SUGAR BEAN PRODUCTION FACTSHEET

Zimbabwe Government

Food and Agriculture Organization of the United Nations

UKaid from the British people

Importance of sugar beans

- Valuable source of protein.
- Enhancement of soil fertility through nitrogen fixation.
- Valuable cash crop.

Agro-climatic and soil requirements

- Thrive in warm climates. Optimal temperature range of 18-24 °C.
- Sensitive to frost.
- Under rain-fed conditions, a minimum of 400 to 500 mm rainfall during the season is ideal.
- Grows best in well drained sandy loam or clay loam soils.
- Sensitive to acid soils. Ideal soil pH of 5.0 – 6.5. Liming important to attain desirable pH level.
- Avoid soils which tend to become waterlogged.
- Do not perform well under excessive water during growing or very hot conditions when flowering.

Varieties

- Choose variety based on:
  - market preference,
  - growth habit,
  - soil and climatic conditions,
  - disease tolerance/resistance, among other factors.
- Varieties can be determinate or indeterminate.
- Short season varieties take 85-95 days; medium season varieties take 95-104 days; Long season varieties take 105-115 days
- Locally available varieties include:
  SC Bounty, PAN 148, Purple Cardinal; Bonus; Gloria and NUA 45.

Land Preparation

- Well-prepared land ensures good germination and reduces weed infestation.
- Land preparation should begin well before the onset of the rainy season.
- Sugar bean should be grown in rotation with a cereal and care should be taken to avoid planting in lands where atrazine has been used.
- Production using conservation farming practices is recommended.
- Plant on ridges, on a flat seedbed or in furrows. Planting on ridges helps prevent waterlogging which damages the sugar bean plants, while planting in furrows helps conserve moisture.
- Sugar bean should be planted in furrows, under minimum tillage which reduces soil disturbance.

Seed requirements

- Use high quality certified seed for successful production.
- Certified seed will reduce the incidences of seed-borne diseases.
- It is not advisable to use retained seed from year to year.
- Seed rate: 100kg/ha
- Seed should first be treated with seed dressing such as Apron Star to manage insect pests and fungal diseases associated with emergence. Apron Star is applied at a rate of 25 grams per 10kg of seed

Planting

Planting dates are restricted mainly by the possible occurrence of frost (planting too late), heavy rain during flowering and rain at harvesting, resulting in reduced yield and poor quality.

- The best time of production is from December/January up to end of February in frost-free areas.
- Recommended spacing between sugar bean rows (inter-row) is 45cm (for smallholder farmers who are not mechanised).
- Recommended in-row spacing is 7 to 10 cm.
- The recommended plant population ranges between 150 000 to 220 000 depending on variety and other considerations
- The ideal planting depth for sugar bean is 2.5 to 5 cm.

Fertilizer Management

It is recommended that fertilizer application be based on soil tests.

- Sugar Beans respond well to lime, manure and basal and top dressing fertilizer application.
- Inoculation with rhizobium can help sugar beans to form nodules and fix nitrogen. Each legume crop needs a specific type of rhizobium bacteria, so always use the right inoculant for sugar bean.

- Lime should be applied at least 4 weeks before planting. Apply lime in the planting furrow (5-7 cm deep) before applying any manure, compost or basal fertilizer.
- Compound D should be applied at the rate of 200-400 kg per hectare.
- Place fertilizer in the furrow and cover with 2 cm of soil before placing the seed on the soil. It is important to cover the fertilizer with soil so that the seed does not "burn" from the fertilizer.
- For mono-cropped sugar beans use the basal fertilizer rate of one "beer/soft drink" cap per 40 and 20 cm furrow row, corresponding to 200 and 400 kg/ha at 45 cm inter-row spacing.
  Apply 100kg/ha Ammonium Nitrate when first flowers appear. All top dressing to be applied by 21 days after planting. Too much nitrogen fertilizer will promote vegetative growth at the expense of fruiting.

Weed control

- Efficient weed control is a pre-requisite for high sugar bean yields as the crop competes poorly with weeds.

Weed control can be manual, chemical or both

- Mechanical weed control should begin during seedbed preparation and be repeated with a hoe between the rows when necessary up to the flowering stage. Weeds in the rows have to be pulled by hand.
- Chemical weed control can be implemented at planting or before and/or after emergence
- Use pre-emergence herbicides before crop and weed emergence such as Alachlor (Lasso 4EC) and Metolachlor (Dual 8EC, or Dual 720EC), and Bateleur Gold.
- Fusilade and Basagran can be used for post emergence to control of weeds.
- Mulching helps control weeds under CA.
- Annex 2 indicates some herbicides commonly used on sugar beans.

Pest and Disease Management

- Scout for diseases such as rust, angular leaf spot and anthracnose and control as necessary. Look out for viral and bacterial diseases and control with fungicides as necessary.
- Check for pests such as bean stem maggot, aphids, thrips and bollworms and undertake control measures as necessary.
- Integrated pest and disease management, using all suitable control measures is recommended.
- Annex 1 summarizes management of common pests and diseases in Zimbabwe.

Harvesting

- Length of growing season varies with variety and climate.
- Sugar bean can mature from 90 to 120 days after planting.
- Harvest when all the pods have turned yellow, but before becoming so dry that they begin to shatter.
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- Sugar beans have a moisture content of 50% at physiological maturity. The beans however are only ready for harvesting when the moisture content drops to 16 % (the ideal being 15%). Seeds may split during threshing when the moisture content is less than 12 %. Beans should be pulled when the moisture content of the pods is temporarily high (to prevent shattering), i.e. early in the morning before the dew has evaporated.
- Harvest and place in an open shed during the rains or in the open air to further dry before threshing.
- Clean the grain, winnow to remove chaff, dust and other rubbish. Remove shrivelled, broken grains and grain of other varieties.

Marketing

- There are many buyers of sugar beans who offer different prices.
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- Speckled beans generally fetch higher prices than other types.
- Additional marketing information can be obtained through AMA, AGRITEX and ICT based platforms like Ecofarmer, e-Mkambo and Esoko. Farmers are encouraged to do market research before deciding to plant the crop.

- Farmers stand a better chance of getting a good price if they bulk their produce as buyers prefer to deal with high volumes.
- Most buyers have quality standards which look at moisture content, cleanliness; absence of foreign matter and varietal purity among other factors.
- By GMB standards sugar beans which qualify in grade A should have the following attributes:
  - moisture content of less than 11%;
  - maximum foreign matter content of 0.5%;
  - less than 1% purple coloured beans;
  - less than 2% off types
- Prices range from $800 to $1000 per tonne depending on the market.

ANNEX 1

Sugar beans gross margin budget

Gross margin budget for Sugar beans				
			One Hectare	
Target Yield levels		kg	1500	
Average price		$/kg	1	
GROSS INCOME		***$***	***1500***	
Recovery rate @	*100%*	*of yield level*		
VARIABLE COSTS				
item	**unit**	**quantity/ha**	**unit cost**	**Total Cost /Hectare**
Seed				
Pan 148	kg	100	$ 3.00	$ 300.00
Fertilizer				
D Extra	kg	300	$ 0.70	$ 210.00
Ammonium Nitrate	kg	100	$ 0.72	$ 72.00
Pesticides				
Apron star	grams	250	$ 0.25	$ 62.50
Carbaryl 85 WP	kg	1	$ 16.00	$ 16.00
Fungicides				
Shavit	L	0.5	$ 16.00	$ 8.00
Copper Oxychloride 85WP	kg	4	$ 10.00	$ 40.00
Dithane M45 (Mancozeb)	kg	3	$ 10.00	$ 30.00
Herbicides				
Dual Magnum	L	1	$ 11.00	$ 11.00
Packaging	Polythene bags	40	$ 0.50	$ 20.00
Hired labour				

planting; harvesting	LD	15	$	3.50	$ 52.50
Sundries @	5%	of above Costs			$ 41.10
TOTAL VARIABLE COSTS					**$ 863.10**
GROSS INCOME					$ 1 500.00
GROSS MARGIN					**$ 636.90**

NB: the gross margin budget is only a guide. Farmers should use figures relevant for their circumstances

ANNEX 2

Pest and Disease Management in sugar bean

Insects	Damage	Recommended products
Bean stem maggot	Maggots attack cotyledons, mine into stems and severe damage indicated by wilting and drying of seedlings.	Crop rotation. Diazinon 30 EC, Apron star seed dressing. Acetameprid can also be used as a follow-up spray with Imidacloprid.
Cutworm	Damage stems on or beneath soil surface.	Digging 5cm when damage is observed & crushing the cutworm. Fenveralate, Carbaryl 85 WP. Lambda Cyhalothrin
Aphids	Vectors of various viruses. Distorted leaves, stunting.	Dimethoate 40EC, Malathion 25 WP, Diazinon 30 EC
Red spider mite	Causes leaf defoliation.	Dimethoate 40 EC, Diazinon 30 EC
Pod borers	Feeds on leaves, buds, flowers and pods. They usually bore clean circular holes through pods resulting in secondary disease infection causing pod decay	Lambda/ Karate
(beetles, leaf hoppers, Caterpillars, Semiloopers)	Leaves are voraciously eaten by larvae (underside, along leaf margins). High insect pressure is indicated if only leaf veins remain uneaten.	Carbaryl 85 WP, Malathion 25 WP.
Bean weevil	Borer into seed to feed leaving the seed perforated with holes.	Early harvest to avoid field infestation, Use of grain protectants.

Given are just examples of pesticides you can visit your local extension Officer for more information

Disease	Symptoms	Recommended remedy
Anthracnose	Early signs of infection by this fungal disease appear on the underside of leaves and cause black lesions on pods.	Use of disease free seed and rotation with non-hosts. Dithane M45, Thiram 80 WP
Bacterial Blight	May manifest itself as small water soaked spots surrounded pale yellow 'halo'. It may also appear as brown patches on lower side of leaves which may dry off to give a burnt appearance. In both cases pods and seeds are reduced in yield and quality.	Use of certified seed and rotation. Copper Oxychloride 85 WP, Dithane M45
Seed borne diseases	Damping off or the failure of infected seeds to germinate.	Use of certified seed
Damping Off	Damping off or the failure of infected seeds to germinate. It is often associated with poorly-drained soils. Stem above and below the soil line darkens, outer cortex tissue decays and sloughs off in sharply defined area circling wilts topples over.	Seed dressings with Vitavax Plus or Thiram 80 WP.
Rust	Early symptoms are small yellow lesions on the underside of older leaves which can cause defoliation.	Rotation, removal of potential sources of spore Dithane M45, Bravo or Folicur.
Bean Mosaic	Causes stunted growth, distorted leaves that curl at the edges and have dark green mosaic blotches.	Control aphids using Dimethoate 40 EC.

Given are just examples of chemicals you can visit your local extension officer for more information

ANNEX 3

Chemical weed management in sugar beans

Product name	Active ingredient	Use rate/ha	Amount for one sprayer load (20 l knapsack)	For which type of weeds
Dual Magnum	Metolachlor	1.1 litres	82 ml	Broad-leaved weeds and grasses
Sencor 480 SC	Metribuzin (triazine)	1.1 litres	75 ml	
Lasso 48 EC	Alachlor	2.5 litres	75 ml	
Fusilade Super	Fluaziflop-p-butyl	1.5 litres	75 ml	Grasses and volunteer wheat
Classic	Chlorimuron ethyl	45 g	5 g	Nutsedge and broad-leaved weeds

** Dual Magnum, Sencor 480 SC and Lasso 48 EC are pre-emergence pesticides while Fusilade Super and Classic are post-emergence pesticides*