

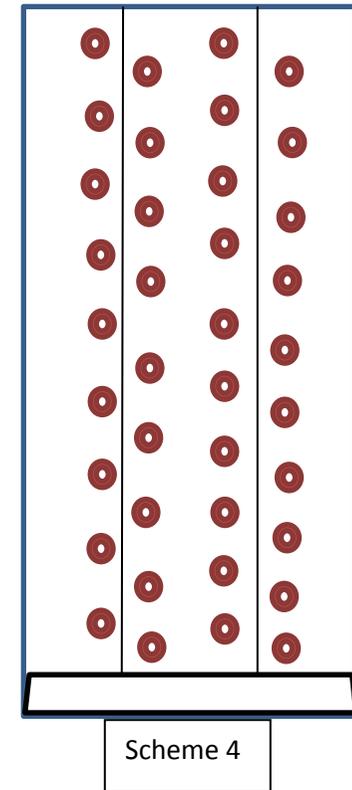
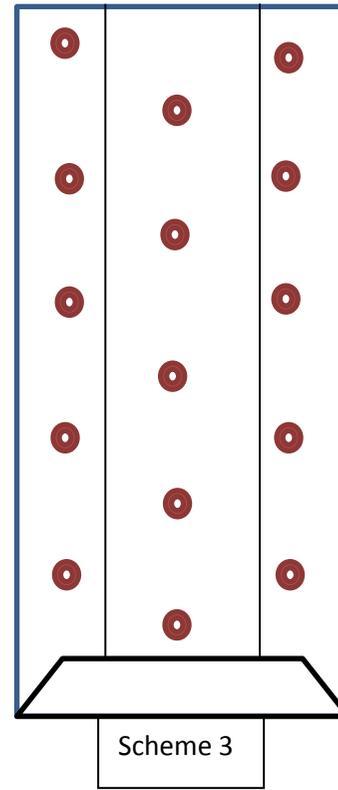
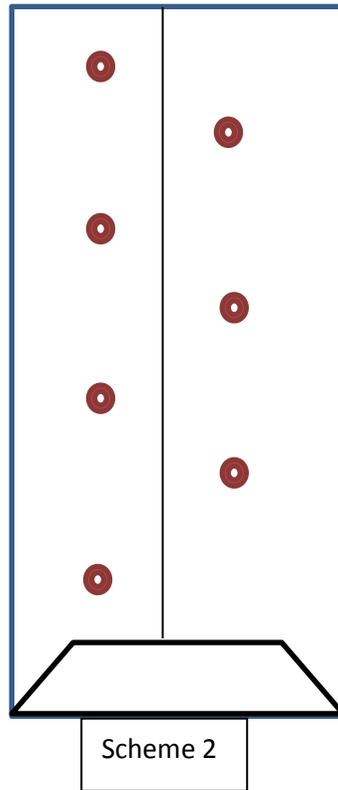
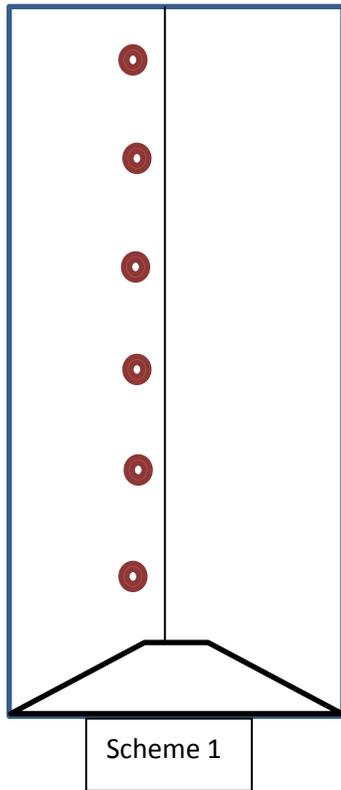
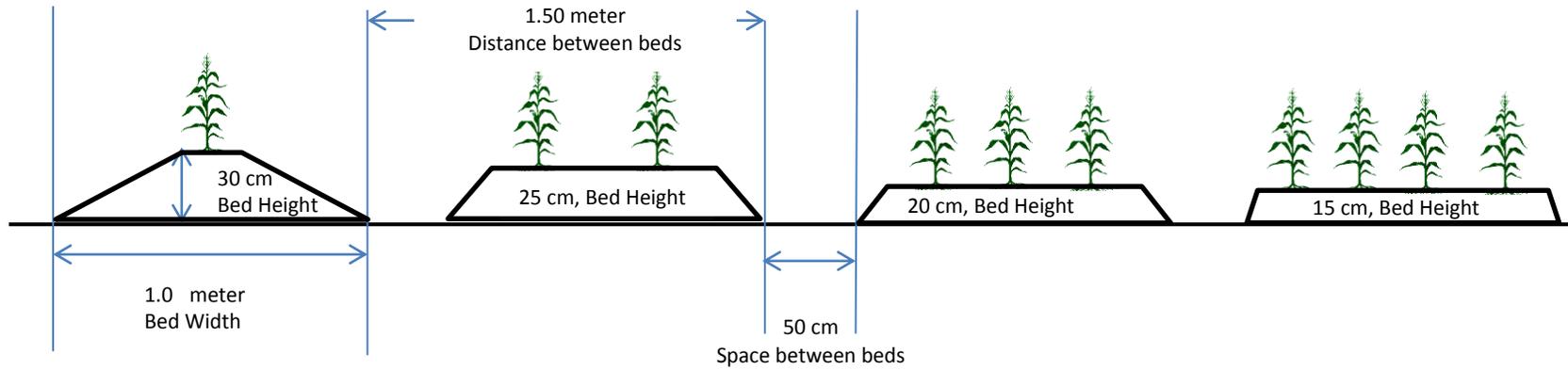
Technical Bulletin #31:

Recommended Plant Spacing for Horticulture Crops

In modern agriculture, having the right number of plants per unit area is very important. Significant differences in yields can occur if the maximum recommended plant densities are not used in the farm plot.

There are some basic considerations that should be taken into account:

- 1. Distance between beds** - For all Cambodia HARVEST horticulture clients, we recommend a distance of 1.50 m (measured from the center of one bed to the center of the adjacent bed) between planting beds. Remember that when using a drip irrigation system, you have to connect the drip lines at a specific distance according to the bed spacing, and you cannot change it once the sub main or manifold is perforated or punched. Therefore, you must choose only one distance between beds.
- 2. Distance between plants** - This will vary according to the crop planted. In table 1 you will note the recommendations for the most commonly planted crops. If you want to grow a crop that is not listed, please contact your Cambodia HARVEST technician to discuss the recommended plant distance.
- 3. Bed shape (width)** - This also varies according to the crop and how many lines (rows) of plants per bed are recommended.
 - a) Scheme 1** - for climbing (trellises) plants like cucumber, wax gourd, and yard long bean, beds should have a trapezoid shape with the flat surface not wider than 20 cm, but enough space for placement of the seed and the drip line. The base of the bed should be 1 m and the height 30 cm.
 - b) Scheme 2** - two lines (rows) per bed, suitable for crops like corn, cabbage, and some peppers. In this case, we use a similar shape, but the top should be about 60 to 70 cm in width, 25 cm in height and a bed base of 1 m. Only one drip line is used per bed placed between the two planted lines.
 - c) Scheme 3** - three lines per bed, suitable for crops like Pak-choi and Chinese cabbage. The shape of the bed is similar: base of 1 m, top of 70 to 80 cm, and height of 20 cm. In this scheme, we use two drip lines per bed.
 - d) Scheme 4** - four lines per bed, suitable for small crops like morning glory, lettuce, and amaranth. The shape is similar: base of 1 m, top of 80 to 90 cm, and height of 15 cm (higher if we can fit the plants on the top). We also use two drip lines per bed.
- 4.** When planting more than one line per bed, use the triangular or zigzag planting pattern, not directly across from each other. In this way, we use the space in a more efficient way (more space for each plant – see below).
- 5.** Because use of a good quality seed is recommended, seed prices are a little higher and we should not misuse or waste any seeds. This is why we encourage transplanting instead of direct seeding and the use of seedlings grown in seed trays, even for crops that may be seeded directly seeded. It is recommended to sow extra seeds in seed trays to replace the ones that never germinate or die (the amount can range from 5 to 10 percent) during the first week after germination.





Recommended Plant Spacing and Population for most common crops in Cambodia

Crop	Distance between Beds	Distance between Plants	Distance between Lines	Type of Planting	Population per Hectare	Seed required to plant one Hectare	Type of Sowing
Amaranth	1.50	0.10	0.10	Four lines per bed	266,667	293,333	Direct only. Must thin plants out
Banana	3.00	2.00	1.50	Two lines per bed	3,333	3,500	Transplant
Bitter Gourd	1.50	0.25		Single line	26,667	28,000	Direct sowing or transplant
Broccoli	1.50	0.35	0.35	Three lines per bed	57,143	62,857	Transplant
Carrot	1.50	0.040	0.10	Four lines per bed	666,667	733,333	Direct only. Must thin plants out about 10 days after germination
Cauliflower	1.50	0.35	0.40	Two lines per bed	38,095	41,905	Transplant
Chai Sim (Chye Sim)	1.50	0.20	0.35	Three lines per bed	100,000	110,000	Transplant
Chinese Cabbage	1.50	0.30	0.35	Three lines per bed	66,667	73,333	Transplant
Chinese Kale	1.50	0.25	0.25	Three lines per bed	80,000	88,000	Transplant
Chinese Mustard	1.50	0.25	0.35	Three lines per bed	80,000	88,000	Transplant
Chinese radish	1.50	0.20	0.25	Four lines per bed	133,333	146,667	Direct sowing
Corn (Waxy and Sweet)	1.50	0.20	0.50	Two lines per bed	66,667	73,333	Direct sowing or transplant
Cowpea	1.50	0.25	0.50	Two lines per bed	53,333	58,667	Direct sowing
Cucumber	1.50	0.25		Single line	26,667	29,333	Direct sowing or transplant
Eggplant	1.50	0.75		Single line	8,889	9,778	Transplant
Green cabbage	1.50	0.35	0.40	Two lines per bed	38,095	41,143	Transplant
Green Flowering Pak Choy	1.50	0.15	0.30	Three lines per bed	133,333	146,667	Transplant
Green Mustard	1.50	0.15	0.20	Four lines per bed	177,778	195,556	Direct sowing or transplant
Green sweet pepper	1.50	0.50	0.50	Two lines per bed	26,667	28,800	Transplant
Ivy gourd	1.50	0.50		Single line	13,333	14,667	Direct sowing
Kale	1.50	0.40	0.40	Two lines per bed	33,333	36,000	Transplant
Leek	1.50	0.10	0.15	Four lines per bed	266,667	266,667	Transplant
Lettuce (Salad)	1.50	0.20	0.20	Four lines per bed	133,333	146,667	Transplant
Longan	6.00	5.00		Single line	333	367	Transplant
Moringa	1.50	2.00		Single line	3,333		Will be used as live barrier



Morning Glory	1.50	0.20	0.20	Four lines per bed	133,333	146,667	Direct seeding and thinning
Pak Choy	1.50	0.15	0.30	Three lines per bed	133,333	137,333	Transplant
Peanut	1.50	0.12	0.20	Four lines per bed	222,222	244,444	Direct sowing
Pineapple	1.50	0.27	0.40	Two lines per bed	50,000	54,000	Transplant
Pumpkin	3.00	1.00		Single line	3,333	3,667	Direct sowing or transplant
Red cabbage	1.50	0.30	0.40	Two lines per bed	44,444	48,000	Transplant
Red chili pepper	1.50	0.20		Single line	33,333	36,667	Transplant
Red sweet pepper	1.50	0.20		Single line	33,333	36,667	Transplant
Snap bean	1.50	0.10	0.30	Three lines per bed	200,000	206,000	Direct sowing
Taro	1.50	0.35		Single line	19,048		Direct sowing
Tomato	1.50	0.30		Single line	22,222	24,444	Transplant
Watermelon	1.50	0.50		Single line	13,333	14,667	Direct sowing or transplant
Wax Gourd	1.50	0.60		Single line	11,111	12,222	Direct sowing or transplant
Winged Bean	1.50	0.15		Single line	44,444	48,889	Direct sowing
Winter melon	1.50	0.60		Single line	11,111	12,222	Direct sowing
Yam	1.50	0.35		Single line	19,048		Direct sowing
Yard Long Bean	1.50	0.35		Single line	19,048	20,952	Direct sowing or transplant
Yellow sweet potato	1.50	0.15		Single line	44,444		Direct sowing, slips
Zucchini	1.50	0.30		Single line	22,222	24,444	Direct sowing or transplant

Cambodia HARVEST

No. 46 Street 310 | Sangkat, Beong Keng Kang 1
Khan Chamkamorn | Phnom Penh, Cambodia
Tel: 855 (0) 23 996419

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