Wheat (*Triticum aestivum*) belongs to the family Poaceae.
In Kenya, it is the second most important cereal grain crop after maize and is grown in areas like Narok, Kitale, Nakuru, Trans-Nzoia, Uasin Gishu, some parts of Laikipia, among others.

VARIETIES
The major variety of wheat grown in Kenya is the Durum. However, there are a number of other wheat varieties. These include;

- Robin
- KS- Chui
- Kenya eagle
- Kenya kingbird

ECOLOGICAL REQUIREMENTS
- *Rainfall*– wheat does well in moderate rainfall ranging from 500-1300mm.
- *Altitude*– wheat growing areas have an altitude range of 1500-2900m asl.
- *Temperature*– the crop requires a relatively warm temperature range of 15-25 degrees centigrade for at least three months. Temperatures above 35 degrees centigrade stop photosynthesis and the growth of the crop. At a higher temperature, e.g. 40 degrees centigrade, the crop dies due to the heat.
- *Soil*– for optimum production, wheat requires a deep fertile soil which is well drained and with an optimum soil PH of between 5.5-7.5. Wheat crop is very sensitive to soil salinity.

GROWING
Propagation is by seeds.

Procedure
- Land preparation. This is made easier by use of CLAMPDOWN 480SL 200ml/20l which is a non-selective herbicide used to kill all types of weeds.
- Till soil to a depth of about 6 inches.
- Mix soil with manure and DAP. In order to improve the rate of nutrient uptake as well as to stimulate crop growth among other benefits, mix DAP 50kg and /or manure 1 ton with 1kg of HUMIPOWER.
- Sow seeds. This can be achieved through broadcasting, dibbling the seeds or using a drill at a depth of about 4cm
- Cover the seeds with a thin layer of soil. A rake can be used in small scale farming. This prevents seeds from drying out in the sun and from being fed by birds.
- Water the newly sown seeds. This may be optional especially if planting has been done on the onset of rains or the soil is moist enough to allow for the seeds to germinate.

Germination of wheat seeds is usually after 4-7 days.

PESTS & DISEASES MANAGEMENT

Pests

- *Wheat aphids*– infestation causes yellowing and premature death of leaves. As these aphids feed, they secrete honeydew which encourages the development of sooty mold. They are also vectors of barley yellow dwarf virus.

Spray KINGCODE ELITE 50EC 10ml/20l or LEXUS 247SC 8ml/20l or PENTAGON 50EC 10ml/20l

- *Thrips*– these are piercing and sucking insects found mostly behind the sheath of the flag leaf feeding. They attack leaves, stems and heads causing significant damages.

Spray ALONZE 50EC 5ml/20l or PROFILE 440EC 30ml/20l or DEFENDER 25EC 40ml/20l

- *Nematodes*– infestation leads to formation of galls/swellings on the roots. This reduces plant vigour resulting into stunted growth.

Drench soil with ALONZE 50EC 10ml/20l or mix 2-3 kg ADVENTURE 5GR with 50kg of basal fertilizer whenever applying fertilizers.

- *Cutworms*– they cut the stem of younger plants below the soil surface. The infested plants withers eventually.

Drench soil with PROFILE 440EC 60ml/20l or PENTAGON 50EC 20ml/20l

- *Stalk borers*– the larvae feed on leaves. As infestation continues, they find their way into the stalk of the plant, feed on the stalk tissues making the stalk weak. Significant losses result as a result of their infestation.

Spray KINGCODE ELITE 50EC 10ml/20l or PROFILE 440EC 30ml/20l or PRESENTO 200SP 5g/20l

- *Birds*– they eat grains off the mature ear thus reducing plant density.

Employ a bird scarer or apply a bad repellant to the seeds. Alternatively, one can change the planting date.

Diseases

- *Brown leaf rust*– infection leads to formation of circular or slightly elliptical pustules which are smaller than those of stem rust. These do not coalesce and have masses of orange to orange brown fungal growth. In severe cases, the leaf dies.

Spray DUCASSE 250EC 20ml/20l or MILESTONE 250EC 10ml/20l or JUPITER 125SC 20ml/20l

- *Powdery mildew*– white to pale grey powdery colonies of fungal growth develop on the upper surfaces of leaves and leaf sheaths. Sometimes, spikes are attacked. Heavy infections cause significant losses.

Spray RANSOM 600WP 15g/20l or EXEMPO CURVE 250SC 20ml/20l or JUPITER 125SC 20ml/20l

- *Barley yellow dwarf* –this is a viral disease. The symptoms vary from one variety to the other. The leaves of attacked plant turn yellow, stunt, and become stiff. The heads become discoloured especially during ripening.

Control aphids by spraying KINGCODE ELITE 50EC 10ml/20l or LEXUS 247SC 8ml/20l or PENTAGON 50EC 10ml/20l

- *Black stem rust*– dark reddish brown pustules develop on stems and spikes. As infection progresses, these pustules coalesce and under favourable conditions, complete crop loss can occur.

Spray DUCASSE 250EC 20ml/20l or MILESTONE 250EC 20ml or JUPITER 125SC 20ml/20l

- *Loose smut*- the inflorescence, except the rachis, is covered with masses of smut spores which are black in colour. Yield losses depend on the number of spikes infected.

Spray MEGAPRODE LOCK 525WP 30g/20l or RANSOM 600WP 15g/20l or ABSOLUTE 375SC 10ml/20l

NUTRITION & NUTRITIONAL DEFICIENCIES

In order to achieve optimum crop production, sufficient nutrients should be made available for the crop. This could be achieved through use of basal fertilizer, e.g. DAP, CAN etc. or foliar fertilizers, e.g. OPTIMIZER, GREENPHITE, LEGENDARY, among others. In addition, proper timing is critical in order to avoid loss of nutrient elements through volatilization, leaching or any other ways.

Deficiencies

The following are some of the deficiency symptoms shown by wheat plants due to unavailability of the respective nutritional elements.

- *Phosphorous deficiency*– this results into stunted growth with development of few shoots. In severe cases, leaves turn pale to yellowish red starting with the older leaves. Eventually, the leaves die. Formation of small heads is a common symptom of phosphorous deficiency.

Correction; spray DIMIPHITE 30ml/20l or GREENPHITE 80ml/20l or LAVENDER 20ml/20l or PLANT SOUL 40ml/20l or GATIT SUPER START 50g/20l

- *Nitrogen deficiency*– wheat appears pale green with older leaves turning yellow first, from the tip to the sheath. In cases of severe deficiency, necrosis occurs. Production of small grains is evident also.

Spray LAVENDER 20ml/20l or GATIT SUPER GROWTH 50g/20l

- *Potassium deficiency*– deficient plants have shortened internodes and the margins of the l eaves dry and become scorched.

Correction; spray DIMIPHITE 30ml/20l or GREENPHITE 60ml/20l or LEGENDARY 20ml/20l or GATIT SUPER FLOWER & FRUITS.

WEED CONTROL

Like in other crops, weeds in wheat plantation compete for nutrients, water, space and sunlight as well as harbouring pathogens. Weed infestation causes significant losses and should thus be controlled.

The following herbicides are effective in controlling weeds;

- AGROMINE 860SL 150ml/20l this is a selective herbicide which kills broadleaved weeds only. It should applied before piping stage, when crop has developed 5-6 leaves.
- TRIBUTARY 750WDG 3g/20l- this is a selective herbicide with a systemic mode of action and fit for the control of broadleaved weeds when crop is in the 3-5 leaf stage.
- DIGESTER SUPER 69EW 50ml/20l- this is a selective herbicide with both contact and systemic actions and is used to control annual and perennial grass weeds.

NOTE

- Whenever doing foliar sprays, always mix the product(s) with INTEGRA 3ml/20l. This is a sticker, spreader and penetrant which helps in improving the products' efficacy, giving effective results.
- CADILLAC 800WP is a preventive fungicide which should be used before a fungal infection has begun on the plant.
- OPTIMIZER 10ml/20l is a superior foliar fertilizer which helps in management of plant stress during adverse climatic conditions, plant immune build up, prevention of flower abortion, improvement of fruit quality & quantity among other benefits. It provides both macro and micronutrients and growth hormones to the plants.
- Alternation of various chemicals (especially fungicides and insecticides) throughout a crop's season help in preventing resistance build-up by the pest, which could happen if only a single chemical was used.

MATURITY, HARVESTING & POST HARVEST HANDLING

Wheat is ready for harvesting after about four months, which varies with the different varieties. When ready for harvesting, tools like sickles or sharp knives are used to cut the wheat heads. This is commonly done by the small scale farmers. Large scale farmers use machines like the combined harvesters. The harvested wheat heads are threshed, dried and winnowed.

After this, the wheat is milled in order to obtain wheat flour. This flour can be bleached to give an attractive and a desired colour or consumed directly. Wheat flour is highly nutritious and is used in bakeries to make cakes, breads etc. and in homes to make chapatis among others. Wheat bran/waste provides a good dairy/chicken feed.

A one- acre piece of land can produce over 20-100kg sacks of wheat