

Technical Bulletin #42:

Knowing Your Crop: Chinese Kale

Introduction

This bulletin is intended to help Cambodia HARVEST clients follow the basic practices recommended by our technical team in order to reduce the risk and increase the yields in kale production.

Chinese kale is a priority crop in commercial horticulture. Generally, it is well grown in temperate zones, and in Cambodia there exist many good varieties adapted to local climate conditions. The most common, called DARA from East West Seed International, can be grown year-round and is very popular with farmers because of high yields and the short maturation period of 25-30 days after transplanting.

Land Preparation

Weeds and existing crops have to be removed before land preparation. Next, plow the land two to three times thoroughly into loose till with a depth from 25 to 30 cm. Organic matter should be applied before harrowing (50 grams per square meter) in order to improve soil. Lime at a rate of 20 grams per square meter is recommended if the pH of the soil is below 5.5. Next, create raised beds with a height of 25 to 30 cm. The distance between beds should be 1.50 m, and the tops of the beds should be 100 cm wide. Once the beds and drainage are prepared, install the drip irrigation system and wet the beds in order to make weeds germinate, allowing control before transplanting. Plastic mulching and rice straw are recommended to cover the beds thereafter. A live barrier crop such as corn must be planted 25-40 days before transplanting and, if using sugar cane, plant two months before transplanting the kale.

Seedling Production

Although kale can be directly seeded, Cambodia HARVEST recommends the use of seedlings to increase seed germination and harvest rates. Chinese kale seeds generally have a dormancy period. Therefore, it is better to use seeds that are about one year old. Also, sow about 10 percent more seeds than your desired outcome to compensate for plants lost during the seedling stage.

Seeds should be placed 0.2 cm deep in the middle of the seed tray cell into a sterilized substrate. The recommended cell size of seed trays is 2.5 x 2.5 x 3.8 cm. After sowing the seeds, cover the holes with a fine material (rice hull ash + sandy soil) and water the seed tray as uniformly as possible until drops start coming out of the bottom of the cells. Keep the seed trays on the germination chamber for two days. After that, take the trays to the seed tray stands and keep them there for 18 to 20 days, after which they should be ready for transplanting (or when the seedlings have four to six leaves).

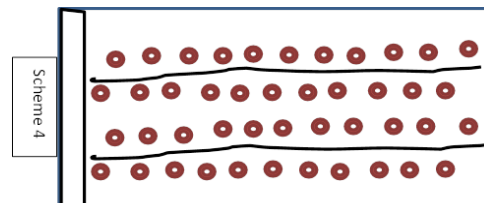
Transplant

The day selected to transplant is one of the most critical days of the Chinese kale life cycle. To be prepared for transplanting, a farmer should have the following:

- Beds should be completely wet (irrigate at least two to three hours on the afternoon before transplanting).



- Mark the holes at well-spaced intervals. Depending on the variety of plant, plant the kale at 15 x 15 cm or up to 25 x 25 cm intervals. Each bed may have between four to six lines. The holes should be 1 to 1.5 cm deeper than the seedlings plugs (4.8 to 5.3 cm). Use a distance marker to plan your transplant holes.
- Because this crop is usually planted four rows per bed, we strongly recommend using two drip lines per bed as shown in Scheme 4.
- Use a starter solution. Prepare 1.5 kgs. of DAP or 15-15-15 and mix that with 200 liters of water, then apply 250 ml of that solution to each hole.
- Select seedlings according to size and transplant them together according to selection. Planting the kale according to their size will avoid plant competition and increase plot uniformity.
- Do not take the seed trays to the transplanting plot. Instead, use a plastic basket or a carton box to transport them to the field.
- After transplanting, water the crop for at least one hour to make the humidity of the bulbs in the plot uniform.



Fertigation

Commercial Chinese kale should be watered every day. The first three days after transplanting, water the crop three hours per day. After that, leave the plant without water for as many days as the plants can resist and check them every day at 2pm. If you see the plants are too wilted, return to normal watering. After this period, when the roots have developed (induction period), irrigate every day. The total time spent watering will depend on the time of year (rainy or dry season), stage of plant, and soil conditions. A Cambodia HARVEST technician will advise you on how to define the irrigation time. Fertilization should be done through the drip system at least once per week, and a Cambodia HARVEST technician will provide you with a fertilization program according to your needs. In general terms, these are the nutrient needs for one hectare of kale:

Nutrients	N	P ₂ O ₅	K ₂ O	Ca	Mg	B
Kg/Ha	203	57	370	176	51	0.52

Pests and Disease Control

Chinese kale is susceptible to a number of pests, such as the diamond back moth, aphids, and worms. Many diseases are attracted to Chinese kale, such as downy mildew, bacterial soft rot, black rot, and grey mold, which are active and very destructive to Chinese kale in cool and damp weather conditions.

Cambodia HARVEST suggests an integrated pest management approach to controlling pests and diseases. Chemicals alone are not enough and, in fact, many times the best solution to problems doesn't involve any pesticides or fungicide. In case of a disease or pest problem, please contact Cambodia HARVEST technicians and ask for advice on how to handle the problem. Farmers may ask technicians to provide the following technical bulletins: "[Pest, Diseases, and Weed Management](#)" and "[Recommended Products for Input Suppliers](#)".

Harvesting

Chinese kale should be harvested when the leaves are large and the flavor and texture is maximized (usually 60 to 70 days after planting). Harvesting the plant late will result in tougher leaves that develop a more bitter taste.

Nutritional Importance

As a general rule, the darker the Chinese kale, the more nutrients it provides. "Loose head" or loose leaf Chinese kale has higher nutritional values than "crisp head" types. A serving of loose leaf Chinese kale (100g) for an adult and a smaller serving (50g) for a child provide two to three times the daily amount of Vitamin A that each needs. This is important because in Cambodia, Vitamin A deficiency is a major cause of night blindness in children.

Reference:

MAFF, FAO: Vegetable Production Manual 2011

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