- Use tolerant/resistant bean genotypes
- Judicious use of conventional insecticides
- Use different combinations of the above (IPM).

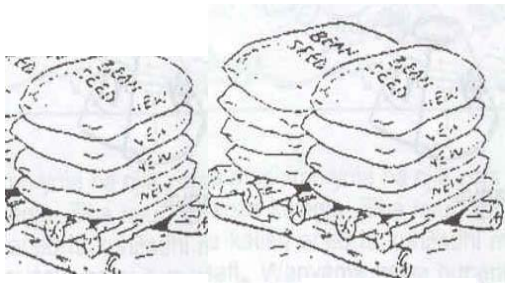
Traditional pesticides

Storage pest management

- Timely harvesting
- Appropriate grain drying
- Maintaning store hygiene
- Avoid mixing old and newly harvested grain in the same store
- Use organic/botanical pesticides (ash, *Vernonia* spp. and *Tephrosia* sp. leaf powder, chillis, etc.)
- Judicious use of conventional insecticides
- Use a combination of strategies (IPM).

Bean grain processing for storage

Remember: More production from small land area



Common bush Climbing beans

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Cultivation of Climbing Beans

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FUTURE HARVEST www.futureharvest.org
CPP CROP PROTECTION PROGRAMME

Introduction

Climbing beans, unlike bush beans require support (stakes) to trail on. Tree branches, other crops (e.g. maize stalks and fruit trees) and fence materials can be used. Climbing beans give 3-4 times more yield than bush beans.

Cultivars

The following cultivars have successfully been tested and proved to be suitable to farmers in different locations in eastern and central Africa: IZO 201297, MORE 90018, R34, R67, R71, R125, R143, R158, R173 and R180.

Characteristics

- Climbing beans are high yielding, producing 3-4 times more compared to other common bean types
- Have proved to be tolerant to insect pests (particularly bean stem maggots- BSM), diseases and drought
- They require very small land area
- Enriches soils through atmospheric nitrogen fixation
- Plants provide cover to the soil
- Crop residues provide nutritive livestock forage.

Land preparation

Prepare the land well in advance by removing all weeds and leaving a fine seed bed.

Planting

- Seed sowing should be carried out on moist soils
- Relay planting can be carried out in a maize field just before harvesting so that maize stalks are used as stakes
- Two seeds are planted at 75 cm between rows and 20 cm between plants within a row
- Secure stakes between two planting stations at second trifoliate leaf stage
- Establish fast growing trees around the farm to provide stakes.

Fertilizer application

Fertile soils and constant moisture will give a good crop establishment and high yields:

- Use organic/botanical fertilizers (e.g. *Vernonia* spp. or *Tithonia* sp.) leaves
- Use animal manure or compost (these should be well decomposed)
- Use inorganic fertilizers such as Diammonium phosphate- DAP (18: 46: P_2O_5) at planting and Calcium ammonium nitrate- CAN (27% N) as top dress.

Weed control

The bean crop has to be kept weed free for good performance. The first weeding should be carried out within 2 weeks after planting. Subsequent weeding can be done as required.

Disease management

Diseases are among the major constriants to bean production:

- Use clean seed that is free from diseases
- Use disease resistant/tolerant genotypes
- Adopt timely planting during the season
- Practice crop rotation and/crop mixtures
- Remove all crop residues from the field
- Use organic pesticides e.g. a mixture of animal milk + wood ash + water
- Judicious use of conventional chemical pesticides
- Use a combination of the above (integrated disease management-IDM).

Field insect pest management

Insect pests account for various levels of losses in the field. Management include:

- Timely planting
- Crop rotation and intercropping
- Use organic and botanical insecticides (e.g. cow urine, ash, neem seed oil and powder, kerosene and soap, *Vernonia* sp. and *Tithonia* spp., etc.