



A FARMER'S GUIDE

INTRODUCTION

Beans have a short maturity period of 60 to 120 days from planting time. The crop needs proper attention and suitable growing conditions in order to maximise yields. To attain this there is a need to apply Good Agricultural Practices (GAPs). These are the foundation for better yields and a profitable bean production venture. GAPs should be observed at all stages of bean production right from site selection, land preparation, seed selection, planting, weed management, soil fertility management, harvesting, post-harvest handling and storage.

PRE-PLANTING ACTIVITIES

Site selection

The recommended site for beans production should have the following:
-Deep fertile well drained and aerated, sandy loams or loamy soils. Therefore areas prone to water logging, very sandy soils and soils that are compacted (clay) should be avoided.

-An optimum soil pH of 5.8 to 6.5. Beans are highly sensitive to acidic soils with pH less than 5.2.

Therefore before a farmer ventures into bean production, soil samples should be taken from the fields and sent for testing.

-Avoid fields which have traces of Atrazine from previous season as this retard growth and reduces yields.

Land preparation

Deep ploughing to aid drainage and good root development followed by disc harrowing to ensure a fine tilth is important. The bean crop is not a good germinator, it endows epigeal germination characteristic.

Hence a fine tilth ensures a good seed to soil contact. A well prepared land and a fine tilth also reduces weed infestation.

Choice of suitable variety

There is a wide range of bean varieties a farmer can choose from in Eswatini. These also differ in their maturity periods. The selection of varieties will depend on the following; market requirement, adaptability and yield potential, length of growing season and resistance to pests and diseases.

Farmers can consult with NMC Farmer Development Officers for advice on the suitability of varieties.

PLANTING

The crop can be planted at a spacing of 45-60 cm between rows and 8-10 cm between plants. Beans do not stand for frost as well as extreme heat especially during flowering and pod formation. Therefore it is important for a farmer to consider climatic conditions of the area when planning for planting. The recommended periods for planting in the different regions of Eswatini are as follows:

Highveld: January-March

Middleveld: January-March

Lubombo:

Lower Lubombo; March-May

- This is done under irrigation

Plateau; Early February to Late February

- Not under irrigation

FERTILIZER REQUIREMENTS

Beans like all other crops need fertilizer as per recommendations from soil test analysis result. However a general recommendation can be used; apply 200-300kg/ha of 2.3.2 (22) or 100-200 kg/ha of 2.3.2. (37) as a basal and 100-150 kg/ha of LAN for topdressing. Beans have the ability to fix atmospheric nitrogen in the soil, so they require minimal topdressing as usually shown by soil analysis results. Early application of nitrogen fertilizer can lead to high vegetative growth of the plant which ends in less pods formed. Nitrogen fertilizer can be applied after 21 days of crop emergence.

PLANT PROTECTION

Weed Control

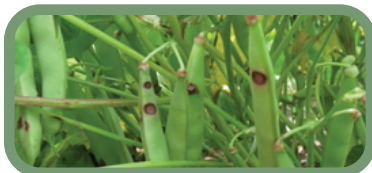
The bean crop has to be weeded at least 2-4 weeks after emergence when using manual method. Herbicides can also be used. This method depends on two factors; correct identification of the type of weed(s) and timeliness of controlling. There are selective herbicides and non-selective herbicides. Application is made at different times depending on the type of herbicide, type of weeds present, crop stage and weed stage. Some herbicides are applied as pre-emergence (soil applied), and post-emergence (folia applied).

Disease Control

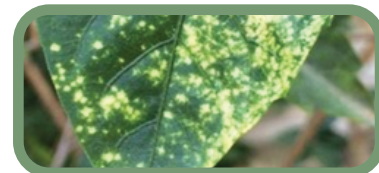
A number of diseases can affect beans, for example, bacteria blight, anthracnose, and bean mosaic. Most of the diseases usually come with the seed. Therefore, it is advisable to treat (inoculate) seeds before planting. For effective management and control, one needs to properly identify a healthy plant and an infected plant for correct selection of chemical to use on management and control.



Bacterial blight



Anthracnose



Bean Mosaic

Pest Control

There are a lot of pests which affect the bean crop. Some of these pests include: CMR beetle (*Mylabris* spp), Bean fly (stem maggots) and bruchids. CMR beetles do not cause severe damage, so upon being identified, it is advisable that you collect and crush physically or malathion can be used if its population increases. Bean fly: this pest is a serious problem in bean production; urgent control measures have to be undertaken immediately it is identified. To control the pest, use endosulfan to treat the seeds.



CMR BEETLE



BEAN FLY EFFECTS

HARVESTING

When to harvest common beans? Most beans varieties used in eSwatini will be ready for harvest 90 to 100 days after planting. There are some varieties that will be ready for harvest at 60 to 90 days after sowing like lake 101 (Cambamanga). Beans should be harvested once the pods have turned pale coloured.

How to harvest common beans? Dry beans have a moisture content of about 50% at physiological maturity. Beans can be harvested manually or mechanically (use machinery). Manually, pull the bean stems when the pods have become discoloured and have dropped leaves. Manual harvesting is ideal for small scale producers while machinery use is ideal for large scale production. It is advisable to harvest in the morning to avoid undue shattering and loss of grain



Mechanical Harvesting



Manual harvesting

Farmers should avoid harvesting pre-maturely as this will cause seeds to shrink and rot. At the same time harvesting shouldn't be delayed to avoid pods shattering, animal damage, and pest attack.

POST-HARVEST HANDLING

Care for harvested beans is necessary. This is to reduce losses in both quality and quantity. Stages in post-harvest handling of common beans:

Drying

Dry the beans before threshing them. Threshing beans before they are properly dry results in damage of the grain. Dry the pods on raised platforms, mat, or tarpaulin to avoid contact with moisture and other impurities. Drying should be done in a place with good air circulation, but not in direct sunshine. Beans are usually ready to be threshed when the moisture content has decreased to 16%.

Threshing and winnowing

It is advisable to do the threshing when the moisture level is 14-16%. If the seeds are too dry, the grain can be easily damaged during threshing. Thresh the pods manually by beating with a stick but do not beat hard as this can damage the grain. After threshing, winnow to remove chaff. Threshing can also be done by using tractor drawn sheller, which minimise broken seeds, time and increase efficiency. After threshing, make sure that winnowing or sifting is done to remove all foreign matter and chaff.



Manual Threshing



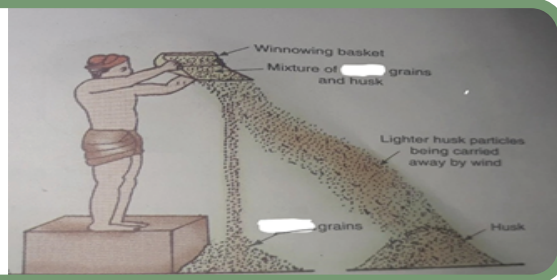
Machinery Threshing Beans

Winnowing and Sorting

It is very vital to clean, sort or select the grain for both storage and market purposes. Good quality product attracts good price. Therefore, after threshing, clean and sort the grain properly; this helps to remove dust, damaged seeds, broken, and diseased seeds. Discrete the grain by size. Commonly, markets accept grade 2 quality.



Winnowing dry beans



Sorting dry beans

Storage

Store the grain in clean, dry, and disinfected bags when the moisture content is 13-15% in a place with good aeration. Do not mix newly harvested grain with stocks from previous harvests. Store the bags at least 1 meter away from the walls and on a raised platform. Store the bags in a non-leaking storehouse to avoid contact with moisture. The storehouse should have good aeration, and cool to protect produce from moulds development.



How much can you make from producing beans?



Be your own boss with just one hectare planted with beans. Since Covid started in 2020, the value of beans inflated from around E14,000 per metric ton to around E20,000 per metric tonne. Based on the gross margin template, after all the deductions have been made, one can remain with E12,035.00 as profit, in just one hectare!



(Beans gross margins)					
Targeted yields	1,5 tonnes/ha				
Gross margin area	1 ha				
Price/ton	19000 SZL/tons				
Revenue	28 500 SZL/cycle				
Cost of sales	16 465 szl				
Gross Margin	12 035 szl				
Gross margin ratio	42 %				
		Unit	Units/ha	SZL/Unit	SZL/ha
1. Land Prep					
	Ploughing	hrs	2,50	450,00	1 125,00
	Discing	hrs	1,25	450,00	562,50
	Sub total				1 687,50
2.Fertilizer					
	Cost of fertiliser				
	Basal fertiliser (NPK)	50kg	4,00	750,00	3 000,00
	Top dress (LAN)	50kg	2,00	500,00	1 000,00
	Cost of applications	Number of applications			
	Tractor (planter) applications	1	hrs	1,25	450,00
	Manual applications (LAN)	1	md	5,00	70,00
	Sub total				4 912,50
3. Planting					
	Cost on planting materials				
	Seeds	10kg	7,00	520,00	3 640,00
	Cost of planting operation				0,00
	Planting (planter hire)	hrs	1,25	0,00	0,00
	Sub total				3 640,00
4. Pest & disease control					
	Cost of pest control products	Number of applications			
	Bravo	1	L	1,00	350,00
	Malathion	2	kg	2,50	100,00
	Cost of applications	Number of applications			
	Tractor boom applications	0	hrs	1,25	0,00
	Manual (knapsack) applications	3	md	2,00	70,00
	Sub total				1 270,00
5. Weed control					
	Cost of herbicides	Number of applications			
	Bladex Super (pre-emergence)	1	4L	1,00	0,00
	Basagran (Pre-emergence and Post-emergence)	2	L	3,00	520,00
	Cost of applications				0,00
	Tractor (boom) applications	2	1 hr	1,25	450,00
	Manual (knapsack) applications	0	md	0,50	0,00
	Sub-total				2 685,00
6. Irrigation					
	Electricity	SZL/ha/month	1,00	0,00	0,00
	Sub total				0,00
7. Harvesting					
	Machanised harvesting				
	Cost of hiring	hrs	1,00	0,00	0,00
	Maize Sheller		1,00	1 000,00	1 000,00
	Manual harvesting	md			0,00
	Wages	md	10,00	70,00	700,00
	Sub total				1 700,00
8. Packaging and Transport Cost					
	Empty bags	50 kg bags	30,00	4,00	120,00
	Transport to market	Tons	1,50	300,00	450,00
	Sub total				570,00
TOTAL COSTS					16 465,00



HEALTH BENEFITS OF BEANS AND OTHER PULSES

Help lower blood cholesterol

Reduce blood sugar and prevent chances of diabetes

Prevention of certain cancer, such as intestinal cancer

Gluten free - used by people with celiac disease

Help in addressing obesity and other chronic illness

INNOVATIVE DISHES FOR BEANS AND PULSES



Meat balls



Umgcushu



Bean Patties



Doughnuts



Swazi Buns



Stew



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