Varying Paddock Yields and Prices  
(assuming 20% Splits @ \$300/t)**

Price (\$/t)	Paddock Yield (tonnes per hectare)				
	0.4	0.8	0.85	1.2	1.6
400	-7	97	109	203	306
450	9	129	177	299	370
500	25	161	191	318	434
550	41	193	245	395	498
600	57	225	313	491	562

**Breakeven Analysis**

Using the above gross margin budget the breakeven yield and price are:

Breakeven Yield at a price of \$520/tonne = 0.33 t/ha ex harvester

Breakeven Price at a yield of 0.85 t/ha ex harvester = \$239/tonne

Additional returns (i.e. over the breakeven yield or price) are required to meet the costs of overheads and management.

**Mungbean historical data**

MUNGBEAN (Katherine)	1988-89	1989-90	1990-91	1991-92	1992-93
Area sown (ha)	331	160	55	150	185
Highest paddock yield	0.74	n.a.	0.4	0.47	1.4
Paddock size (ha)	90	n.a.	20	90	20
Average yield	0.40	0.18	0.16	0.43	0.3

n.a. = not available

## 4.4

**MUNGBEANS for Stockfeed - Zero Tillage**

ENTERPRISE NAME: Mungbeans

REGION: Katherine

ENTERPRISE UNIT: 1 hectare

DATE: September 1993

INCOME		\$/ha	Your Estimate
Yield	0.85 t/ha @ \$300/tonne at Katherine	255	
Other Income	Fertiliser subsidy 110 kg/ha @ \$95/tonne	10	
<b>A. TOTAL INCOME</b>		<b>265</b>	
<b>VARIABLE COSTS</b>			
Land Preparation			
Roundup CT	2 L/h @ \$11/h	22	
Wetting agent	100 ml/ha @ \$7.25/L	1	
Spraying	9.4 ha/h @ \$15.64/h	2	
Planting			
Seed (Putland)	11 kg/ha @ \$1.75/kg	19	
Planting	3.2 ha/h @ \$15.01/h	5	
Fertilisers			
Superphosphate	110 kg/ha @ \$332/tonne	37	
Harvesting			
Harvesting	3.2 ha/h @ \$76.01/h	24	
Marketing			
Cartage to depot	@ \$35/tonne	30	
Handling	@ \$12/tonne	10	
<b>B. TOTAL VARIABLE COSTS</b>		<b>149</b>	
<b>C. GROSS MARGIN PER HECTARE (A-B)</b>		<b>117</b>	

**Notes:**

One spraying for insect control may be necessary in some circumstances.

An additional net value for stubble hay can be included in some farming systems.

Yields should be lower when budgeting for conventional tillage.

**Sensitivity of Mungbean for Stockfeed Gross Margin (\$/ha) to Varying Yields and Prices**

Price	Yield (tonnes per hectare)					
(\$/t)	0.45	0.65	0.85	1.05	1.25	1.45
280	7	53	100	146	193	240
290	11	60	108	157	205	254
300	16	66	117	167	218	269
310	20	73	125	178	230	283
320	25	79	134	188	243	296

**Breakeven Analysis**

Using the above gross margin budget the breakeven yield and price are:

Breakeven Yield at a price of \$300 t/ha = 0.39 t/ha

Breakeven Price at a yield of 0.85 t/ha = \$163/tonne

Additional returns (i.e. over the breakeven yield or price) are required to meet the costs of overheads and management.