Annex 8. Other Materials

Annex 8.1. Technical Guides

Chili

Ver. November 2019

Purpose:

Stabilize the quality and quantity of chili by improving survival rate of transplanted seedling

Current issues:

- High rate of missing plant on the field
- Weaker growth at later stage of harvest
- Severe disease and insect damages

How to improve the missing plant rate

Missing plants

Transplant equal size seedlings

Transplant good seedling by improving nursery management

- ✓ Selection
- ✓ Appropriate condition for seedling growth

Soil Media for Nursery

1	:	1	:	1	:	1
Soil		Compost		Husk charcoal		Cocopeat

All components are mixed well and placed it on the tray

Seedling rearing

Germination and Pot up

1st selection
Choose only good shoots for pot up

Germination
5-7 days

Hold the leaf part

Traditiona
l practice

Transplant to the farm when plant is still young

Lower survival rate

Place soil in the pot first, then transplant the seedling about 5 mm deep in the soil

Pot up when shoot has 2 true leaves

Pot up
7-14 days after sowing

Tap the pot on the ground to settle the pot soil

Seedling rearing

2nd selection
Transplant only good seedlings on the farm

Watering and Sunlight

Shifting pots

Assure sunlight to avoid spindly growth by shifting the seedlings place on the nursery bed.

Pinch first flower and all side shoots before first flower!

+/- 30 cm

After pot up

Developing root

3-4 weeks after pot up

Water thoroughly until the water drain out from bottom of the pot

Too much water rather inhibit appropriate root growth

Rear seedling until about 10 true leaves and first flower blooms

Appropriate water and sunlight management are important for healthy seedling growth

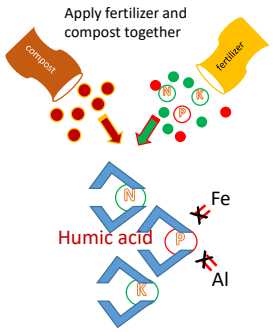
How to improve the efficiency of fertilizer

Symptom of fertilizer deficiency is observed during harvest period

Leaves are turning yellow and the yield may gets lowered form deficiency of appropriate nutrients

Efficient fertilization method

Why apply compost?



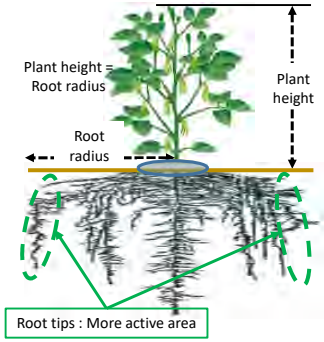
Compost is not fertilizer, but very important

- ✓maintain nutrients available when plants need
- ✓also maintain physical condition of soil such as drainage and aeration

- **Fertilizer should be available until later stage of harvest**
- **Compost is important to hold and store fertilizer in soil until harvest period**

Efficient fertilization

Why fertilizer should be broadcast?

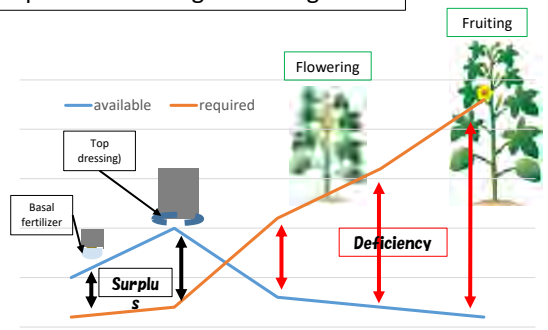


Fertilizer needs to be applied where root grows

- ✓Roots are growing toward outside as wide as the height of the plant
- ✓Root tip area where new roots are growing is more active to absolve nutrients

Efficient fertilization

Traditional fertilization practice compared with actual requirement over growth stage



Nutrient requirement increase during flowering and fruiting period

✓ Traditional application supply excess nutrients at initial stage when the plant requirement is still very low

✓ However, nutrients become deficient when plant need most

Efficient fertilization

Basal fertilizer application

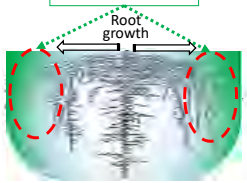
✓ Broadcast and mix with soil

Broadcast fertilizer on bed

Apply all basal fertilizer evenly

Mix the fertilizer evenly within the plowed layer

Top-dressing



Top dressing

✓ Apply fertilizer where root tip grows

Basal	N-P-K	kg/100m²
Compost	-	200
NPK	16-16-16	14
SP36	0-36-0	4
Dolomite (Mg)	-	10

Top dressing	N-P-K	kg/100m²
Urea	46-0-0	2.7
KCL	0-0-60	2.4

Transplanting

Improve rooting to promote better later growth

Soak seedlings in a water before transplanting to provide adequate water for rooting

Take out the seedling from pot without braking pot soil

Cover planting hole by soil so no crevice between mulch and soil surface.
Closed condition maintain soil more stable underneath mulch.

Appropriate preparation improve rooting for transplanting

Tomato (Rainy season)

Ver. November 2019

Purpose:
Stabilize tomato production during rainy season by using temporarily rain shelter.

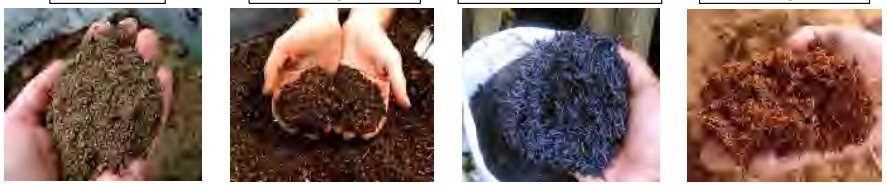
- Verify cost efficiency of temporary rain shelter for protection from rain damages
- Maintain healthy growth even under wet condition by transplanting good seedling and appropriate management.

Harvest under rainy season will be stabilized by:

- Use of temporary rain shelter
- Nursery and fertilization
- Thinning, pruning, and training

Soil Media for Nursery

1	:	1	:	1	:	1
Soil		Compost		Husk charcoal		Cocopeat



All components are mixed well and placed it on the tray

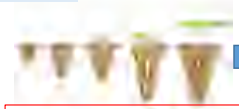
Seedling rearing

Germination and Pot up

1st selection
Choose only good shoots for pot up

Germination
5-7 days

Place soil in the pot first, then transplant the seedling about 5 mm deep in the soil



Hold the leaf part

Traditional practice

Transplant to the farm when plant is still young

Lower survival rate

Pot up when shoot has 2 true leaves

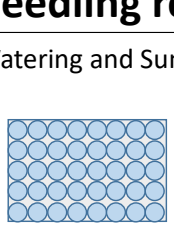
Tap the pot on the ground to settle the pot soil

Pot up
7-14 days after sowing

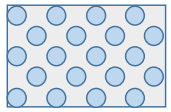
Seedling rearing

Watering and Sunlight

2nd selection
Transplant only good seedlings on the farm



Shifting pots



Assure sunlight to avoid spindly growth by shifting the seedlings place on the nursery bed.

After pot up

Water thoroughly until the water drain out from bottom of the pot

Developing root

Too much water rather inhibit appropriate root growth

+/- 30 cm

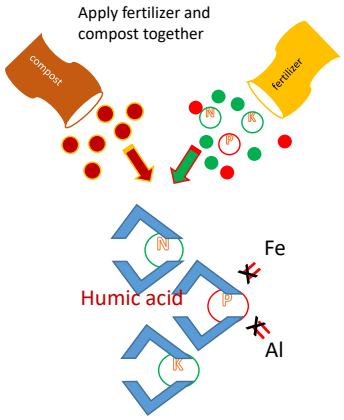
3-4 weeks after pot up

Rear seedling until about 10 true leaves and first flower blooms

Appropriate water and sunlight management are important for healthy seedling growth

Efficient fertilization method

Why apply compost?



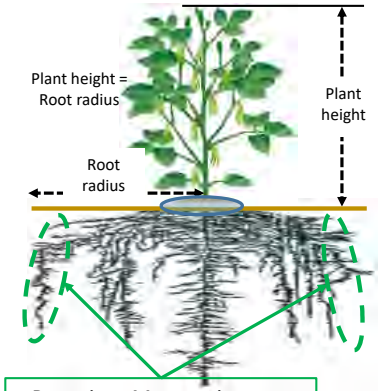
Compost is not fertilizer, but very important

- ✓maintain nutrients available when plants need
- ✓also maintain physical condition of soil such as drainage and aeration

- **Fertilizer should be available until later stage of harvest**
- **Compost is important to hold and store fertilizer in soil until harvest period**

Efficient fertilization

Why fertilizer should be broadcast evenly?



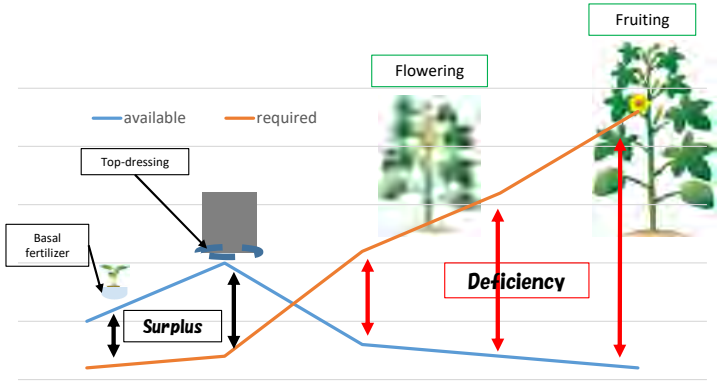
Root tips : More active area

Fertilizer needs to be applied where root grows

- ✓Roots are growing toward outside as wide as the height of the plant
- ✓Root tip area where new roots are growing is more active to absolve nutrients

Efficient fertilization

Traditional fertilization practice compared with actual requirement over growth stage



Nutrient requirement increase during flowering and fruiting period

- ✓ Traditional application supply excess nutrients at initial stage when the plant requirement is still very low
- ✓ However, nutrients become deficient when plant need most

Efficient fertilization

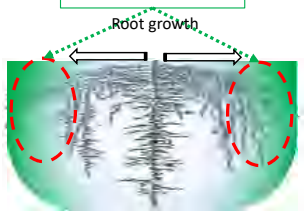
Basal fertilizer application
✓ Broadcast and mix with soil

Broadcast fertilizer on bed

Apply all basal fertilizer evenly

Mix the fertilizer evenly within the plowed layer

Top-dressing



Top dressing
✓ Apply fertilizer where root tip grows

Basal	N-P-K	kg/100㎡
Compost	-	200
NPK	16-16-16	14
SP36	0-36-0	4
Dolomite (Mg)	-	10

Top dressing	N-P-K	kg/100㎡
Urea	46-0-0	2.7
KCL (MOP)	0-0-60	2.4

Transplanting

Improve rooting to promote better later growth

Soak seedlings in a water before transplanting to provide adequate water for rooting

Take out the seedling from pot without braking pot soil

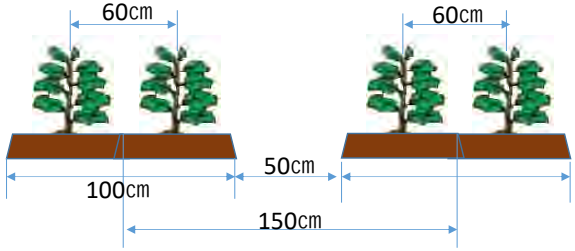
Cover planting hole by soil so no crevice between mulch and soil surface.
Closed condition maintain soil more stable underneath mulch.

Appropriate preparation improve rooting for transplanting

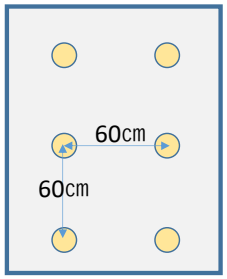
Transplant spacing (local tomato)

About 200 plants / 100 ㎡ will be transplanted by this spacing

Bed width	100 cm
Alley width	50 cm
Row to row	60 cm
Bed to bed	150 cm



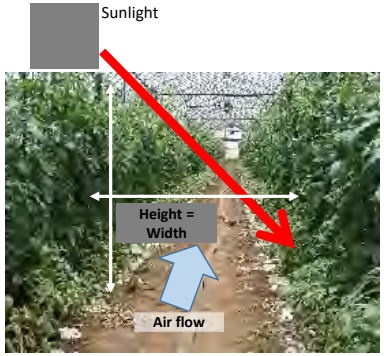
2 row / bed planting space
Plant to plant 60 cm
Row to row 60cm



Training, Pruning and Thinning

Benefits of appropriate training, pruning and thinning

- Improve utilization of space
- Improve efficiency of husband
- Improve environmental condition against disease infection
- Stabilize of quality and quantity of fruits



- ➢Appropriately trained plants can bare fruits on wider area as surface
- ➢Appropriate space between plants improve efficiency for husbandry work
- ➢Adequate aeration maintain appropriate temperature and humidity for healthy growth
- ➢Plants can catch sunlight more efficiently

Training

Appropriate training provide better growing environment for stable production

- ✓ Many shoots are gathered up to 1 line.
- ✓ Overclouded condition lower the efficiency of sunlight and aeration to induce diseases, insect damages and physiological disorder.

Symptom of streak rot
Caused by insufficient sunlight.

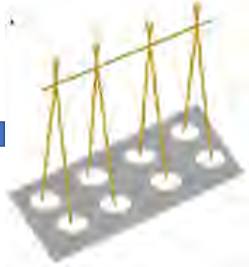
- ✓ Each shoots are allocated to maintain necessary space
- ✓ All leaves as well as fruits can receive appropriate sunlight
- ✓ Allocate shoots and leaves evenly so other side can be see through
- ✓ Thick stem is not appropriate. Thin stem can hold many fruits

Training

Examples of training structure to maintain appropriate growth condition

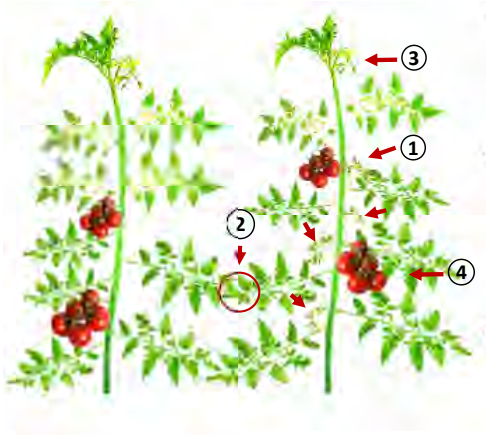
Recommended

+ This shape may be able to maintain more weight.
+ It makes good aeration and sunlight penetration.
− It requires more stakes.



+ It is not easily blown by the wind.
+ It does not requires many stakes.
− Plants will be too dense and it causes bad aeration and sunlight penetration.

Pruning and Thinning



① Side shoots pruning
- Reduce overcrowded shoots.
- Shift nutrients for new shoots growth for more flowering.

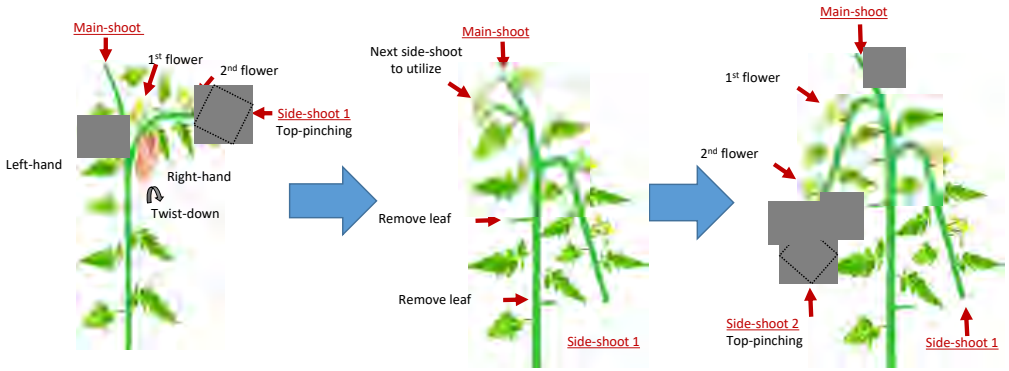
② Thinning leaves
- Improve aeration for better environment (pest control).
- Improve sunlight efficiency for better photosynthesis.

③ Top-pinching
- Induce secondary shoot growth.
- Shift vegetative growth to reproductive growth.

④ Fruit thinning (for modern market specification 8-11 fruits/kg):

Thinning out fruits when there are more than appropriate number of fruit appears
- Keep 6 – 8 fruits for 1 cluster.
- Thin out small and deformed fruits.

Side-shoots Utilization (Optional)



The advantage of using this method:
- Managing the height of fruits for easy handling
- Utilizing the space of plants in order to improve better environment
- Possible to generate more clusters.

Temporary Rain Shelter

Momotaro Tomato

Ver. November 2019

Purpose:
Enlarge the fruit size of tomato to 180 – 220g

- Maintain healthy growth of plant for stable production and large size of fruit.
- Transplant good seedling to improve survival rate of plant until end of season.

Fruit size will be enlarged by :

- Appropriate fertilization
- Better nursery management
- Training, Pruning, and Thinning

Soil Media for Nursery

1	:	1	:	1	:	1
Soil		Compost		Husk charcoal		Cocopeat





All components are mixed well and placed it on the tray

Seedling rearing

Germination and Pot up

1st selection
Choose only good shoots for pot up

Germination
5-7 days



Hold the leaf part

Place soil in the pot first, then transplant the seedling about 5 mm deep in the soil

Traditional practice

Transplant to the farm when plant is still young

Lower survival rate



Tap the pot on the ground to settle the pot soil

Pot up when shoot has 2 true leaves

Pot up
7-14 days after sowing

Seedling rearing

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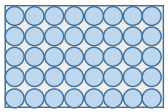
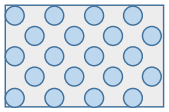
Watering and Sunlight

Shifting pots

Assure sunlight to avoid spindly growth by shifting the seedlings place on the nursery bed.



+/- 30 cm

After pot up

Developing root

3-4 weeks after pot up

Water thoroughly until the water drain out from bottom of the pot

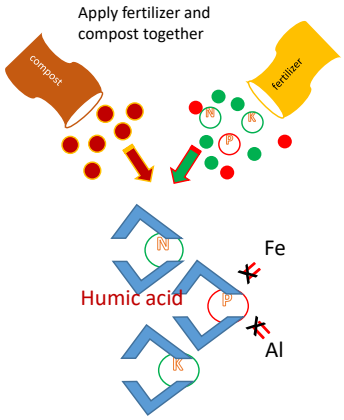
Too much water rather inhibit appropriate root growth

Rear seedling until about 10 true leaves and first flower blooms

Appropriate water and sunlight management are important for healthy seedling growth

Efficient fertilization method

Why apply compost?



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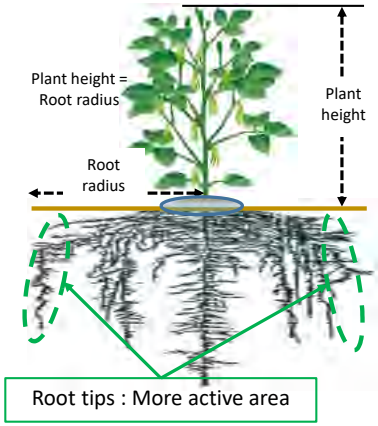
Efficient fertilization

Why fertilizer should be broadcast evenly?



Fertilizer needs to be applied where root grows

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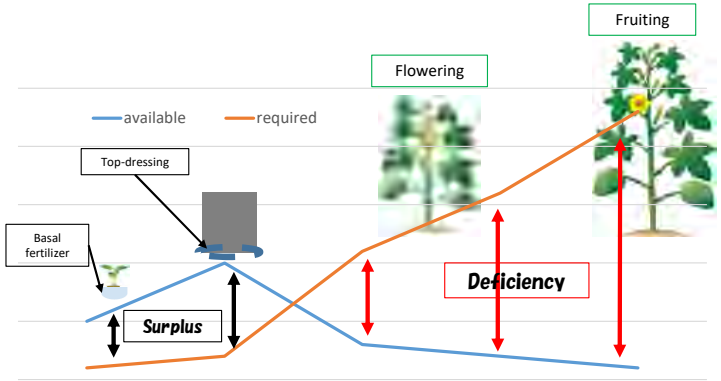
Efficient fertilization

Traditional fertilization practice compared with actual requirement over growth stage



Nutrient requirement increase during flowering and fruiting period

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Efficient fertilization

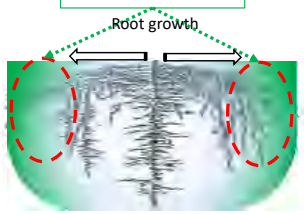
Basal fertilizer application
✓ Broadcast and mix with soil


Broadcast fertilizer on bed


Apply all basal fertilizer evenly


Mix the fertilizer evenly within the plowed layer

Top-dressing



Top dressing
✓ Apply fertilizer where root tip grows

Basal	N-P-K	kg/100㎡
Compost	-	200
NPK	16-16-16	14
SP36	0-36-0	4
Dolomite (Mg)	-	10

Top dressing	N-P-K	kg/100㎡
Urea	46-0-0	2.7
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Transplanting

Improve rooting to promote better later growth

Soak seedlings in a water before transplanting to provide adequate water for rooting

Take out the seedling from pot without braking pot soil

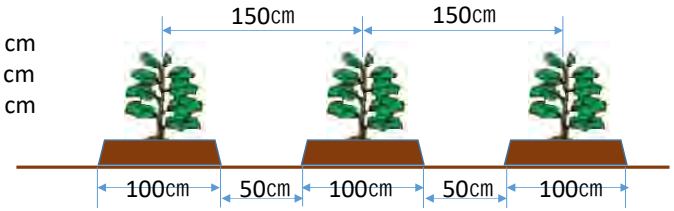
Cover planting hole by soil so no crevice between mulch and soil surface.
Closed condition maintain soil more stable underneath mulch.

Appropriate preparation improve rooting for transplanting

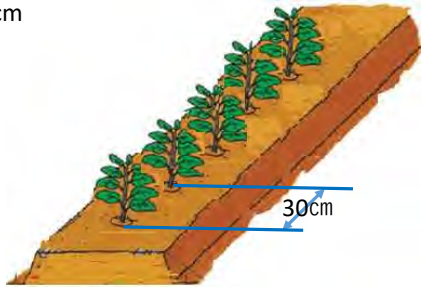
Transplant spacing (large tomato)

About 200 plants / 100 ㎡ will be transplanted by this spacing

Bed width 100 cm
Alley width 50 cm
Row to row 150 cm



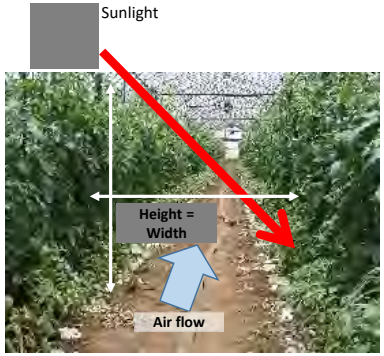
Plant to plant 30 cm



Training, Pruning and Thinning

Benefits of appropriate training, pruning and thinning

- Improve utilization of space
- Improve efficiency of husbandry
- Improve environmental condition against disease infection
- Stabilize of quality and quantity of fruits



- ➢Appropriately trained plants can bare fruits on wider area as surface
- ➢Appropriate space between plants improve efficiency for husbandry work
- ➢Adequate aeration maintain appropriate temperature and humidity for healthy growth
- ➢Plants can catch sunlight more efficiently

Training

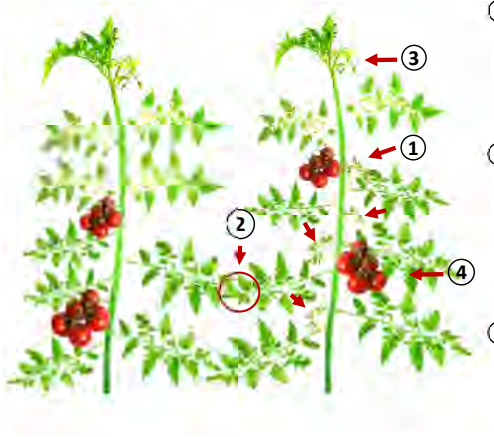
Appropriate training provide better growing environment for stable production

- ✓ Many shoots are gathered up to 1 line.
- ✓ Overclouded condition lower the efficiency of sunlight and aeration to induce diseases, insect damages and physiological disorder.

Symptom of streak rot
Caused by insufficient sunlight.

- ✓ Each shoots are allocated to maintain necessary space
- ✓ All leaves as well as fruits can receive appropriate sunlight
- ✓ Allocate shoots and leaves evenly so other side can be see through
- ✓ Thick stem is not appropriate. Thin stem can hold many fruits

Pruning and Thinning



① Side shoots pruning
- Reduce overcrowded shoots.
- Shift nutrients for new shoots growth for more flowering.

② Thinning leaves
- Improve aeration for better environment (pest control).
- Improve sunlight efficiency for better photosynthesis.

③ Top-pinching
- Induce secondary shoot growth.
- Shift vegetative growth to reproductive growth.

④ Fruit thinning for beef tomato:

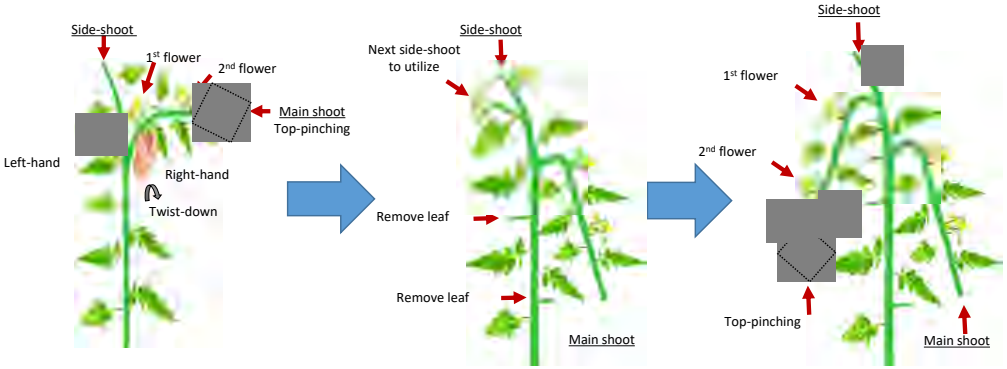
Thinning out fruits when there are more than appropriate number of fruit appears

1^{st} – 2^{nd} cluster = 3 fruits

After 3^{rd} cluster = 4 - 5 fruits

◆Thin out small and deformed fruits.

Side-shoots Utilization (Optional)



The advantage of using this method:
- Managing the height of fruits for easy handling
- Utilizing the space of plants in order to improve better environment
- Possible to generate more clusters.

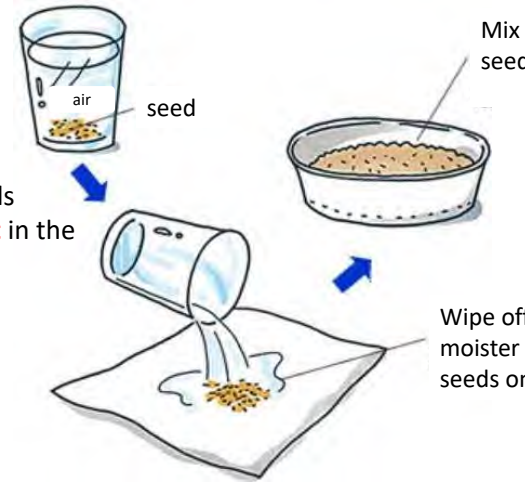
Carrot

Ver. November 2019

Seed Preparation

➢ **Improve seed condition by soaking the carrot seed in the water for more stable germination.**

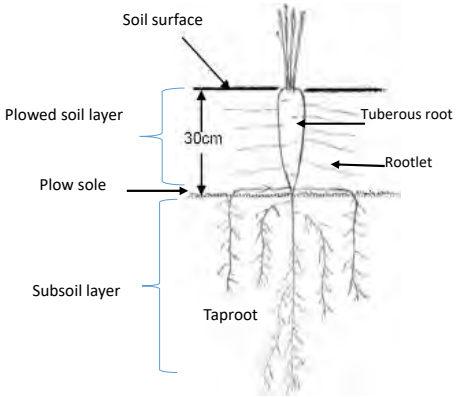
☐ Change water during soaking.



Land Preparation

- Make a higher bed for rainy season planting
- Make a lower bed for dry season

Plow up to 30 cm in order to ensure the good tuber growth.



- ➢ Tuberous root and rootlet will grow in plowed soil layer
- ➢ Taproot will grow more than 1m into subsoil layer
- ➢ Cultivate at least 30cm to provide healthy growth of tuberous root and rootlet
- ➢ Avoid the field with gravels.
- ➢ Before cultivating soil better to use Nematicide such as a Marshal.

Herbicide for Carrot

◆ Weeding is one of the highest cost in carrot cultivation. In order to save the labor cost, the usage of pesticide can be an option:

Systemic, post-emergence herbicide:
Kill the whole plant over a short period. Conducted throughout the plant in its vascular system.

- Brand: Roundup
- Active Ingredient: **Glifosat**

Pre-emergent herbicides:
Work as preventive because it interferes with weed seed germination

- Brand: Goal
- Active Ingredient: **Oksifluorfen**

Selective herbicides:
Kill only certain target plants. This one targets wide leaves.

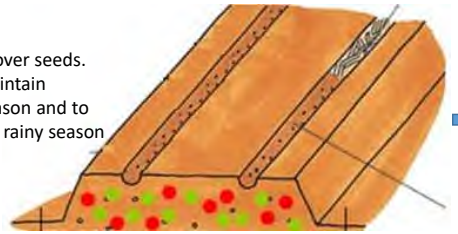
- Brand: Zincor
- Active Ingredient: **Metribuzin**

✻ See the instruction on the product of how and when to apply it properly

Fertilization and Sowing

Soil should be well irrigated 1 day before sowing (water is the key for carrot germination).

Cover 5-6mm soil over seeds. Pack the soil to maintain moisture in dry season and to avoid get ruined in rainy season



Seed can be sown in a row instead of spot

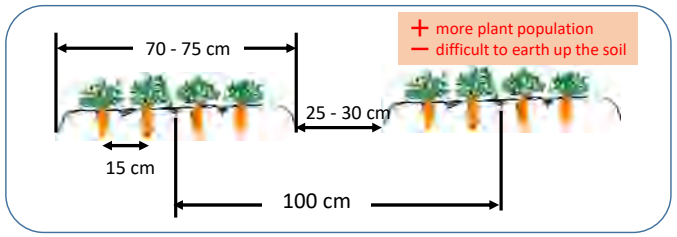
✓ Broadcast and mix fertilizer evenly in the soil
✓ Use an appropriate herbicide if necessary

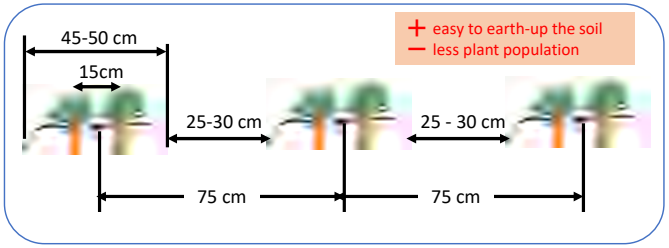
◆ Compost must be applied ideally 1 month before sowing.

	N-P-K	kg/100㎡
Fertilizer	16-16-16	10
Compost	-	200
Dolomite	-	10

Alternative plant spacing (4 rows / bed)

50% more plant can be sown 4 rows / bed compared to 2 rows / bed





# of plants per 100㎡ for 4 row / bed sowing

Planting Space	# of plants
3cm	≒ 12000
5cm	≒ 8000
10cm	≒ 4000

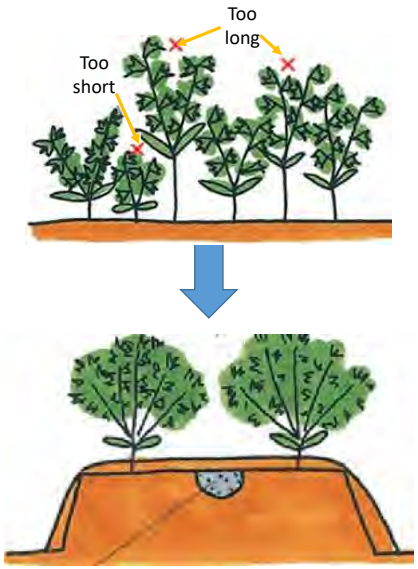
# of plants per 100㎡ for 2 row / bed sowing

Planting Space	# of plants
3cm	≒ 8800
5cm	≒ 5300
10cm	≒ 2600

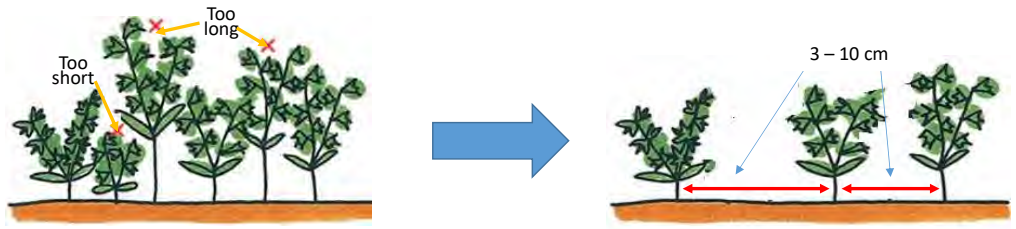
Thinning

◆ 1st thinning
At 2-3 true leaves
Thin out plants with too long and too short growth.

◆ 2nd thinning
At 5-6 true leaves
Make the plant space even at around 3-10 cm (depends on market demand).
When do thinning keep the plant in uniform size.



Thinning to secure optimal yield



◆Thin out to 1 plant for a space
Make sure to thin out to 1 plant at a place. 2 or more plants within a space interfere each other to inhibit growth of carrot to appropriate size.

- EXPECTED YIELD FOR EACH PLANT SPACING (100㎡)

Plant spacing	Plants / 100㎡	Harvest rate (60%)	Ave wt. / carrot	possible harvest wt. / 100㎡	marketable yield / 100㎡ (60%)
3 cm	8800	5300	100 g	530 kg	320 kg
5 cm	5300	3200	170 g	550 kg	330 kg
10 cm	2500	1600	300 g	480 kg	300 kg

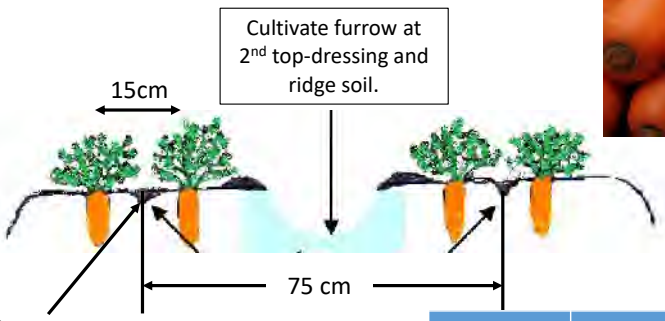
There will be more than enough number of plants after thinning even only 60% is marketable. So, it is important to thin out to appropriate space to ensure optimal size for each demand

Row to Row Interval

Top-dressing

- 1st top-dressing for vegetative growth
- 2nd top-dressing for fruit growth

Top-dressing
- Good tuber growth
- Good internal color of carrot



Earthing up regularly following the growth.

1st top-dressing
✓ Cut small furrow to apply fertilizer, then cover the soil.

	N-P-K	kg/100㎡
Fertilizer	16-16-16	3

✓ Apply above quantity at each top-dressing.

Planting Space

1 2

The image of carrot plant condition

1) Plant spacing of carrot plants.
2) Growth condition of carrot leaves at later stage.

Beans

Ver. April 2019

Purpose of Test Growing :

- Extending the harvesting period of bean
- Increasing amount of Grade A beans

The target is expected to be achieved by :

- Management of Seedling
- Designing of Fertilizing
- Applying net
- Pruning & Thinning

IJHOP4 2018-2020 JICA

Soil Media for Nursery

1	:	1	:	1	:	1
Soil		Compost		Husk Charcoal		Cocopeat




All components are mixed well and placed it in the pots

Seedling Nursery

Sowing Radicula-side down

Pesticide application before transplant

Sowing 3 seeds on 9cm pot

Transplant seedlings to the field after 20 days

Germination

Thinning
Leaving 2 plants on the pot when foliate primary leaf occurs

Fertilization Application

Mix the soil with fertilizer well so that the concentration of fertilizer is equal until 30 cm depth of soil.

BASIC FERTILIZER

Compost	200kg / 100 ㎡
NPK	8kg / 100 ㎡
SP36	2kg / 100 ㎡
Dolomite	10kg/ 100 ㎡

2ND FERTILIZING (when flowering)

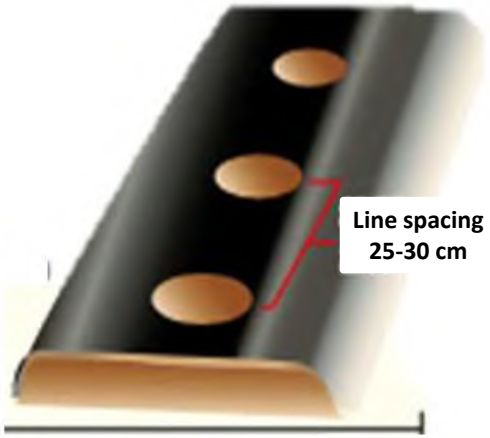
Urea	0.5kg/ 100 ㎡

3RD FERTILIZING 3 (start of harvesting)

Urea	0.5kg / 100 ㎡

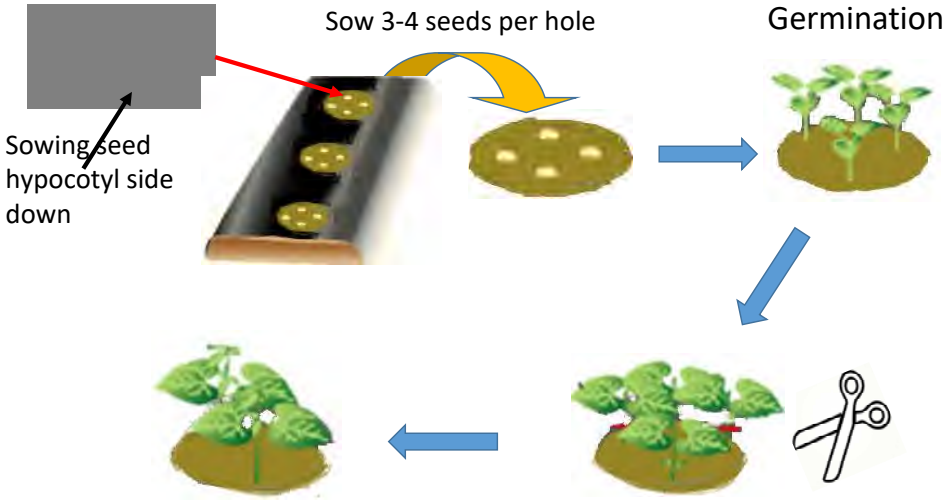
Transplanting

Short bean variety



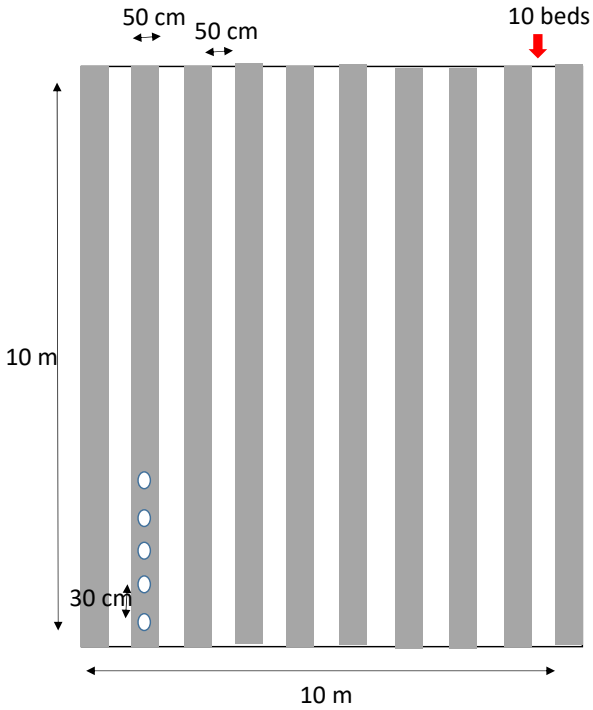
Width of bed 50-60cm

Direct sowing method



Grow 2 good seedlings in a hole

Select 2 good seedlings and thin out when 2 true leaves are appeared



Line spacing of Bean

Information

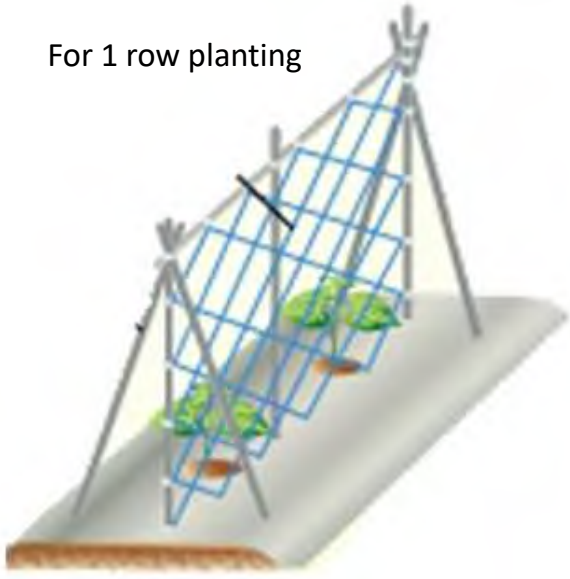
- Field size: 10 m x 10 m = 100 m2
- Widht of bed: 50 cm
- widht of road: 50 cm
- line spacing of plant: 30 cm

- Total bed: 1000cm/100cm= 10
- Total plant per bed:
  1000cm/60cm = 33 plants

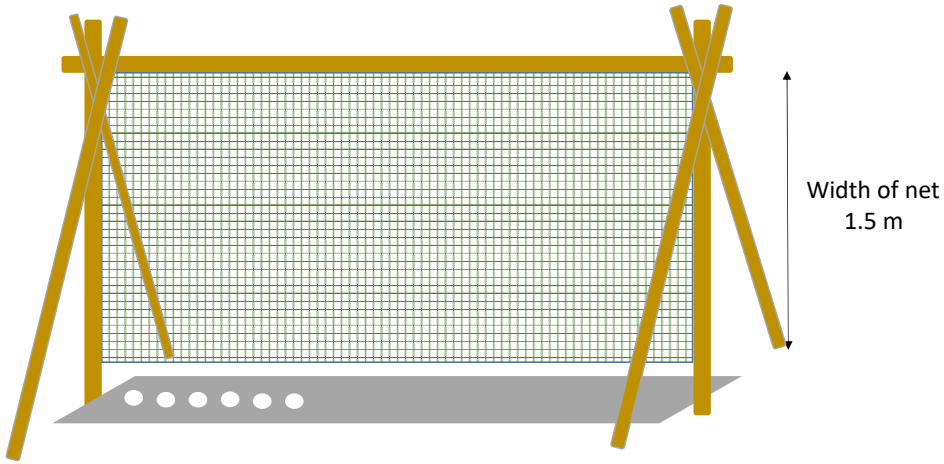
- Total plant per 100 m2:
  10 beds x 33 = **330 plants**

Install Net & Pole (for long type of bean variety)

For 1 row planting



Installment of Bean Net

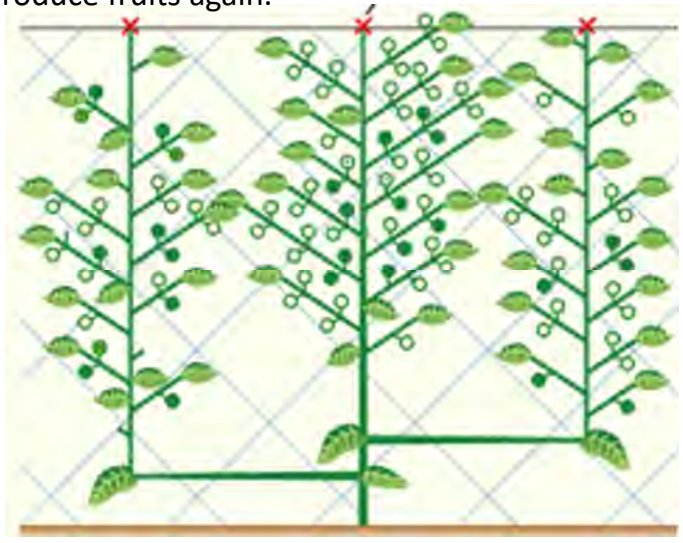


Correct

Incorrect

Pruning for long vine variety

Pruning center core of vine to stop growth when 3 vines reach the above of nets of 1 plant. Then new sprouts will appear from side of vine and produce fruits again.



Broccoli

Ver. November 2019

Purpose:

- Stabilize broccoli production during rainy season by using temporarily rain shelter
- Produce broccoli within specification adjusted to different purpose of market: for retailer or processing

Nursery Preparation

- Sowing interval 2-3cm
- Softly press sown seed before covering the soil

Preparation of pot soil

- Mix 3L compost with 10L soil

	N-P-K	g/10L soil
Fertilizer	16-16-16	5
Compost	-	3 L
Dolomite	-	10-12

Soil Media For Nursery

1	:	1	:	1	:	1
Soil		Compost		Husk charcoal		Cocopeat



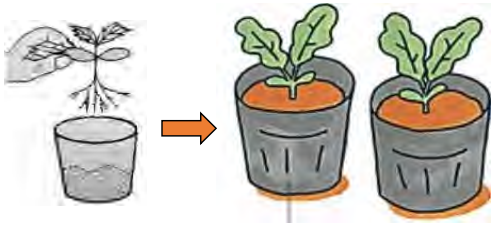


All components are mixed well and placed it on the tray

Pot-up

Transplant into pot

When 2-3 true leaves are occurred (max. 14 days from sowing)



7 cm pot

Application of liquid fertilizer

Apply fertilizer (16-16-16) at 500 times dilution (2g of fertilizer in 1L of water)

✓ Apply 7-10 days interval as watering the seedlings

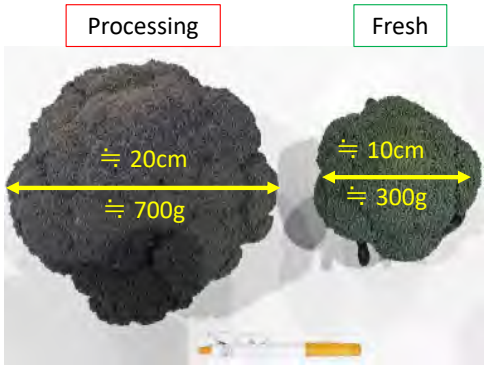
Pot soil

Prepare pot soil at the same time as the preparation of soil media

The seedlings will be ready to transplant around 20 days after pot-up

Fruit size for processing demand

Processors preferer large size product for efficient work at their factory



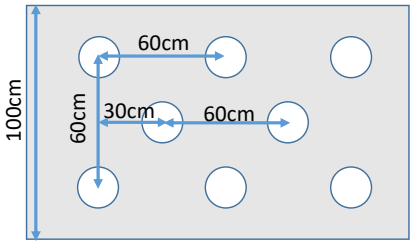
Different planting space is required for cultivation of large size fruit

- Varieties may be different between processing and fresh
- No secondary fruit will be harvested from processing variety
- Cultivation period for processing variety will be longer than fresh variety

Transplanting Space

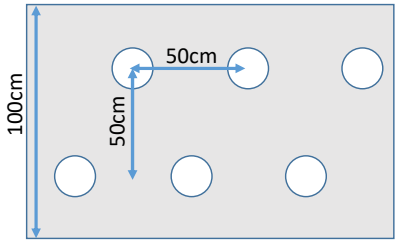
Fresh demand Small
3- 4 fruits / kg

330 plant/100㎡

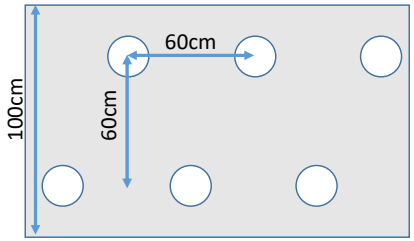


Fresh demand Large
2-3 fruits / kg

280 plant/100㎡

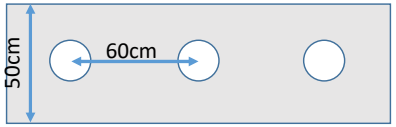


Processing demand 1
700g / fruit

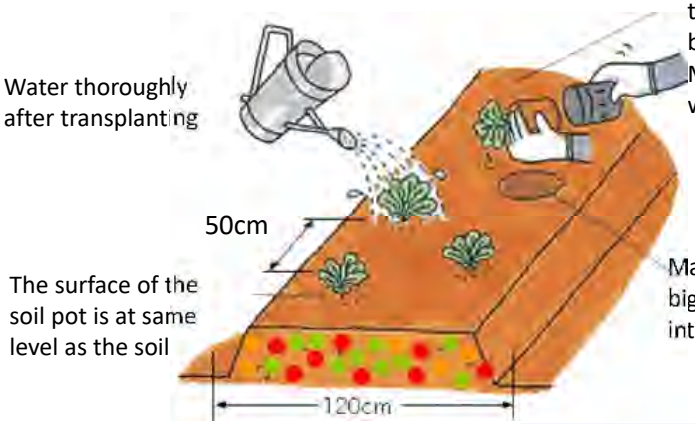


Processing demand 2
700g / fruit

230 plant/100㎡



Transplanting



- Dip seedling pot thoroughly into water before transplanting. Maintain pot soil intact with roots in the pot
- Make transplanting hole big enough to place the intact roots.

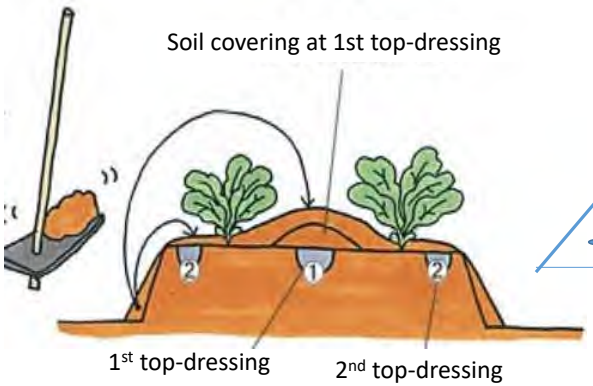
1. Broadcast and mix fertilizer evenly in the soil
2. Transplant at the equal interval

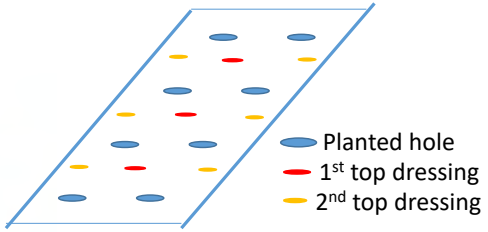
	N-P-K	Kg / 100㎡
Fertilizer	16-16-16	15
Compost	-	200
Dolomite	-	10

Top-dressing

Cultivate furrow and ridge after 2nd top-dressing

	N-P-K	Kg / 100㎡
Fertilizer (Urea)	46-0-0	0.4





1. Make a hole over mulching sheet
2. Place fertilizer in the hole
3. Earth up soil to cover the hole

Planting Broccoli in Rainy Season

- Using temporary rain shelter

Cabbage

Ver. November 2019

IJHOP4 2016-2020 JICA

Purpose:

- Stabilize cabbage production during rainy season by introducing the proper field management method
- Continuously harvest cabbages according to the shipping schedule for the markets

Nursery Preparation

- Sowing interval 2-3cm
- Softly press sown seed before covering the soil

Soil Media For Nursery

1 Soil : 1 Compost : 1 Husk charcoal : 1 Cocopeat

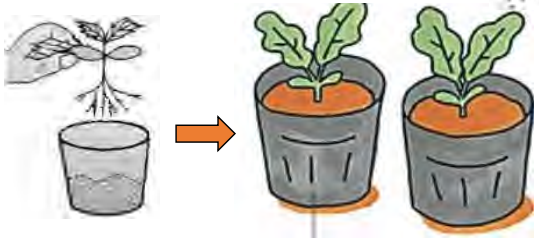




All components are mixed well and placed it on the tray

Pot-up

Transplant into pot
When 2-3 true leaves are occurred (max. 14 days from sowing)



7 cm pot

Application of liquid fertilizer
Apply fertilizer (16-16-16) at 500 times dilution (2g of fertilizer in 1L of water)

✓ Apply 7-10 days interval as watering the seedlings

Pot soil
Prepare pot soil at the same time as the preparation of soil media

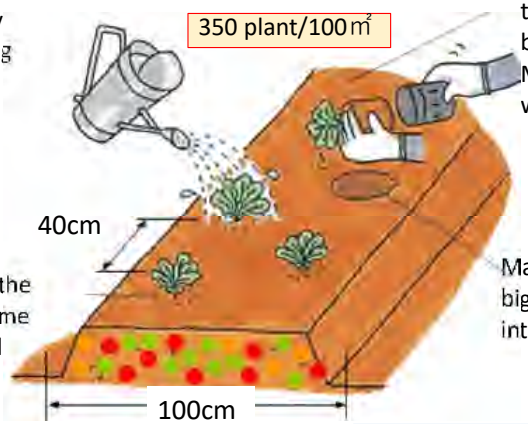
The seedlings will be ready to transplant around 20 days after pot-up when 5~6 true leaves appear

Transplanting

Water thoroughly after transplanting

350 plant/100㎡

- Dip seedling pot thoroughly into water before transplanting. Maintain pot soil intact with roots in the pot



The surface of the soil pot is at same level as the soil

Make transplanting hole big enough to place the intact roots.

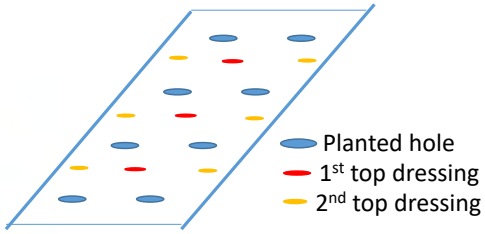
1. Broadcast and mix fertilizer evenly in the soil
2. Transplant at the equal interval

	N-P-K	Kg / 100㎡
Fertilizer	16-16-16	15
Compost	-	200
Dolomite	-	10

Top-dressing

Cultivate furrow and ridge after 2nd top-dressing

	N-P-K	Kg / 100m²
Fertilizer (Urea)	46-0-0	0.4



1. Make a hole over mulching sheet
2. Place fertilizer in the hole
3. Earth up soil to cover the hole

Head Lettuce

Ver. November 2019

Purpose:

- Stabilize head lettuce production during rainy season by using temporarily rain shelter and introducing the proper field management method
- Continuously harvest head lettuce according to the shipping schedule for the markets

Nursery Preparation

- Sowing in the cell tray: 1 seed 1 cell.
- Softly press sown seed before covering the soil

The seedlings will be ready to transplant around 20 days after pot-up when 2~3 true leaves appear

Soil Media For Nursery

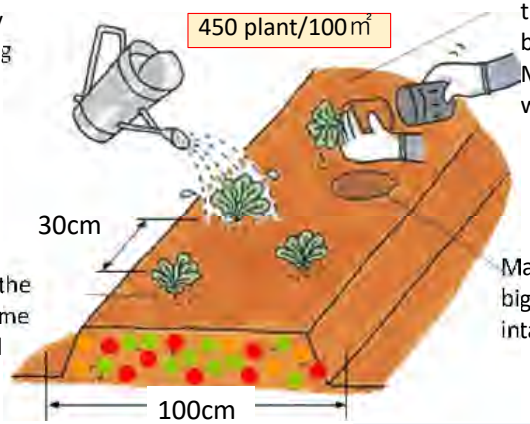
1 Soil	:	1 Compost	:	1 Husk charcoal	:	1 Cocopeat




All components are mixed well and placed it on the tray

Transplanting

Water thoroughly after transplanting



- Dip seedling pot thoroughly into water before transplanting. Maintain pot soil intact with roots in the pot

The surface of the soil pot is at same level as the soil

Make transplanting hole big enough to place the intact roots.

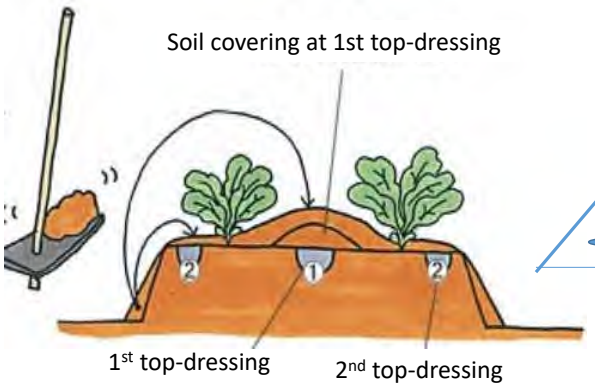
1. Broadcast and mix fertilizer evenly in the soil
2. Transplant at the equal interval

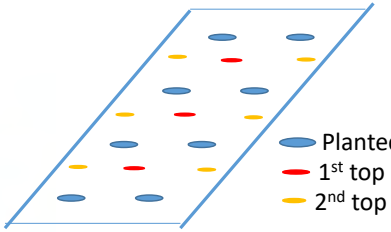
	N-P-K	Kg / 100㎡
Fertilizer	16-16-16	15
Compost	-	200
Dolomite	-	10

Top-dressing

Cultivate furrow and ridge after 2nd top-dressing

	N-P-K	Kg / 100㎡
Fertilizer (Urea)	46-0-0	0.4





1. Make a hole over mulching sheet
2. Place fertilizer in the hole
3. Earth up soil to cover the hole

Planting Head Lettuce in Rainy Season

- Using temporary rain shelter

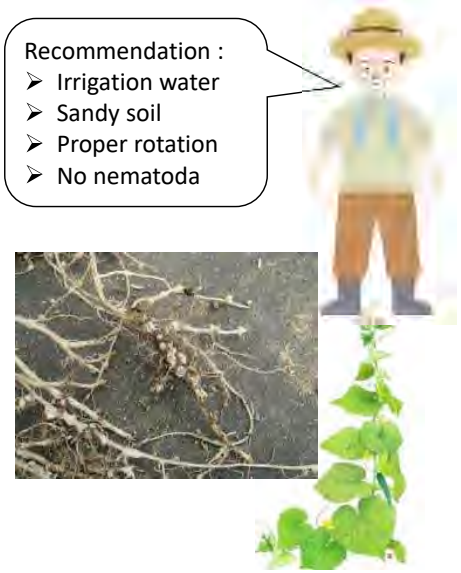
✻ this is the illustration of temporary rain shelter from broccoli planting

Kyuri

Ver. April 2018

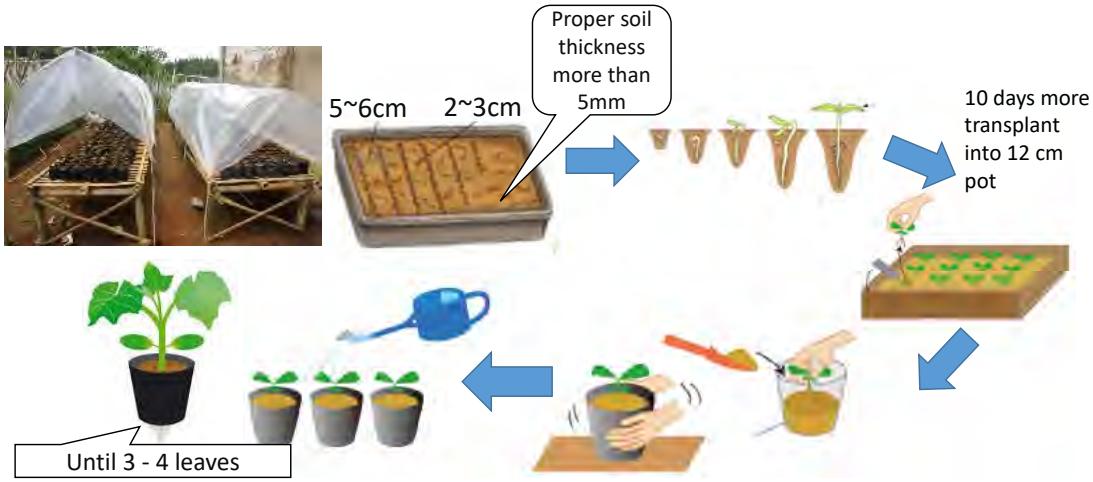
Kyuri's characteristics

- Optimal temperature for growth 23℃~28℃
- Water requirement is high (irrigate as soil is not get dried during dry season)
- Proper soil pH 5.5 ~7.2
- Appropriate rotation is recommended (kyuri is more susceptible to replant failure)



Nursery

- Prepare appropriate soil media for germination and pot
- Install proper nursery bed (apart from ground soil with rain cover)
- Seedling should rare up to 3 - 4 true leaves (young seedling is recommended)
- Secure sunlight to avoid spindly growth of seedling



Fertilization

Basal fertilizer	
Compost	300 kg / 100 ㎡
NPK 16-16-16	13 kg / 100 ㎡
Dolomite	10 kg / 100 ㎡

- ½ of total requirement is applied by basal fertilizer
- Basal fertilizer must broadcast and mix with soil (do not concentrate near transplanted seedling)
- Rest of ½ is applied by top dressing

Total application of N-P-K by elements

N	5.0kg / 100㎡
P_2O_5	3.5kg / 100㎡
K_2O	4.5kg / 100㎡

Transplanting

Good seedling

- No pests and diseases
- Good root growth inside pot
- White Roots grow out from bottom of pot

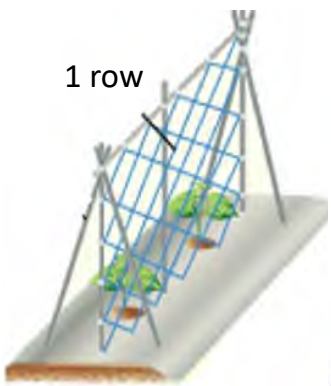
- Green and thick leave, stiff stem with short nodes Good cotyledon on seedling

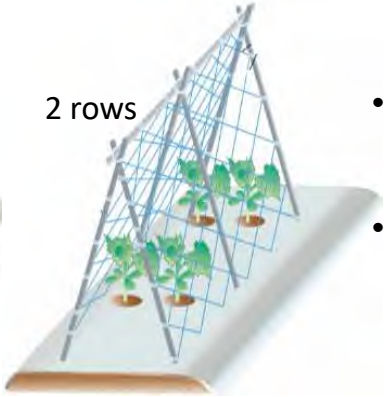
Bad seedling

- Infected from pests and diseases
- Pale and thin leave
- Wilted cotyledon
- Wilting leaves

- Irrigate well the bed soil before transplanting
- Select only good seedlings at equal condition for transplanting in order to maintain stable growth

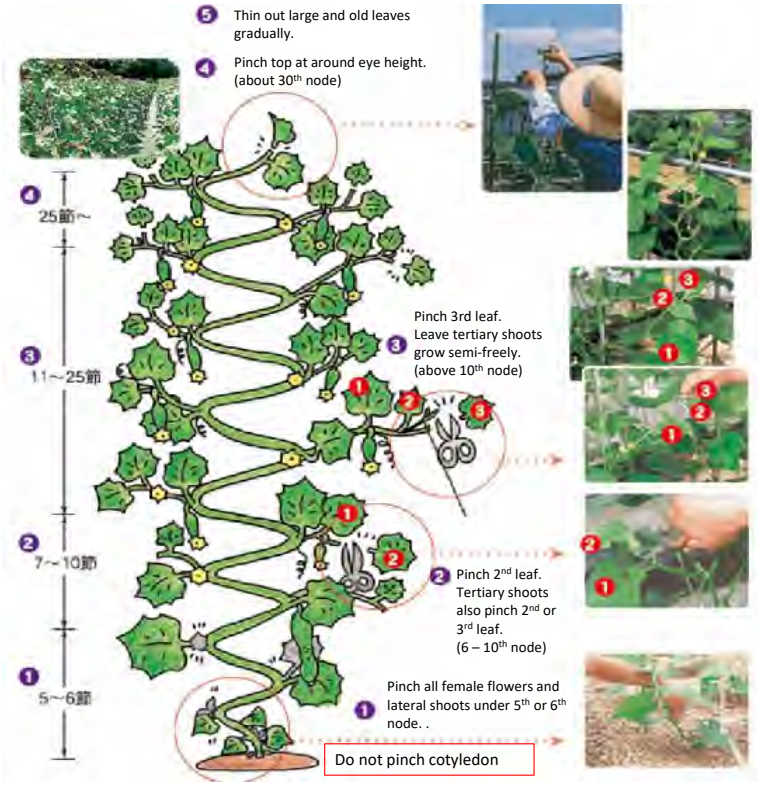
Preparation of bed





- Seedlings can be transplanted easer 1 or 2 rows on a bed
- Bed should be prepared at appropriate spacing (80cm apart)
- Appropriate aisle space ensure better sunlight for plant and also improve work efficiency for maintenance

Bed width100 - 120 ㎝, aisle 80 cm



Top-dressing and irrigation

- Apply first top-dressing soon after start of first harvesting.
- Apply 2kg of NPK (16-16-16) for 100 ㎡ for every 7 - 10 days.
- Water requirement of kyuri is relatively high, so irrigate well to maintain plant vigor; however, do not over moist to avoid root rot damage.
- Maintain vigor of plant to avoid curly and irregular shape fruits.

Harvest

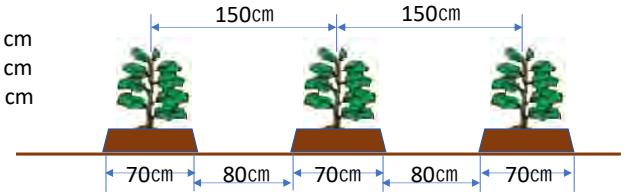
- Harvest fruits within 20cm of size
- Kyuri fruit can grow very fast, so it may exceed right size within 1 day. Harvest twice a day is recommended
- Cold storage is recommended for maintaining freshness

Planting Guide
Nasu (Japanese Eggplant)

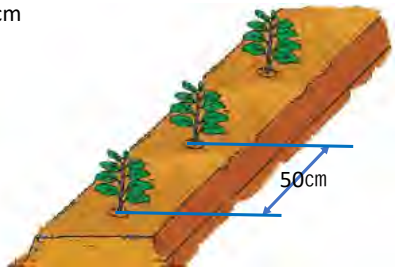
Transplant spacing

About 130 plants / 100 ㎡ will be transplanted by this spacing

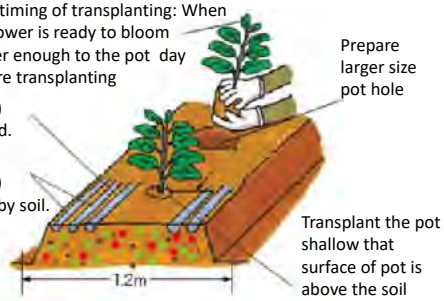
Bed width	70 cm
Alley width	80 cm
Row to row	150 cm



Plant to plant 50 cm



Preparation & Transplanting



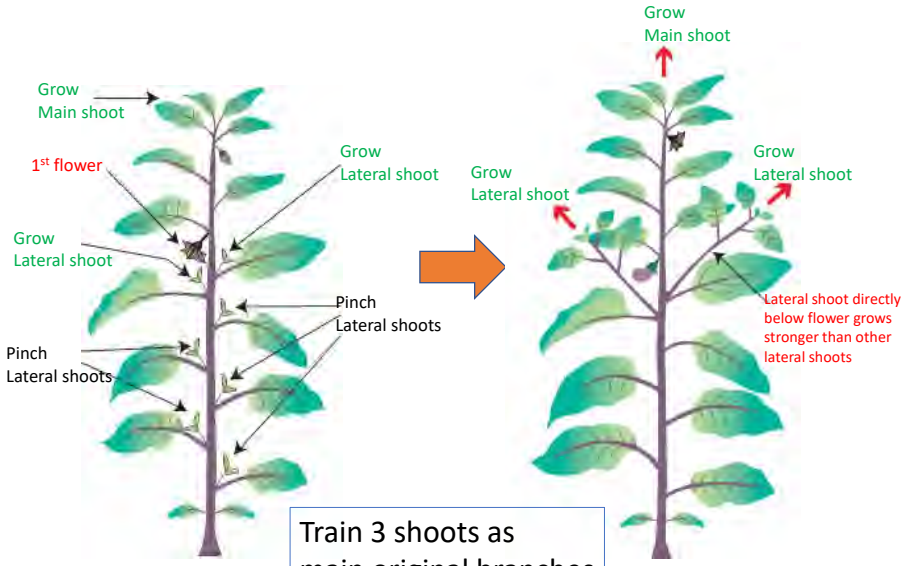
1st top dressing
・Apply compound fertilizer (8-8-8)
40 – 50g / ㎡ 7 -10 days after rooted.

2nd top dressing
・Apply compound fertilizer (8-8-8)
apart from seedling and covered it by soil.

Preparation
① pH adjustment
- Compost 3 – 4 kg / ㎡
- Dolomite 120g / ㎡

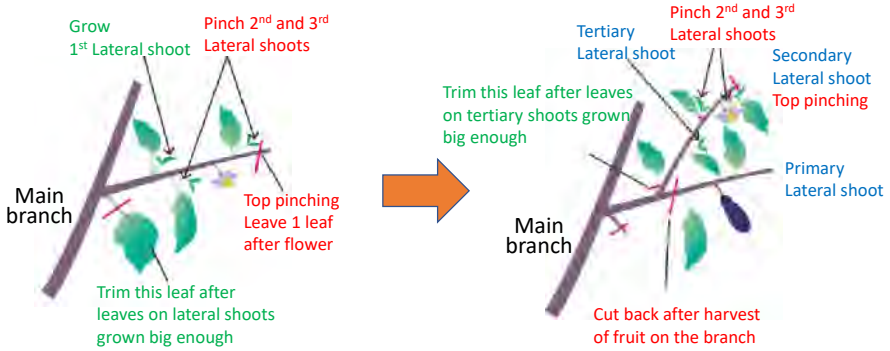
② Basal fertilizer
- Compound fertilizer (N-P-K 8=-8-8) 150 – 180 g / ㎡

Training method (Nasu 3 main branches)



Train 3 shoots as
main original branches

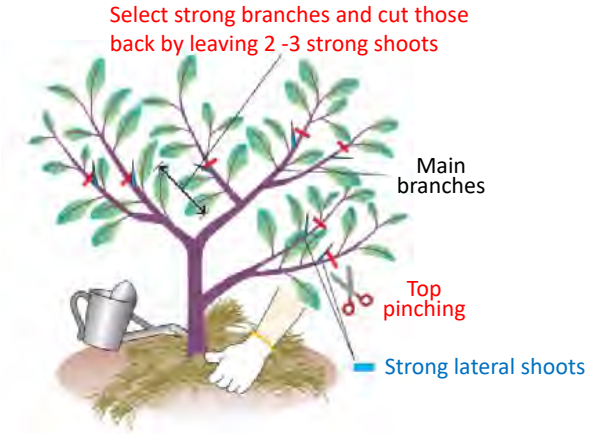
Training method for shoots growing from main branches (priority in maintaining fruit quality)



Bear 1 fruit on each lateral shoot, and pinch top leaving 1 leaf after flower.

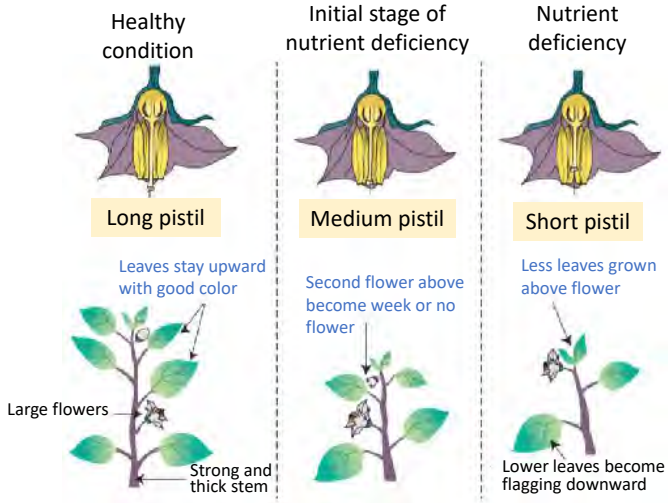
Repeat top pinching, harvest and cut back for each first lateral shoot on fruiting branches.

Method of regaining vigor



Cut back the plant to regain vigor when the quality and yield of fruits become low

How to evaluate the vigor of plant



Stigma higher than stamen in the flower is indication of good vigor

Flowers become to have short pistil when losing vigor by low nutrient, low sun light, or high temperature.
Application of fast acting fertilizer will be effective.

Piman
(Japanese Paprika)

Ver. November 2019

Purpose:
Introduce a proper cultivation technique for new Japanese variety vegetable “Piman” in order to produce high yield and improve quality

Cultivation introduced:

- Appropriate fertilization
- Proper nursery and transplanting management
- Proper training and pinching method
- How to maintain the healthy growth of plants

Efficient fertilization

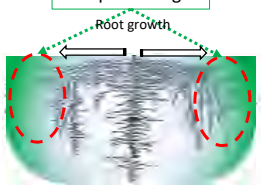
Basal fertilizer application
✓ Broadcast and mix with soil

Broadcast fertilizer on bed

Apply all basal fertilizer evenly

Mix the fertilizer evenly within the plowed layer

Top-dressing



Top dressing
✓ Apply fertilizer where root tip grows

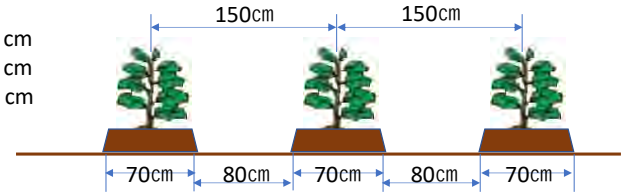
Basal	N-P-K	kg/100㎡
Compost	-	200
NPK	16-16-16	12
SP36	0-36-0	3
Dolomite (Mg)	-	10

Top dressing	N-P-K	kg/100㎡
Urea	46-0-0	4.8 (0.8kg*6 times)
KCL	0-0-60	3.6 (0.6kg*6 times)

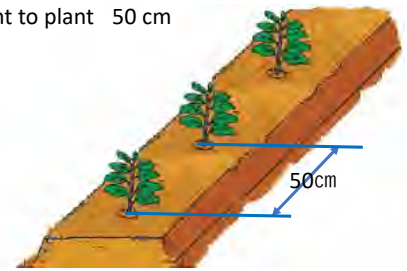
Plant spacing

About 130 plants / 100 ㎡ will be transplanted by this spacing

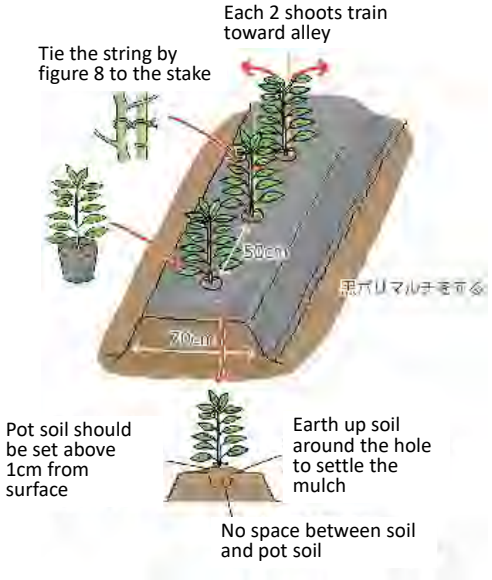
Bed width 70 cm
Alley width 80 cm
Row to row 150 cm



Plant to plant 50 cm

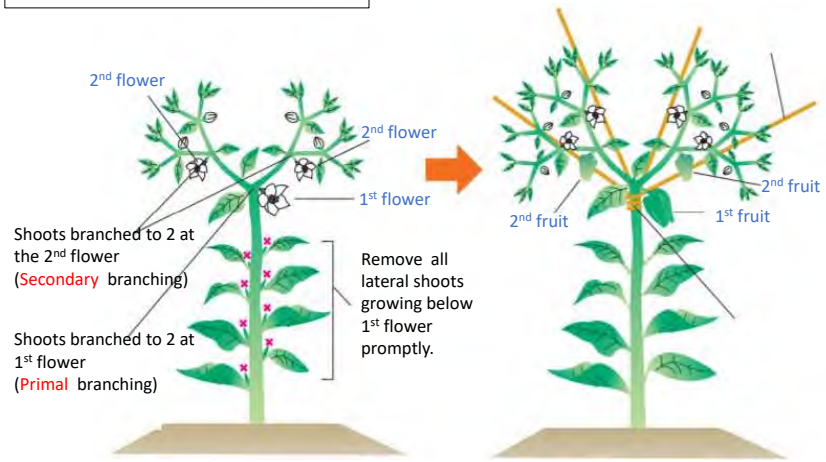


How to Transplant Piman Seedlings



Training Method

➢ Utilize 4 main branches

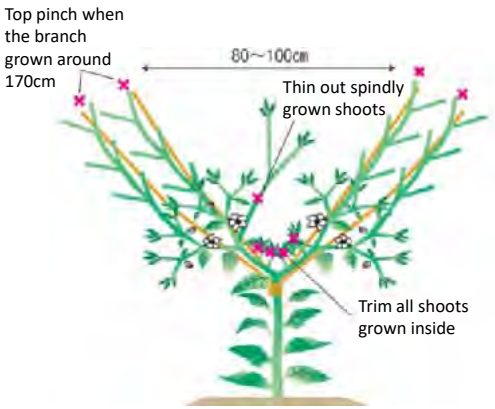


Non productive shoots such as no flower or spindly grown should be thinned out promptly.

Train 4 main branches outward, and maintain canopy

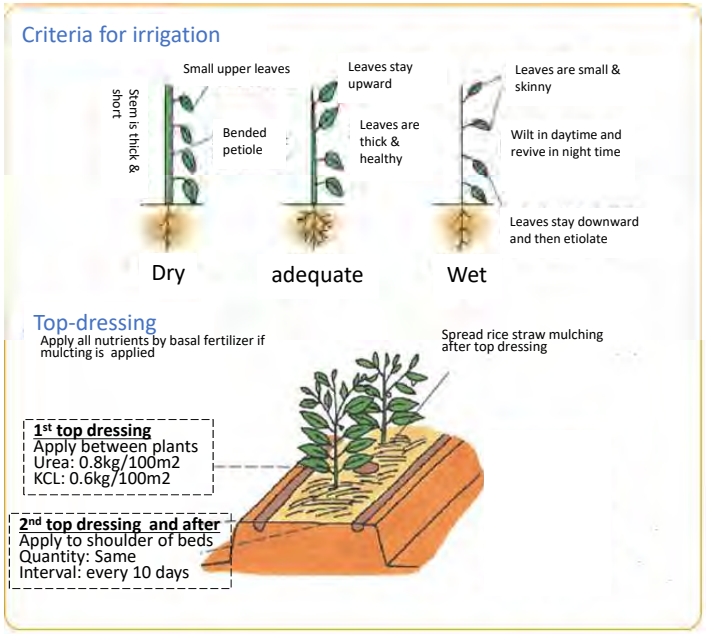
Training Method

➢ priority in maintaining fruit quality



Maintain first 4 branches as main branch.
Let grow about 3 nodes for each branch and top pinch. Cut back to 1st node after harvest.

Irrigation and Top-dressing



The types of plant condition

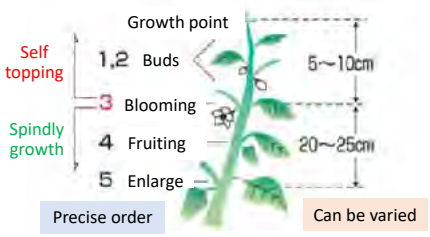
			
Utilize the strong shoot directly underneath the 1st flower	Typical condition after initial training. Trim lower leaves under harvested fruits after harvest.	Too many lateral shoots growth on the plant is causing week growth of shoots.	Excess thinning of lateral shoots, which will induce sun-burned fruits

How to identify the vigor of plant

Condition around growth point

Loosing vigor
Bloom close to growth point
(above 3 in the picture)

Spindly growth
Bloom long below from growth point
(below 3 in the picture)



Condition of pistil

Short pistil

Inefficient pollination
Immediate top dressing
is recommended

Medium pistil

Losing vigor
Fast acting top dressing
is recommended

Long pistil

Appropriate condition
Try to maintain the flowers in this appearance

Kabocha

Ver. February 2020

Purpose:
To introduce proper cultivation techniques for producing high yield and quality Kabocha.

Cultivation introduced:

- Appropriate fertilization
- Proper nursery and transplanting management
- Proper training, pinching, and pollination method
- How to properly maintain the healthy growth of plants up to harvest

Soil Preparation for Nursery

1	:	1	:	1	:	1
Soil		Compost		Husk Charcoal		Cocopeat




All components are mixed well and placed it in the pots

Nursery Management

Sow 3-4 seeds. The depth of seeding shall be 1cm.

Germination
3-4 days

1st selection
Choose only good shoots for pot up

Hold the leaf part

Pot up when shoot has 1-2 true leaves

Assure sunlight to avoid spindly growth by shifting the seedlings place on the nursery bed.

When 4-5 true leaves come, transplant t o the field. (around 30 days after sowing)

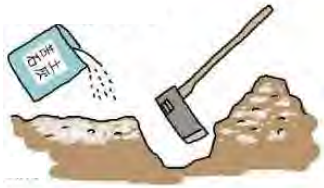
2nd selection
Transplant only good seedlings on the farm

Appropriate water and sunlight management are important for healthy seedling growth

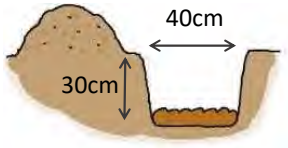
Land Preparation

Optimal Soil pH: 6.0~6.6
Continuous cultivation: Possible

2 weeks before planting

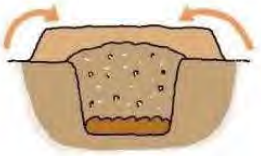


Apply Dolomite (100g/m^2) and cultivate well.



Dig a hole and apply 1kg/hole of compost.

Mix 25g of NPK fertilizer (16:16:16) with the soil.



Put the soil back into the hole and make the bed.

Cover with a plastic much.

Plant the seedling shallowly and water the plant.

Transplanting

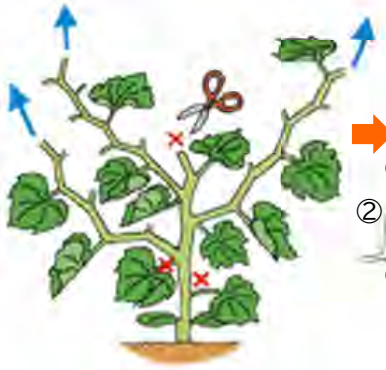
The space between the plants shall be 70-100cm for a cultivation on the ground, and 50-60 cm for a vertical cultivation.

Transplant the seedlings shallowly.

After transplanting, pinch the main vine, keep two secondary vines.

Plant Management

1. Pinch the main vine after the 4-5 true leaves come out.
2. Grow 3-4 secondary vines and bear two Kabocha on each secondary vine.



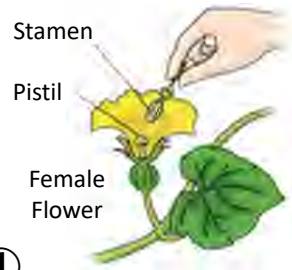
20-25
Leave the leaves and small vines, and then pinch at the around 25th of code.

16-20
Bear the second fruit of Kabocha by artificial pollination. Leave the leaves and small vines.

10-15
Bear the first fruit of Kabocha by artificial pollination. Leave the leaves and small vines .

1-9
Prune the female flowers and their small vines. Leave only male flowers and their small vines.

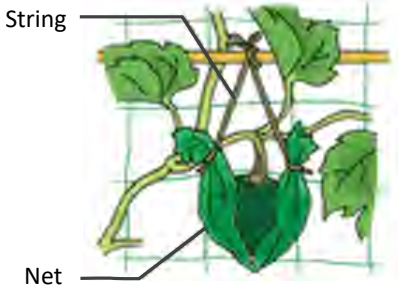
Plant Management



Stamen

①

②



③

1. Artificial Pollination
During female flowers blooming, take stamen from male flowers, and put on pistils of the female flowers.

2. Pinching the Small Vaine
Pinch the small vine near the Kabocha fruit.

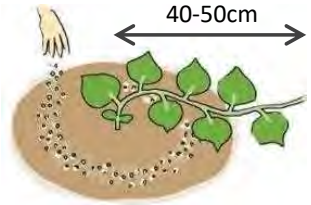
3. Hanging the Kabocha
Hang the Kabocha by a net or string.

Fertilization Application

Preferable soil pH for kabocha is 6.0-6.5.

pH Control
Apply Dolomite (100g/m²), and cultivate the soil two weeks before transplanting.

Basal Dressing
Dig a hole and apply 2kg of compost and mix 25g/m² of fertilizer (16:16:16) with the soil, a week before transplanting.



1st Top Dressing*
When the vines grow 40-50cm long, 10g/m² of NPK fertilizer (16:16:16) could be applied around the plants.

2nd Top Dressing*
When a diameter of the Kabocha fruit is around 5cm, 10g/m² of fertilizer (16:16:16) could be applied around the plants.

***Top dressing is not always required.**
If the plant is healthy enough, do not apply fertilizers.

Harvesting

Around 40 to 50 days after pollination, the kabocha will be ready for harvest.

It is a time for harvest, when the core of the Kabocha becomes dried and blown.

Not matured yet.

Matured enough.

Disease Control

Powdery Mildew (Fungi)

Occurrence condition	Dry condition
Transmission	Fungi spread by Wind
Immediate measure	Trim the infected leaves before spreading by wind
Physical prevention	Watering, thinning, moderating the amount of nitrogen
Preventive Chemical	(M5) Daconil / (M4) Ingrofol / (M1) Funguran
Curative Chemical	(3) Score / (M3) Antracol / (1) Topsin

Mosaic Disease (Virus)

Occurrence condition	Dry condition
Transmission	Virus spread by aphids and using scissors.
Immediate measure	Remove the plants and cultivate the place deeply.
Physical prevention	Use silver mulch, screen net to avoid pests
Preventive Chemical	Not effective
Curative Chemical	For insects: (1B) Kanon / (3A) Decis / (4A) Avidor / (6) Agrimec

Disease Control

Phytophthora (Fungi)

Occurrence condition	Wet condition
Transmission	From the soil splash by rain.
Immediate measure	Trim the infected leaves and fruits.
Physical prevention	Make the bed high bed and mulch it.
Preventive Chemical	(-) Bordeaux mixture / (M4) Ingrofol / (M5) Daconil / (M1) Funguran
Curative Chemical	(11) Equation / (27) Curzate / (M3, 43) Trivia / (M5,40) Revus / (M3) Dithane

Downy mildew (Fungi)

Occurrence condition	Continuous rain, Excess/deficiency of nitrogen, High plant density
Transmission	Spores spread by wind.
Immediate measure	Remove plants or leaves affected carefully
Physical prevention	Mulch the bed and set rain shed.
Preventive Chemical	(-) Bordeaux mixture / (M4) Ingrofol / (M5) Daconil
Curative Chemical	(M3, 43) Trivia / (49) Zorvec / (M3,4) Ridomil

Insect and Pest Control

Cucurbit leaf beetle

Physical prevention	Use silver mulch or silver tape to avoid insects. Use the screen sheet to protect the seedlings.
Preventive and Curative Chemical	(1A) Furadan, Marshal, Tamafur , Amabas / (1B) Curacron, Kanon, Matador, Dursban, (3A) Matador

Spodoptera litura (Cutworm, Cotton leaf worm)

Occurrence condition	The caterpillar stays at the bottom of the plant or in the soil around the plant, and become active in night.
Immediate measure	Remove caterillars in the soil around the plant or remove the eggs or larvae on the backside of the leaves.
Physical prevention	Set a screen or net to avoid moths.
Preventive and Curative Chemical	(1B) Kanon, Curacron / (3A) Alika, Decis, / (4A) Besvidor /(6) Agrimec / (13) Rampage / (15) Match

Insect and Pest Control

Life miner

Immediate measure	Remove the insects with the leaf.
Physical prevention	Set yellow tape, or yellow board to avoid the pest.
Preventive and Curative Chemical	(5) Endure 120SC, Integrete 40WG / (6) Abenz 22EC, Proclaim 5SG, Siklon 57WG/ (1A) Lanate / (2B) Regent, (6) Agrimec / Demolish / (13) Rampage /(28) Prevathon

Melon

Ver. February 2020

Purpose:
To introduce proper cultivation techniques for producing high yield and quality of melons.

Cultivation introduced:

- Appropriate fertilization
- Proper nursery and transplanting management
- Proper training, pinching, and pollination method
- How to properly maintain the healthy growth of plants up to harvest

Soil Preparation for Nursery

1	:	1	:	1	:	1
Soil		Compost		Husk Charcoal		Cocopeat




All components are mixed well and placed it in the pots

Nursery Management

Soak the seeds in water overnight.

Sow 3-4 seeds. The depth of seeding shall be 1cm.

Germination starts 3-4 day after sowing.

When 1-2 true leaves come, thin and keep 2 plants.

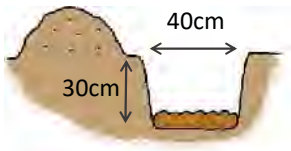
When 2-3 true leaves come, thin and select the best plant.

When 4-5 true leaves come, transplant to the field.

Land Preparation

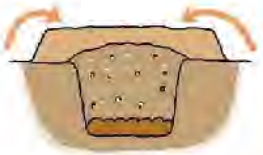
2 weeks before planting

Apply Dolomite (100g/m2) and cultivate.



Dig a hole and apply 2kg/hole of compost.

Mix 25g/hole of NPK fertilizer (16:16:16) with the soil.



Put the soil back into the hole and make the bed.

Cover with a plastic much.

Plant the seedling shallowly and water the plant.

Transplanting

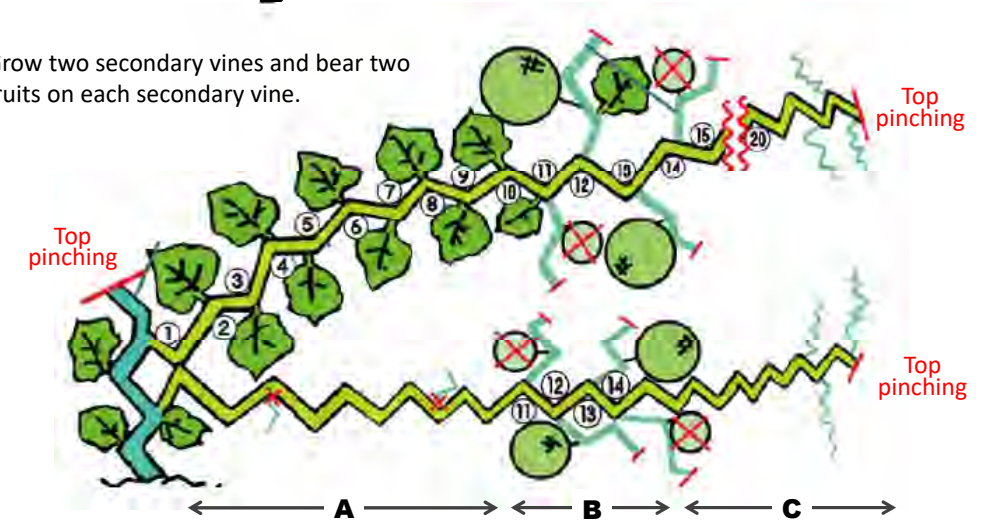
The space between the plants shall be 70-100cm for a cultivation on the ground, and 50-60 cm for a vertical cultivation.

Transplant the seedlings shallowly.

After transplanting, pinch the main vine, keep two secondary vines.

Plant Management

Grow two secondary vines and bear two fruits on each secondary vine.



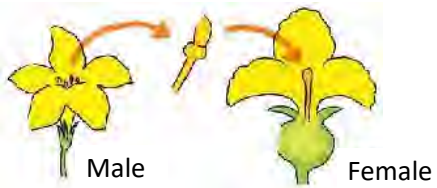
A. 1-10
Remove all small vines soon after they come out. Keep only the leaves.

B. 11-15
Bear the fruits and select two fruits for growing. Then pinch the vine with the fruit.

C. 16-25
Keep the small vines and pinch the secondary vines at around 25th node.

Pollination and Fruit Thinning

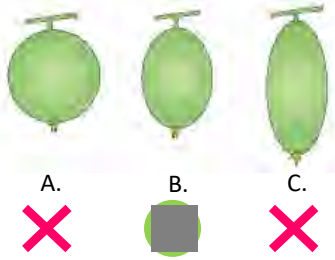
1. Artificial Pollination



1. Artificial Pollination
Druing flowering time, take a make stamen and put on the female stamen.

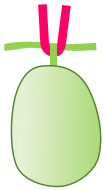
2. Fruits Thining
Select two fruits per vine one week after pollination. An oval fruit shall be selected.

2. Fruits Thinning



A. The fruit will be small and not be a round shape.
B. The fruit will be a round shape and sweet.
C. The fruit will be large, but the Brix dgree will be low.

3. Hanging



Hang the fruit by a string soon after thinning

Fertilization Application

Preferable soil PH for melon is 6.5-7.0.

Melon does not require much nitrogen.

Top dressing is not always required. If the plant is healthy enough, do not apply fertilizers.

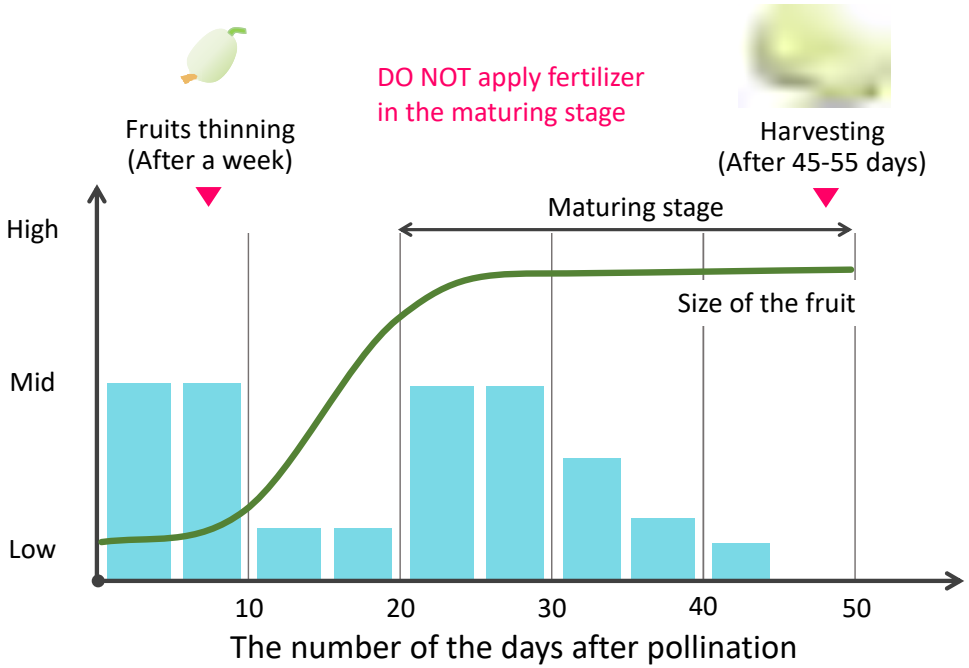
Two weeks before transplanting
Apply Dolomite (100g/m2) and cultivate.

Just before transplanting
Dig a hole and apply 2kg of compost.
Mix 15g of NPK fertilizer (16:16:16) with the soil.

10 days after pollination
10g/hole of NPK fertilizer (16:16:16) could be applied around the plants.

20 days after pollination
STOP applying any fertilizer. Otherwise the Brix level of the fruit will not increase.

Water Requirement of Melon



Harvesting

The harvest time could be judged by observing the leaf near the fruit.

The leaf near the fruit withers because of magnesium deficiency.

Around 45 to 55 days after pollination, the melon will be ready for harvest.

Pest and Disease Control

Pest Control

Aphids
It appears on the new buds and stems. Apply pesticides, when you observed.
Spider mites
It appears on the back side of the leaves and bit them. Apply pesticides, when you observed.

Disease Control

Fusarium wilt
It is caused by *Fusarium oxysporum*. The disease can not control by fungicide. The infected plant should be removed immediately. The fungi will remain in the soil for around 5 years. Cucurbits plants (Cucumber, Kabocha, Melon, Watermelon etc.) and Convolvulus plants (Sweet potato, Kankung etc.) should not be planted at the place.
Downy mildew
It is caused by *Pseudoperonospora cubensis*. Yellow spots will be observed ath the beggninng stage. Apply Daconil (Chlorothalonil), Ingrofol (Captan), Dithane-M45, Curzate (Mancozeb) or other fungicides to the plants.
Powdery mildew
It is caused by *Sphaerotheca fuliginea*. The white powder will be observed on the young leaves and stems. Apply Daconil (Chlorothalonil) or other fungicide to the plant.

Fusarium wilt

Downy mildew

Pest and Disease Control

The plants which are good as a companion plant with melon

Spring Onion	Avoid the insects
Shallot, Garlic	Control the diseases, such as fusarium wilt.
Corn	Promote the growth each other
Turnip	Promote the growth each other
Parsley*	Control the moisture contents
Chervil(French parsley)	Avoid insects
Marygold	Control the soil borne disease

* Parsley can be planted for living mulching.

The plants which are not suitable as a companion plant with melon

Carrot**	Increase the soil borne disease
Broccoli**	Increase the soil borne disease
Cucurbits	Increase the soil borne disease

** Carrot and Broccoli should not be planted after melon.

Watermelon

Ver. February 2020

Purpose:
To introduce proper cultivation techniques for producing high yield and quality watermelon.

Cultivation introduced:

- Appropriate fertilization
- Proper nursery and transplanting management
- Proper training, pinching, and pollination method
- How to properly maintain the healthy growth of plants up to harvest

Soil Preparation for Nursery

1	:	1	:	1	:	1
Soil		Compost		Husk Charcoal		Cocopeat




All components are mixed well and placed it in the pots

Nursery Management

Sow 3-4 seeds. The depth of seeding shall be 1cm.

Germination
3-4 days

1st selection
Choose only good shoots for pot up

Hold the leaf part

Pot up when shoot has 1-2 true leaves

Assure sunlight to avoid spindly growth by shifting the seedlings place on the nursery bed.

When 4-5 true leaves come, transplant t o the field. (around 30 days after sowing)

2nd selection
Transplant only good seedlings on the farm

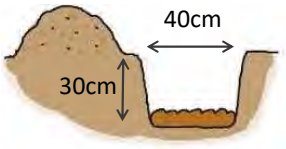
Appropriate water and sunlight management are important for healthy seedling growth

Land Preparation

Optimal Soil pH: 6.0~6.6
Continuous cultivation: Possible

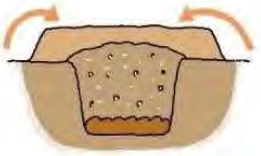
2 weeks before planting

Apply Dolomite (100g/m2) and cultivate well.



Dig a hole and apply 2kg/hole of compost.

Mix 25g of NPK fertilizer (16:16:16) with the soil.



Put the soil back into the hole and make the bed.

Cover with a plastic much.

Plant the seedling shallowly and water the plant.

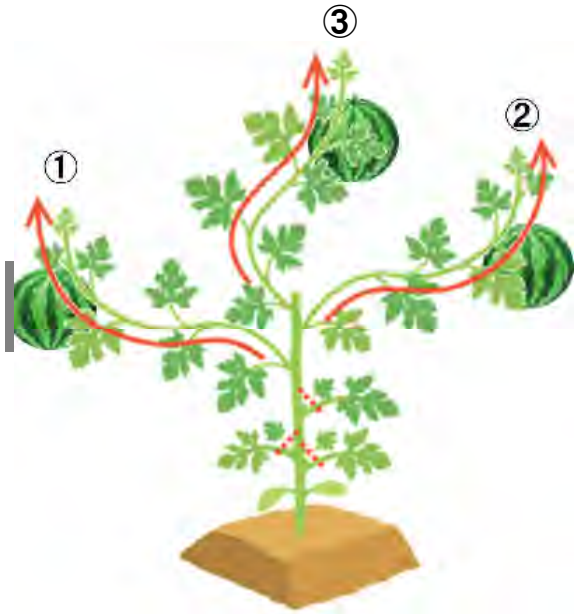
Transplanting

The space between the plants shall be 150-200cm for a cultivation on the ground, and 80-100 cm for a vertical cultivation.

Transplant the seedlings shallowly.

After transplanting, pinch the main vine, leave 3-4 secondary vines.

Plant Management

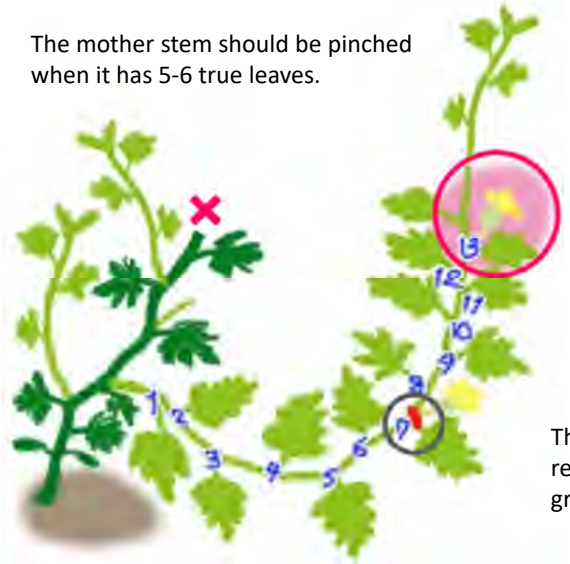


Select 3-4 secondary vines to grow. Each vine will bear one fruit on it.

Pinch the main stem, when it had 4-5 true leaves.

Plant Management

The mother stem should be pinched when it has 5-6 true leaves.



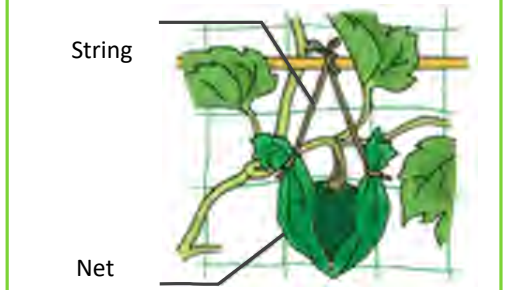
All small vines after the second female flower should be retained.

The second or third female flower should be pollinated and grown.

The first female flower should be removed, since the fruit will not grow large.

All small vines before the second female flower should be removed.

Plant Management



Artificial Pollination

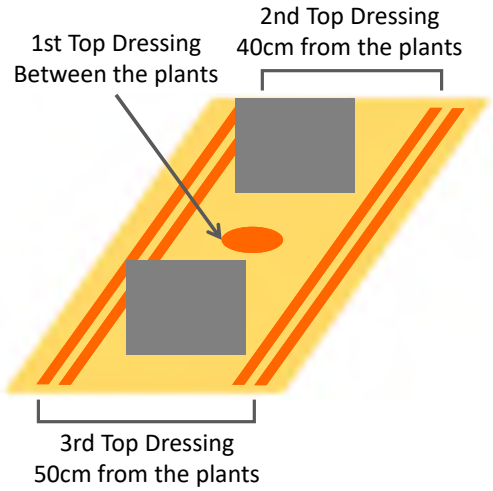
During female flowers blooming, take stamen from male flowers, and put on pistils of the female flowers. It should be done before 10:00 AM in the morning of the flowering day.

Hanging Frutis

Hang the fruits by a net or string. Since the large fruits shall be more than 5kg, they should be supported enough by a net or string.

Fertilization Application

Preferable soil PH for watermelon is 5.0-6.5.



Two weeks before transplanting
Apply Dolomite (100g/m^2) and cultivate.

Basal Dressing
Dig a hole and apply 2kg/m^2 of compost.
Mix 50g/m^2 of fertilizer (16:16:16) with the soil.

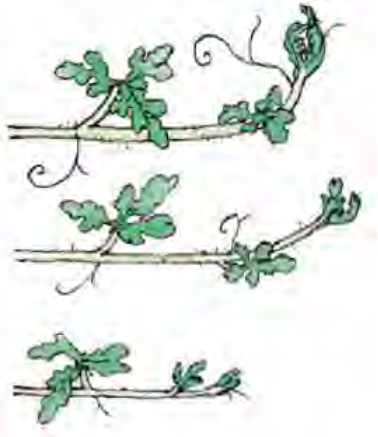
1st Top Dressing
When the main vines grow 40-50cm long, 20g/m^2 of NPK fertilizer (16:16:16) could be applied between the plants.

2nd Top Dressing
Soon after the 1st fruit pollinated, 20g/m^2 of NPK fertilizer (16:16:16) could be applied around 40cm far from the plants.

3rd Top Dressing
When a diameter of the 1st fruit becomes around 10cm, 20g/m^2 of NPK fertilizer (16:16:16) could be applied around 50 cm far from the plants.

Fertilization Application

In case that you grow watermelons on the ground, you can judge the fertilizer requirement by the plants condition.



Too much fertilizer

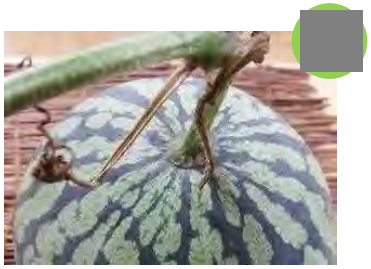
Optimal condition

Need more fertilizer

***Top dressing is not always required.**
If the plant is healthy enough, do not apply fertilizers.

Harvesting

Around 35 to 40 days after pollination, or 85 to 90 days after transplanting, watermelon will be ready for harvest.



The tendril becomes hard, and the color of it turns into brown. That is optimal timing for harvest.

Disease Control

Anthracnose (Fungi)

Occurrence condition	Wet condition
Transmission	Black spores spread by rain and wind. Fruits are also damaged.
Immediate measure	Trim the infected leaves and fruits.
Physical prevention	Mulch the soil and set a rain shed.
Preventive Chemical	(1B) Curacron, (1B) Dursban, (3A) Matador
Curative Chemical	(1) Topsin / (3) Amistar top, Score / (11) Infinito / (M3) Antracol, Dithane, / (43) Trivia/ (P1) Bion

Panama disease / Fusarium wilt (Fungi)

Occurrence condition	Low pH soil.
Transmission	Fungus stay in the soil. Seed also could be infected.
Immediate measure	Remove plants or leaves affected carefully
Physical prevention	Avoid continuous planting. Control soil pH.
Preventive Chemical	(M5) Daconil / (M4) Ingrofol / (M1) Funguran
Curative Chemical	(11) Cabrio / (P1) Detazeb

Disease Control

Powdery Mildew (Fungi)

Occurrence condition	Dry condition
Transmission	fungi spread by Wind
Immediate measure	Trim the infected leaves before spreading by wind
Physical prevention	Watering, thinning, moderating the amount of nitrogen
Preventive Chemical	(3,11) Amistar TOP / (M5) Daconil / (M4) Ingrofol
Curative Chemical	(3) Score / (M3) Antracol / (1) Topsin

Mosaic Disease (Virus)

Occurrence condition	Dry condition
Transmission	Virus spread by aphids and using scissors.
Immediate measure	Remove the plants and cultivate the place deeply.
Physical prevention	Use silver mulch, screen net to avoid pests
Preventive Chemical	Not effective
Curative Chemical	For insects: (1B) Kanon / (3A) Decis / (4A) Avidor / (6) Agrimec

Insect and Pest Control

Red spider mite

Immediate measure	Spray water on the backside of the leaf. The population of the mites will decrease.
Physical prevention	Since mite is small, it is hard to control them.
Chemical prevention	(6) Agrimec, Alfamex, Demolish, Numectin, Okrite / (13) Ludo, Rampage / (21A) Samite

Insect and Pest Control

Cucurbit leaf beetle

Physical prevention	Use silver mulch or silver tape to avoid insects. Use the screen sheet to protect the seedlings.
Preventive and Curative Chemical	(1A) Furaand 3GR, Marshal 200SC, Tamafur 3GR, Amabas 500EC / (1B) Kanon 400 EC, Diazinon 600EC

Aphid

Occurrence condition	It appears on the new buds and stems. It carries virus disease.
Immediate measure	Remove aphids before they propagate.
Physical prevention	Use silver mulch and silver tape to avoid aphids.
Preventive and Curative Chemical	(1A) Marshal / (1B) Biocron / (3A) Buldok, Decis / (4A) Avidor, Confidor, Winder / (6) Agrimec, Numectin, Okrite, Siklon / (21A) Samite

IMPROVEMENT ON FRUIT QUALITY AND HARVEST CONTINUITY OF CRYSTAL GUAVA

Ver. November 2019

Endang Gunawan

CENTER FOR TROPICAL HORTICULTURE STUDIES –

BOGOR AGRICULTURAL UNIVERSITY

TARGET OF PLANT PRODUCTIVITY

1-2 years :

✓ 50 – 60 kg/tree/year

2-3 years :

✓70 – 80 kg/tree/year

4-5 years

✓90 – 100 kg/tree/year

❋ for rainy season and dry season with enough water availability.

✓ In middle-land area with no irrigation, there will be no production or “skip” production in that season.

TARGET OF FRUIT QUALITY

Grade A	Grade B	Grade C
a. Uniformity in fruit size, weight ± 300 g b. Fruit shape is round or almost round c. Skin color is soft green d. Texture of fruit skin is smooth, no brown spot caused by disease, rotten, and physical collision	a. Fruit size 250-300 g b. Fruit shape is not round perfectly c. Texture of fruit skin has brown spot in small amount	a. Fruit size is not uniform < 250 g or > 300 g b. Texture of fruit skin is not smooth, has brown spots, defect caused by physical collision c. Fruit skin is yellowish d. Fruit shape is imperfect

PRODUCTION MANAGEMENT OF CRYSTAL GUAVA

- Fertilization Management
- Canopy Management
- Controlling Infectious Organisms of Plant
- Fruit-bagging
- Harvest and Post-harvest Fresh Management

FERTILIZATION MANAGEMENT

- Target of production based on age
- Check status of soil fertility (sufficiency of soil nutrient)
- Check status of plant nutrient (sufficiency of plant nutrient)

Status of Soil Fertility

It is still unavailable for crystal guava

→ must be established together

➢Nutrient analysis

✓Routine fertility

- pH, N, P, K, Mg, Ca, KTK, etc.

✓Type and class of soil

- Content of organic materials, ratio (sand : loam : dust)

Status of Plant Nutrient

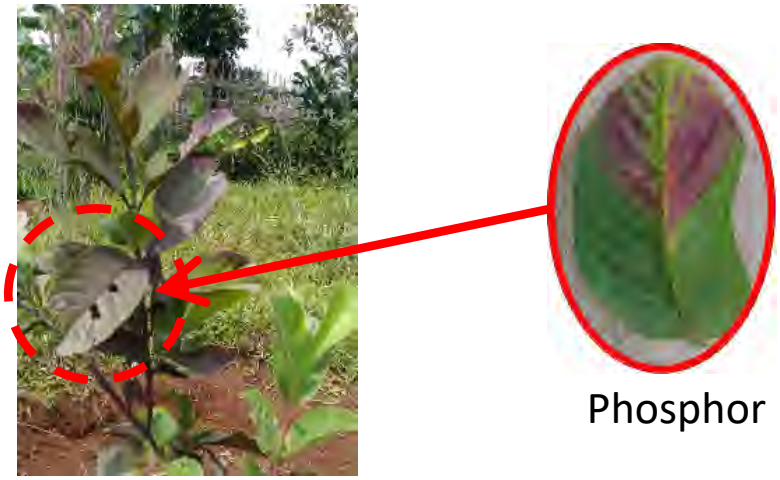
Status of plant nutrient = sufficiency of plant nutrient

Check condition of plant appearance (canopy) → Check condition of leaves, flowers, and fruits

Nutrient deficiency

Nitrogen

Nutrient deficiency



Phosphor

Nutrient deficiency

Potassium

Nutrient deficiency

The usage of slow-release fertilizer

- Crystal guava becomes productive
- The frequency of harvest becomes intensive
- The consequence (fertilizer is available and fulfilled)

- Slow-released fertilizer
  - Slow-released
  - Not easily leached
  - Available up to 6 months*
  - More effective compared with conventional fertilizer

Additional Fertilization

- KNO3 fertilizer (%K2O high > % NO3)
  - Spray with pesticide
    - Concentration 0.5-2 g/l
  - Apply liquid fertilizer
    - Concentration 2 g/l, 1-2 liter per plant
  - Maximum time for application is 10 a.m.
  - Spray on bottom part of leaf-surface that close to fruit
  - Apply every 7-10 days

Additional fertilization

- Boron fertilizer
  - Spray with pesticide
    - Concentration 0.05 g/L
  - Apply liquid fertilizer
    - Concentration 5 g/10 L, 1-2 liter per plant
  - Maximum time for application is 10 a.m.
  - Spray on bottom part of leaf-surface that close to fruit
  - Apply every 7-10 days

IRRIGATION

- Apply in dry season
- Fulfil water need for 10 L per plant as minimum
- If the field is lack of water
  - Shoot of dormant leaf
  - Flower drops
  - Fruit set drops
  - Slow growth of fruit
  - Fruit size gets smaller
  - Less normal of fruit shape
  - Texture of fruit meat is hard
  - Susceptible to lice, thrips, and mites attacks → leaf and fruit are not bright

CANOPY MANAGEMENT

- Form pruning
- Maintenance pruning
- Production pruning

Purpose

- Forming canopy
- Taking care
- Production

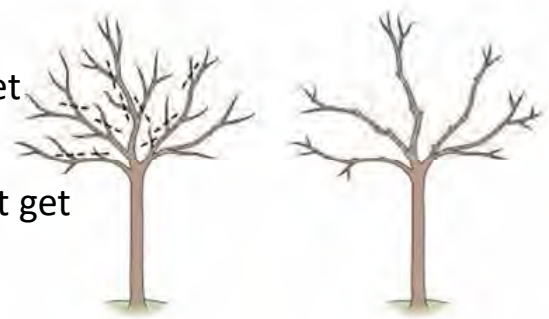
✓Healthy plant
✓Optimum and quality production

Form Pruning

- ***Thinning cuts*** : Trimming canopy/thinning branches
- ***Heading back*** : Shortening canopy/cutting horizontal branch
- ***Pinching*** : cutting growth point/leaf point on twig

Thinning Cuts

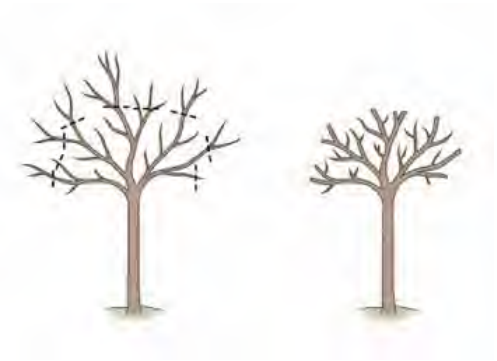
- Age is < 1 year
- Plant has not producing yet
- Ideal form of canopy
- Air circulation and sunlight get inside canopy
- Taking care of fruits for productive plant



Form Pruning (Thinning cuts)

Heading Back

- Pruning of taking care
- On productive plants
- Cut the branching
- Control length of branch
- Induce more flowers and fruit



Pruning of Raising

- Negative branch and twig
- Infected parts by pest and disease
- Died parts
- Overlaying branches/twigs

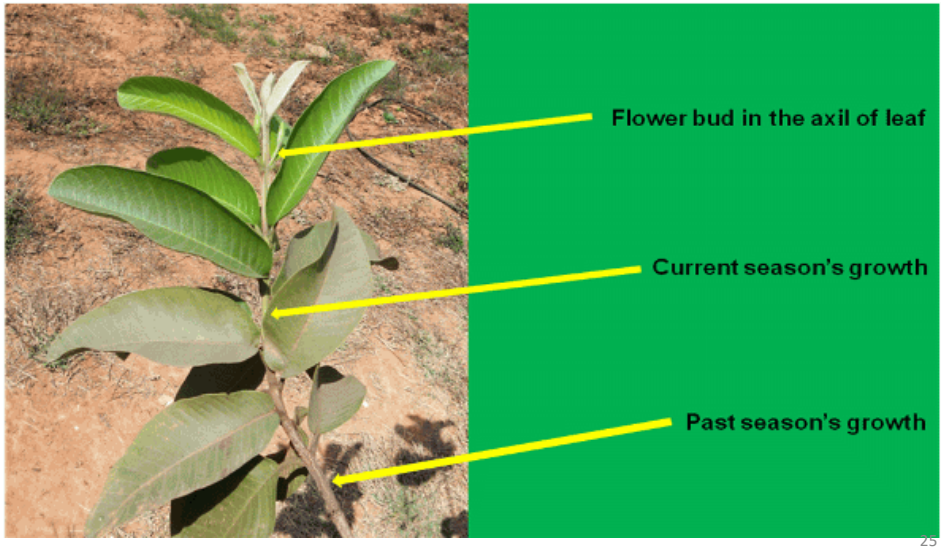
Heading back

20-25 days after pruning, flower bud comes out

Pinching

- Remove leaf shoot
- Cut twig point where leaf grows
- Induce leaf shoot that brings flower

Growth Pattern of Leaf and Flower



Top pinching

- Apply on twig that has long ways growth of leaf-series
- Precisely cut after matured leaf grows properly (full size, color is dark green)
- If there is any fruit, remain 7 leaves after flower or fruit

Purpose of Top Pinching

- Induce leaf shoot and flower shoot to grow
- Control fruit size
- Improve fruit quality
  - Shape
  - Color of fruit-skin
  - Crunchiness
  - Taste

When? Pruning is done

- Beginning of rain season
- When planting media has enough water
- After fertilizing
- After harvesting

→

- Thinning cuts
- Heading back

- When planting media has enough water
- Perfect growth of leaf
- When flower grows
- When fruit is growing big

→

- Pinching

CONTROLLING INFECTIOUS ORGANISMS OF PLANT (OPT)

- Identification of OPT vs Physiology
- Pest vs disease vs weed
- Agro-climate

OPT vs Physiology

Main Pests

Main Diseases

OPT Control

- Healthy plant
- Sanitation of tools and farm
- Pesticide application
  - Target of OPT
  - Selective (active ingredient)
  - Time

California/ Bordeaux Mixture

- Heat 10 L of water until it boils
- Put 1 kg of sulfur, then mixed while it is boiling
- Dissolve 1 kg lime $CaCO_3$ in 1L of water. Wait until sediment begins settling at the bottom of water. Then remove the clear water and pour the lime sediment to sulfur solution. Then mix and heat it.
- Cool the mixed solution (color is red yellowish)
- Ready to use

Application of Bordo Mix

Pesticide Selection

Insecticide for white flies, sugarcane scale/Aulacaspis tegalensis (active ingredients: demetoat, abamectin, imidakloprid, deltametrin) → Kanon, Agrimec, Confidor

Insecticide for larva, grasshopper (active ingredients : klorpirifos, sipermetrin, deltametrin) → Decis, Curacron, Dursban

Acaricide for mite (active ingredients: piridaben, pirethroid, diafentiuron) → Samite, Omite, Kelthane*

Fungicide for pestalotia (active ingredients: klorotalonil, benomyl) → Antracol, Ridomil

Fungicide for Anthracnose, Phytophthora (active ingredients: mankozeb, maneb, propamokarb, Cu-oxiclorida) → Dithane, Curzate, Maneb

Fungicide for leaf-rust (active ingredients: Cu-hydroxida) → Daconil

Fruit rust of *Pestalotia psidii* control

- Apply pruning on infected plant part
- Eliminate waste of pruning (burn or throw faraway)
- Increase dose of potassium fertilizer (1.5 – 2 times)
- Spray contact and systemic fungicide on healthy part of plant alternately every 8 – 15 days, depends on weather/season
  - Contact fungicide (b.a. mankozep, copper sulphate)
  - Systemic fungicide (b.a. benomyl, Azoksistrobin and Difenokonazol)

Pest and Disease Control in Rainy Season

- Pests which usually attack in rainy season
  - Aphids
  - Leaf miner
  - Black headed caterpillar
- Diseases which mostly infect
  - Antrachnose, Pistalotia, Leaf rust, Sooty mold, Phytophtora
- Application of contact and systemic insecticide every 15 days alternately
- Application of contact and systemic fungicide every 7 – 15 days alternately
- Combined the application before 10 a.m or 4-5 p.m.

Pest Control in Dry Season

- Pests which usually attack in dry season
  - White fly
  - Aphids
  - Leaf miner
  - Black headed caterpillar
- Apply contact and systemic pesticide every 10-20 days alternately
- Combined the application before 10 a.m and or at 4-5 p.m

FLOWER AND FRUIT THINNING (Thinning)

Purpose

- Improve fruit quality
- Improve total dissolved solids (*Brix) of fruit
- Control fruit size
- Optimize plant productivity
- Continuity/sustainability of plant production

How?

- One series of twig
  - Remain 7—12 leaves
  - Remain 1—2 fruit-set
- Discard fruit-set
  - When the diameter is 1 cm
  - Being infected by pest/disease
  - Has abnormal shape
  - Has troublesome position for bagging

FRUIT BAGGING

- 30-40 days after flowers bloom
- Fruit diameter is 2-3 cm
- Healthy fruit
- Normal fruit shape
- Ideal fruit position

Criteria of Bag

- Material (durable, safe)
- Color (fruit quality)
- Simple (easiness: easy, cheap, applicative)
  - ✓Plastic bag
  - ✓Net foam
  - ✓Newspaper
  - ✓Carbon paper
  - ✓Cement paper
  - ✓Fruit bag

Fruit Bag

Fruit Bagging

① 

② 

③ 

Bagged Vs Opened

HARVEST AND FRESH-HANDLING

Criteria for harvest

- 90 – 100 days after flower blossom
- 60-70 after bagging

Harvesting Fruits

Fresh-Handling

MAKING COMPOST/ORGANIC FERTILIZER

QUALITY ORGANIC FERTILIZER

- Through fermentation process or composting
- Ratio of carbon nitrogen (C/N) 15-20
- pH 6.5-7
- Contains various amount and types of nutrient
- Soft size

PROCESS OF COMPOSTING

1. Selection on raw materials
2. Cutting, chopping
3. Prepare location
4. Materials processing
5. Enrichment
6. Repetitive mixing
7. Sifting
8. Packing

MATERIAL SELECTION

- Livestock waste
  - (manure of poultry, cow, buffalo, goat, horse)
- Plant waste
  - Rice straw, leaf, grass
- Industrial/household waste
  - Charcoal rice husk, rice bran, sugar cane, ash, eggshell

NUTRIENT CONTENT IN ANIMAL MANURE

Source of manure	N	P	K	Ca	Mg	S	Fe
	ppm						
Cow	0,53	0,35	0,41	0,28	0,11	0,05	0,004
Beef cattle	0,65	0,15	0,30	0,12	0,10	0,09	0,004
Horse	0,70	0,10	0,58	0,79	0,14	0,07	0,010
Poultry	1,50	0,77	0,89	0,30	0,88	0,00	0,100
Ship	1,28	0,19	0,93	0,59	0,19	0,09	0,020

Source: Tan (1993)

CUTTING MATERIALS

Rice straw, leaf, and grass

Chop/cut

Size 5-10 cm

PREPARING TOOLS AND LOCATION

- Hoe, watering can, water bucket, jute bag/plastic bag
- Building
  - Roof by tile/zinc/palm fiber, etc.
  - Floor should be better using cement
  - Size: 5 x 10 m, height is adjusted
  - Make drainage in surrounding building

MATERIALS PROCESSING

- Mixing selected materials
- Buildup mixed materials
  - 15-20 cm for lowland
  - >20 cm for highland

Aeration must be good to gurantee supply of O_2 for microbial decomposer and weathering

ENRICHMENT

- Adding other materials to enrich types of nutrient
- Source of calcium (lime, eggshell, bone powder)
- Source of N, P (fish bone, dry blood, bird/bat manure)
- Source of potassium (banana hump, ash, sawdust)
- Molasses
- Microbe

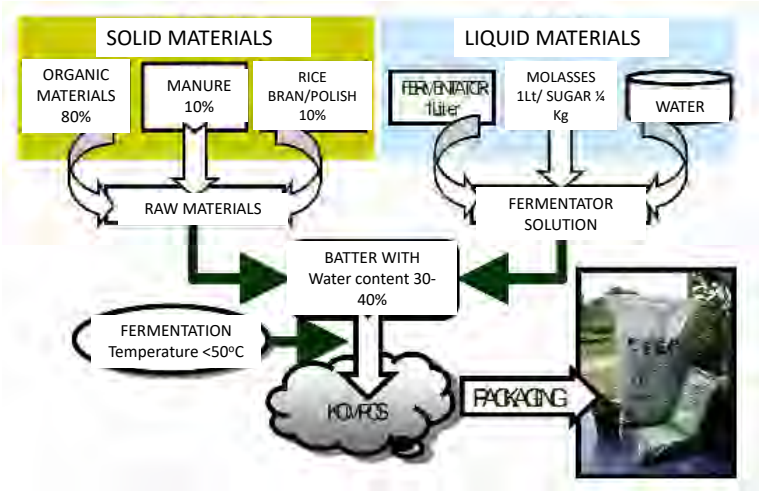
PEMBALIKAN

- Composting process is 5-6 days
- Turn and mix every 2 days
- Maintain optimum temperature at 40-45^{O}C
- Proper moisture
- Criteria of mature compost
  - Black
  - Crumble
  - Fragile
  - Tapai smelly

CONTINUANCE PROCES

- Sifting (0.5 – 1 cm)
- Packing (5, 10, 20 kg)

PROCESS OF COMPOSTING



THANK YOU

Paprika

Ver. November 2019

Main Issue: ***Outbreak of Thrips population***

- ✓ Damage fruits to degrade marketing value
- ✓ Damage plants to reduce total yield

Purpose:

- Decrease pesticide application but maintain the same good yield and the quality of product.
- Produce safer paprika (less residue of pesticide).
- Decrease production cost.

Introducing an appropriate management of pesticide application to decrease thrips population in the greenhouse

Current condition

Lose control of increasing thrips population

✓ Over application of the same type of pesticide induced strong tolerance in thrips against the pesticide.

Mechanism of how pesticide tolerance is developed

- ◆ There are many different genotype of insects exist.
- ◆ Each genotype type has different tolerance for different pesticide.

correlation

✗

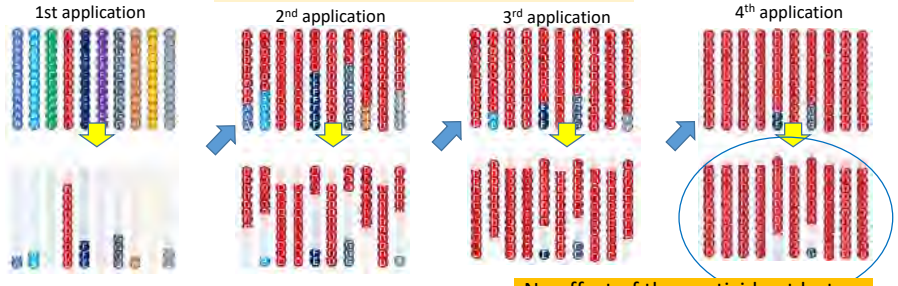
- Applying a same type of pesticide repeatedly causes the bias of population diversity
- It will induce high concentration of tolerant type

✓

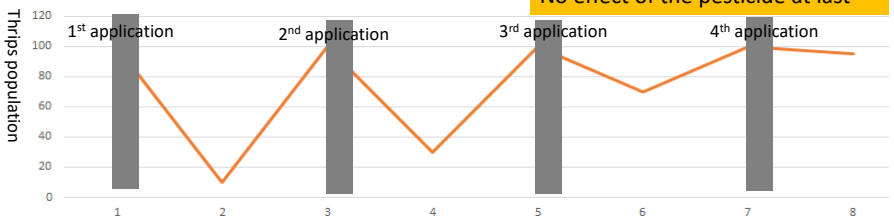
- Rotation application of different types of pesticide maintains appropriate diversity of insects
- Diversified population maintain the effectiveness of pesticide

Trend of pesticide effect

If same pesticide applied repeatedly,



No effect of the pesticide at last



✓ Thrips which has tolerant genotype against repeatedly used pesticide saturate in the house

Countermeasures

✓ Introduction of systematic pest control with the planned application of pesticide

Techniques introduced are

1. Good nursery management
2. Appropriate rotation of pesticides according to the application plan
3. Serial application of combination of 3 type's pesticides for cleaning up the insect

1. Good nursery management

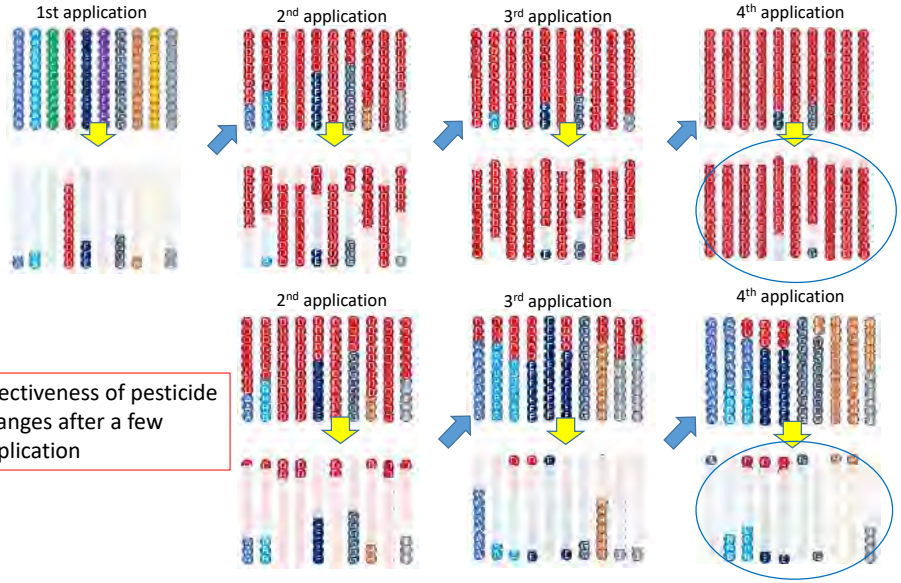
✓ Protect young seedlings from thrips infection by using net on nursery bed

✓ Young seedlings are more susceptible to pest damages

✓ Plants protected by thrips at the early stage shall have longer healthy growth period.

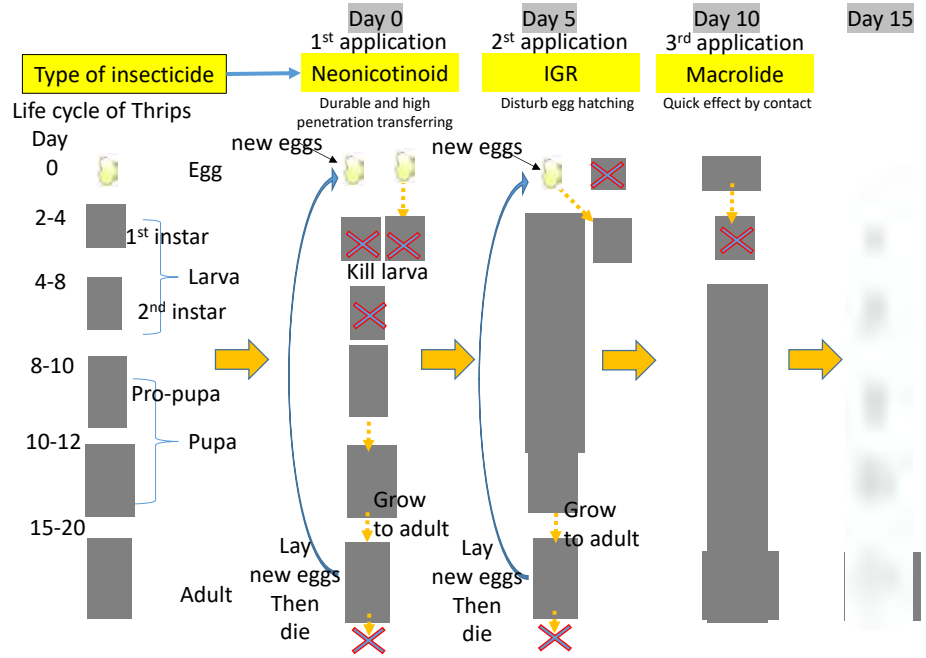
2. Introduction of appropriate rotation

1. Application of same pesticide



Effectiveness of pesticide changes after a few application

3. Cleaning-up pesticide application of thrips



Scheduled application of different types of pesticide

Aplikasi Pestisida untuk Paprika — Ver.1

No.	Hari	Rencana Aplikasi	Aplikasi di Lahan	Nama Pestisida	Bahan Aktif	Jenis		Tujuan	Waktu	Kategori
	-30									
1	0	1-Dec		Marshal	Carbosulran			Pindah tanam	1/1	1A
2	30	31-Dec		Demolish	Abamectin	Macrolide	Kontak	mengendalikan jumlah thrips	1/3	6
3	45	15-Jan		Arrivo	Cypermethrin		Kontak		1/5	3A
4	60	30-Jan		Delouse	Imidacloprid	Neonicotinoid	Sistemik	rotasi 3 pestisida	1/2	4A
5	65	4-Feb		Match	lufenuron	IGR	Kontak	ketika thrips sudah endemik	1/4	15
6	70	9-Feb		Endure	Spinetoram	Macrolide	Sistemik		1/2	5
7	85	24-Feb		Abenz	Emamectin		Kontak	mengendalikan jumlah thrips	1/2	6
8	95	6-Mar		Rampage	Chlorfenapyr		Kontak		1/2	13
9	105	16-Mar		Kateve	Nitenpyram	Neonicotinoid	Sistemik	rotasi 3 pestisida	1/3	4A
10	110	21-Mar		Match	lufenuron	IGR	Kontak	ketika thrips sudah endemik	2/4	15
11	115	26-Mar		Rampage	Chlorfenapyr		Kontak		2/2	13
12	130	10-Apr		Demolish	Abamectin	Macrolide	Kontak	mengendalikan jumlah thrips	2/3	6
13	140	20-Apr		Arrivo	Cypermethrin		Kontak		2/5	3A
14	150	30-Apr		Delouse	Imidacloprid	Neonicotinoid	Sistemik	rotasi 3 pestisida	2/2	4A
15	155	5-May		Match	lufenuron	IGR	Kontak	ketika thrips sudah endemik	3/4	15
16	160	10-May		Endure	Spinetoram	Macrolide	Sistemik		2/2	5
17	175	25-May		Abenz	Emamectin		Kontak	mengendalikan jumlah thrips	2/2	6
18	185	4-Jun		Arrivo	Cypermethrin		Kontak		3/5	3A
19	195	14-Jun		Demolish	Abamectin	Macrolide	Kontak		3/3	6
	205									
	215									

Traditional practice: Pesticides are applied more than 30 times for 7 month period

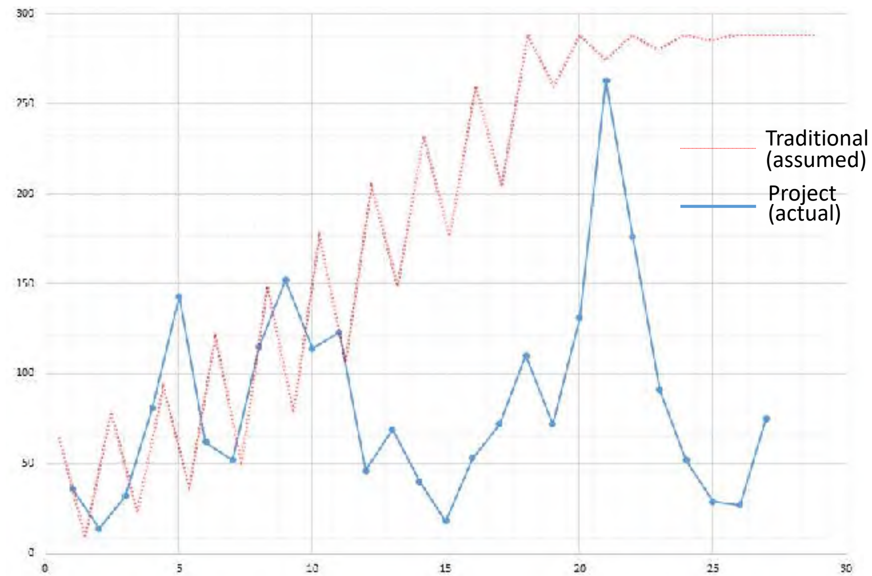
Reduced to 19 applications during 7 month

Different type of active ingredient

Locally available pesticide for thrips by different category

No.	Kategori	Bahan Aktif	Nama Kimia (Merek)	Kemasan	Harga	Gambar	Catatan
1	6	Abamectin	Absina	1 liter	Rp 300,000		
			Supermec	100 ml	Rp 90,000		
			Schomec	200 ml	Rp 140,000		
			Bombermex	250 ml	Rp 250,000		
			Promolish	1 liter	Rp 300,000		
			Demolish	200 ml	Rp 160,000		
			Abacel	1 liter	Rp 220,000		
			Agrimec	100 ml	Rp 100,000		
2	6	Emamectin	Sikton	25 gr	Rp [illegible]		
			Abenz	250 ml	Rp 140,000		
			Dortao	250 ml	Rp 160,000		
			Proclaim	25 gr	Rp 120,000		
3	13	Chlorfenapyr	Ranevo	250 ml	Rp 100,000		
			Rojusu	100 ml	Rp 90,000		
			Promojoss	200 ml	Rp 125,000		
			Rampage				
4	3A	Cypermethrin	Sidamethrin	400 ml	Rp 40,000		
			Klensect	1 liter	Rp 180,000		
			Procex	500 ml	Rp 75,000		
			Arrivo	250 ml	Rp 135,000		
5	5	Spinetoram	Endure	100 ml	Rp 100,000		Hanya satu merek
6	4A	Nitenpyram	Kateve	250 ml	Rp 65,000		Hanya satu merek
7	4A	Imidacloprid (Serbuk)	Counter Plus	250 gr	Rp 75,000		
			Delouse	100 gr	Rp 30,000		
			Avidor	100 gr	Rp 25,000		
		Imidacloprid (Cair)	Movento	100 ml	Rp 55,000		
			Interprid	100 ml	Rp 40,000		
			Delouse	80 ml	Rp 40,000		
			Abuk	100 ml	Rp 40,000		
8	15	lufenuron	Match		Rp 62,000	Tidak tersedia sekarang	Hanya satu merek

Trend of thrips population during cultivation period



Condition of plants at 90 – 100 days after transplanting

Clubroot Disease

Plasmodiophora brassicae

More than 1 billion of hypnospores live in 1g of the root. They can survive for 7 to 10 years in the soil.

Points for prevention of the disease

- Once the fungus appears, they will remain for 7-10 years in the soil.
- The fungus will become very active in the acidity soil at pH6.0 or less.
- Only plants of brassica will be infected by the fungus.

Field management

- Remove the plants affected with its roots and the soil around.
- Then apply Daconil 75WP (1.5g/m^2, after diluted with 1000 times of water).
- Plant other family of plants such as spring onion.

Preparation for the next planting season

- Adjust the soil pH by applying **dolomite**. Fungus will be not active in the soil at pH7.2 or higher.

Chemical control*

- Once the disease appears in the field, apply a fungicide to sterilize the soil of the field.

Name of Pesticide (Code)	Timing	Amount	Usage
Nebijin 0.3DP (36) Flusulfamid 0.3%	Before transplanting	20～30kg/10a	Apply the dusts to the field and mix with the soil.
Nando 500SC (29) Fluazinam 500g/L	After transplanting	500ml/10a (0.5ml/m2)	Dilute with 200-400 times of water, then apply to the soil.
Daconil 75WP (M5) Chlorothalonil(TPN) 75.0%	After transplanting	1.5kg/10a (1.5g/m2)	Dilute with 1000 times of water, then apply to the soil.

*** Only one fungicide should be applied just once in a cultivation season.**

Safety information

Nando

(1) Irritating to skin. (2) May cause sensitization by skin contact. (3) Possible risk of harm to the unborn child. (4) Very toxic to aquatic life with long lasting effects.

Daconile

(1) Irritating to respiratory system. (2) Limited evidence of a carcinogenic effect. (3) Risk of serious damage to eyes. (4) May cause sensitization by skin contact. (5) Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Nebijin

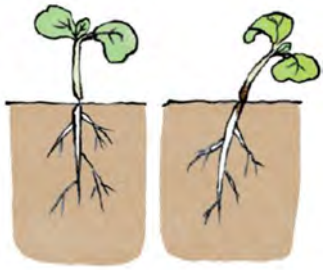
(1) Toxic to aquatic organisms. (2) Harmful to terrestrial vertebrates. (3) It may be harmful if swallowed, inhaled or absorbed through the skin. (4) Repeated exposure at high doses may cause reproductive / developmental damage, or damage to organs.

Damping off

Rhizoctonia solani (Broccoli)
Rhizoctonia solani、*Pythium megalacanthum*、*P. zingiberis (Cabbage)*

Points for prevention of the disease

- The disease appears frequently in the soil at high moisture content.
- The fungus remain in the soil or plants residue
- Besides plants of brassica, many other families of plants could be affected by the fungi.
- Immature compost contributes to propagation of the fungus.



Infected seedling

Nursery management

- Sterilize the nursery soil by solar heat, or use a new soil.
- Avoid the environment of high temperature and high humidity at the nursery.
- Avoid using immature compost for the media.

Field management

Do not use affected seedlings.

- Avoid applying immature compost to the field.
- Keep the good drainage of the field.
- Remove the infected plants immediately.
- Avoid planting the same family of plants continuously.

Chemical control*

- If the disease appears severely in the nursery or field, apply a fungicide such as Nando 500SC.

Name of Pesticide (Code)	Timing	Amount	Usage
Nando 500SC (29) Fluazinam 500g/L	Nursery period	0.5ml/m^2	Dilute with 200-400 times of water, then apply to the soil.
Nando 500SC (29) Fluazinam 500g/L	After transplanting	500ml/10a (0.5ml/m^2)	Dilute with 200-400 times of water, then apply to the soil.

*** Maximum application: 2 time/cultivation (Once at the nursery and once at the field)**

Safety information

Nando

(1) Irritating to skin. (2) May cause sensitization by skin contact. (3) Possible risk of harm to the unborn child. (4) Very toxic to aquatic life with long lasting effects.

List of Insecticide

Group		Product Name	Active Ingredient	Mechanism			Target													Mximum Usage (times)
				Contact	Systemic	Stomach poisons	Caterpillar/worm	Aphid/mite	Thirps	Fruit borer	Planthoppers	Leaf miner	Sucking pest	Stem borer	White fly	Grasshoper	Nemathode	Fruit fly	Bean Fly (seedling fly)	Snail	
1A		Amabas 500 EC	BPMC/Fenobucarb	●		●	●				●					●					n.a.
1A		Furaand 3 GR	Carbofuran/Carbosfuran	●	●		●							●						●	1
1A		Lannate 40 SP / 40 WP /250 WP	Methomyl	●	●		●	●		●		●			●						3
1A		Lavrin 75 Wp	Thiodicarb			●															2
1A		Marshal 200 SC	Carbofuran/Carbosfuran	●	●		●	●	●	●	●										1
1A		Marshal 5 GR	Carbofuran/Carbosfuran	●	●		●							●			●				1
1A		Metindo 25 WP / 40 SP	Methomyl	●		●	●			●			●						●		3
1A		Tamafur 3gr	Carbofuran/Carbosfuran		●		●				●										1
1B		Biocron 500 EC	Profenofos			●	●	●													6
1B		Bionik 400 EC	Dimethoate	●		●	●	●													3
1B		Callicron	Profenofos	●																	6
1B		Catleya 500 EC	Phoxim	●																	n.a.
1B		Curacron 500 EC	Profenofos	●			●														6
1B		Diazinon 600 EC	Diazinon	●			●												●		2
1B		Dursban 200 EC	Chlorpyrifos	●		●	●	●													2
1B		Kanon 400 EC	Dimethoate	●	●			●	●				●								3
2B		Balistic 50 SC	Fipronil	●		●															2
2B		Regent 50 SC	Fipronil	●	●		●			●	●	●									2
2B		Toplin 50 SC	Fipronil		●																2
3A		Akurata 200 EC	Fenvalerate	●			●														5
3A	4A	Alika 247 ZC	Lambda cyhalothrin Thiamethoxam			●	●	●		●			●		●						3
3A		Arrivo 30 EC	Cypermethrin		●	●															5
3A		Buana 55 EC	Lambda cyhalothrin		●	●															3
3A		Buldok 25 EC	Beta-cyfluthrin		●	●	●	●	●	●								●			3
3A		Decis 25 EC	Deltamethrin		●	●	●	●	●	●			●					●			3
3A		Fast 100 (Fastac EC 15)	Alpha-cypermethrin		●	●															5
3A		Gemilang 110 EC	Cypermethrin		●	●	●														5
3A		Matador 25 EC	Lambda cyhalothrin		●	●	●	●		●							●				3
3A		Matarin 50 EC	Lambda cyhalothrin		●	●															3
3A		Meothir 50 EC	Fenpropathrin			●															3
3A		Rizotin 100 EC	Cypermethrin	●			●														5
3A		Vigor 100 EC	Cypermethrin	●			●						●								5

4A	3A	Alika 247 ZC	Thiamethoxam	Cyhalothrin			●	●	●		●			●		●							3
4A		Avidor 25 WP	Imidacloprid		●	●			●	●													3
4A		Besvidor 25 WP	Imidacloprid		●	●		●				●											3
4A		Confidor 200 SL	Imidacloprid		●	●			●	●		●		●		●	●						3
4A		Confidor 5 WP	Imidacloprid		●	●			●	●		●		●		●	●						3
4A		Delouse	Imidacloprid			●																	3
4A		Imidaplus 25 WP	Imidacloprid			●	●																3
4A		Ketave	Nitenpyram		●		●						●										3
4A	28	Virtako 300 SC	Thiamethoxam	Chlorantraniliprole	●	●		●					●				●						3
4A		Winder 25 WP	Imidacloprid		●	●			●	●							●						3
4C	5	Integrete 40 WG	Sulfoxaflor	Spinetoram			●				●												2
5		Endure 120 SC	Spinetoram			●		●		●				●		●							2
5	4C	Integrete 40 WG	Spinetoram	Sulfoxaflor			●	●		●				●		●							2
6		Abenz 22 EC	Emamectin benzoat		●		●				●												3
6		AGRIMEC 18 EC	Abamectin		●		●	●	●	●				●									3
6		Alfamex 18EC	Abamectin			●	●	●		●		●		●									3
6		Demolish 18 EC	Abamectin		●																		3
6		Numectin 20 EC	Abamectin				●		●	●				●		●							3
6		Okrite 20 EC	Abamectin		●				●	●													3
6		Proclaim 5 SG	Emamectin benzoat				●																3
6		Siklon 57 WG	Emamectin benzoat		●			●	●		●			●		●							3
12A		Pegasus 500 SC / 500 SV	Diafenthiuron		●		●		●	●						●							2
13		Ludo 310 EC	Chlorfenapyr		●			●	●	●	●			●									2
13		Rampage	Chlorfenapyr		●		●	●	●	●				●		●							2
14		Fortuna 290 - SL	Dimehypo		●	●	●																n.a.
14		Venus 400 SL	Dimehypo			●	●	●							●								n.a.
14		Vista 400Sl	Dimehypo				●																n.a.
15		Match 50 EC	lufenuron		●		●	●															3
21A		Samite 135 EC	Pyridaben		●				●														2
28		Prevathon 50 SC	Chlorantraniliprole		●	●		●			●		●										3
28	4A	Virtako 300 SC	Chlorantraniliprole	Thiamethoxam	●	●		●				●				●							3
「-」		Toxiput 5 GR	Metaldehyde			●																	2

List of Fungicide

Group		Product Name	Active Ingredient		Target Disease														Mximum Usage (times)
					Late Blight (Phytophthora infestans)	Purple Blotch (Alternaria porri)	Anthranose (colletotrichum sp.)	Leaf spot (Cercospora sp.)	Downey Mildew (Psedoperenospora cubencis)	Powdery Mildew (Oidium sp.)	Pythium blight (Pythium sp.)	Downey Mildew (Peronospora destructor)	Brown Rot of Stem (Rhizoctonia solani)	Fusarium Wilt (Fusarium oxysporum)	Early Blight (Altenaria solani)	Downy Mildew (Peronosclerospora maydis)	Rice Blast (Pyricularia oryzae)	Club root (Plasmodiophora brassicae)	
1		Beconil 80 WP	Benomyl																3
1	M3	Kocide 54 WP	Carbendazim	Mancozeb															3
1		Topsin M 70 WP	thiophanate-methyl				●	●		●							●		3
3	11	Amistar TOP 325 SC (+ZPT)	Difenoconazole	Azoxystrobin		●	●												3
3		Folicur 25 WP	Tebuconazole																3
3		Score 250 EC	Difenoconazole			●	●	●		●					●				3
4	M3	Ridomil 4/64 WG	Metalaxyl/Mefenoxam	Mancozeb	●				●		●								n.a.
4		Saromyl 35 SD	Metalaxyl/Mefenoxam		●														n.a.
11	3	Amistar TOP 325 SC (+ZPT)	Azoxystrobin	Difenoconazole		●	●												3
11		Cabrio	pyraclostrobin		●	●	●	●					●	●					2
11		Equation	Azoxystrobin		●	●							●						3
11		Infinito	pyraclostrobin																2
27		Curzate 64 WP/ Cymoxil 50 WP	Cymoxanil		●			●											3
28		Previcur N 722 SL	Propamocarb Hydrochloride		●	●	●				●	●							3
29		Nando 500 SC	Fluazinam															●	1
36		Nebijin	Flusulfamide															●	1
40		Acrobat 50 WP	Dimethomorph		●														3
40	M5	Revus 440 SC	Mandipropamid	Chlorothalonil	●														2
40		Revus Opti	Mandipropamid																2
41		Bactosyn 150 AL	Oxytetracycline																2
43	M3	Trivia 73 WP	Fluopicolide	Propineb	●	●	●	●	●			●				●			3
49		Zorvec Encantia	Oxathiapiprolin		●				●										2
M1		Fuguran 80 WP	Copper(II) hydroxide																Unrestricted
M1		Kocide 54 WP	Copper(II) hydroxide		●	●	●	●	●										Unrestricted

M3		Altrena 90 WP	Ziram																**2**
M3		Antracol 70 WP	Propineb		●	●	●	●		●	●								**4**
M3	**P1**	Bion M 1/48 WP	Mancozeb	Acibenzolar-S-methyl	●		●												**3**
M3		Curtahane 80 WP	Mancozeb																**3**
M3		Detazeb 80 WP	Mancozeb			●				●				●					**3**
M3		Dithane 80 WP	Mancozeb		●		●												**3**
M3		Dithane M 45 80 WP	Mancozeb		●			●											**3**
M3	**1**	Kocide 54 WP	Mancozeb	Carbendazim															**3**
M3		Petronil 75 WP	Mancozeb		●	●			●										**3**
M3		Polaram 80 WP	Mancozeb		●														**3**
M3	**4**	Ridomil 4/64 WG	Mancozeb	Metalaxyl/Mefenoxam	●				●		●								**3**
M3	**43**	Trivia 73 WP	Propineb	Fluopicolide	●	●	●	●	●			●				●			**4**
M3		Viktory 80 WP	Mancozeb																**3**
M4		Ingrofol	Captan			●					●								**5**
M5		Agrionil 75 WP	Chlorothalonil																**4**
M5		Daconil 75 WP	Chlorothalonil		●	●	●	●				●							**4**
M5		Grownil 75 WP	Chlorothalonil		●			●											**4**
M5		Karibu 75 WP	Chlorothalonil		●	●	●												**4**
M5	**40**	Revus 440 SC	Chlorothalonil	Mandipropamid	●														**3**
M5		Supranil 75 WP	Chlorothalonil		●														**4**
P1	**M3**	Bion M 1/48 WP	Acibenzolar-S-methyl	Mancozeb	●		●												**4**

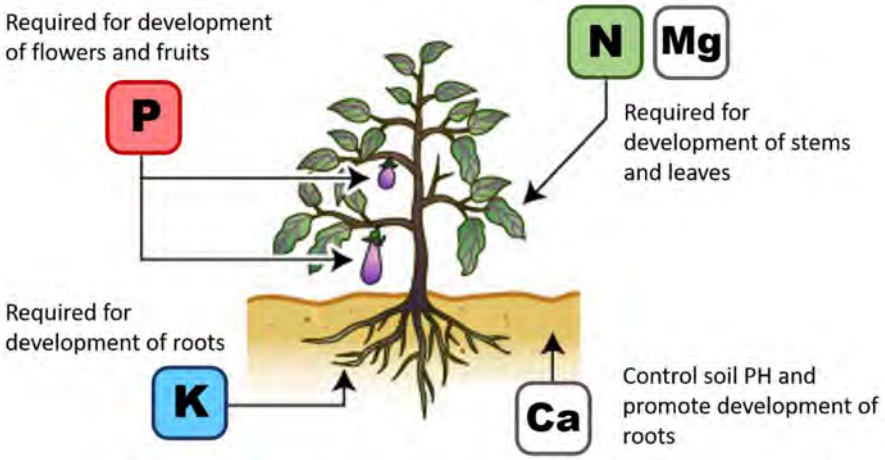
List of Harbicide

Group	Product Name	Active Ingredient	Target weeds		Application		Max. Usage
			Wide Leaf	Poaceae	Leaf	Soil	(time)
B	Ally Plus && WP	Metsulfuron-methyl	●		●		2
C1	Zenicore 70 WP	Metribuzin	●	▲	●	●	2
D	Gramoxone 276 SL	Paraquat dichloride	●	●	●		3
D	Paraxone 276SL	Paraquat dichloride	●	●	●		3
G	Bom-Up 520 SL	Glyphosate-isopropyl ammonium	●	●	●		1
G	Ruso 485SL	Glyphosate-isopropyl ammonium	●	●	●		1
G	Crash 480 AS	Glyphosate-isopropyl ammonium	●	●	●		1
G	Konup 490 SL	Glyphosate-isopropyl ammonium	●	●	●		1
G	Roundup 486SL	Glyphosate-isopropyl ammonium	●	●	●		1
G	Supremo 480SL	Glyphosate-isopropyl ammonium	●	●	●		1

Cultivation in Rainy Season

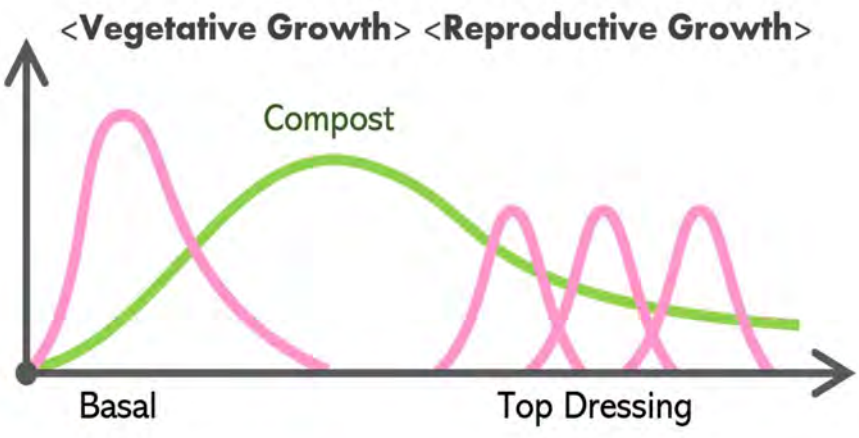
Nutrients Requirement

Each nutrient has different functions for plant growth. Nitrogen (N) is the most important element since it helps the stem and leaves grow. However, nitrogen excess is harmful to the plant. Nitrogen could make a plant weak against disease, pests, and insects.



Design of Fertilization

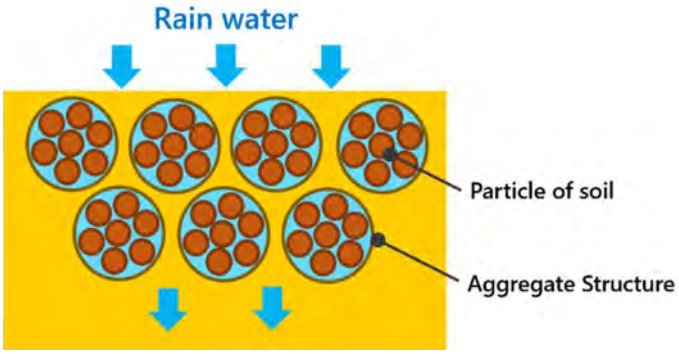
The Effect of compost appears slowly but it lasts for a long time. When we apply compost, we should consider it when it becomes effective. While prosphoras (P) stays in the soil for a long time, N is released into water and air soon after applying. Therefore, N should not be applied at once. Considering the balance of the plant body and the root, N and potassium (K) should be applied together.



Characteristics of Compost

Improvement of soil structure (nutrients retaining, moisture control, pH control)

Compost improves the soil structure and the capacity of retaining fertilizer and moisture. While the good soil retains moisture, it drains the water very well. So, good soil can keep optimal moisture content for plants. Compost also controls the pH of the soil by supplying organic matters into the soil.



Increasing micro-organisms (decomposition, disease control)

Compost propagates micro-organisms in the soil. Micro-organisms decompose organic matters in the soil. So that plants can absorb the decomposed nutrients. Also, the micro-organisms can control bacteria and fungus in the soil. Consequently, the soil-borne disease will be controlled by applying compost.

Nutrients effects (NPK and micro-nutrients such as Mn, Fe, Cu, Mg, S)

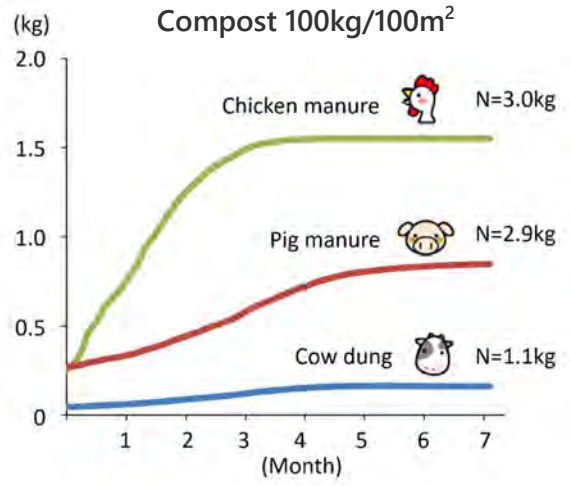
Compost contains NPK and other micro-nutrients. Since most of the chemical fertilizers do not contain micro-nutrients, applying compost is required for growing healthy plants. When we apply compost, the amount of nitrogen should be considered carefully.

Chemical Composition of Manure

Manure Type	N	P	K
Cow dung	1.1	1.1	2.1
Goat manure	2.6	0.4	4.6
Pig manure	2.9	4.2	2.3
Chicken manure	3.0	4.9	3.5

Actual effects of nitrogen

The nitrogen effect of compost appears gradually. The peak of the effect of chicken manure is 3 to 4 months after application. Not all nitrogen can be absorbed by plants, but the effect lasts for longer than chemical fertilizers.



Basic Design of Fertilization

Standard of fertilizer application

The formula below can be applied to most of the fruit vegetables. If you have no idea about the amount of fertilizer, you just follow the formula and observe how the plant grows. The actual nutrients requirement depends on how to grow, the variety of the plant, soil conditions, weather conditions, etc. Observing the plant condition, the amount of fertilizer should be adjusted. Since the growth condition is different, the nutrients requirement of the plant is not the same in dry season and rainy season.

Fartilizetion Standard (kg/100m2)

Element	N	P	K	Ca	Mg
Total Requirement	2.4	0.8	4.0	3.2	0.6

This standard can be applied for most of the furit vegetables such as tomato, kyuri, nasu, piman, melon, water melon, kabocha etc.

Composition of nutrients

When you apply fertilizers, consider the composition of nutrients. Notably, nitrogen excess is harmful to the plant. The composition of compost depends on the materials. It can be calculated by the amount of manure.

Composition of nutrients (%)

Type	N	P	K	Ca	Mg	Mn
Urea	46.0					
NPK	16.0	16.0	16.0			
SP36		36.0				
KCL			60.0			
Dromite				25.0	11.0	
Compost	1.0	2.0	1.0	2.0	0.5	0.5

Tomato

Nutrients requirement of tomato

Other than nitrogen, tomato requires prosphoras, potassium, calcium, and other micro-nutrients. Since the cultivation period of tomato is relatively long, nitrogen and potassium should be applied little by little. Considering the characteristic of tomato, nitrogen excess should be avoided.

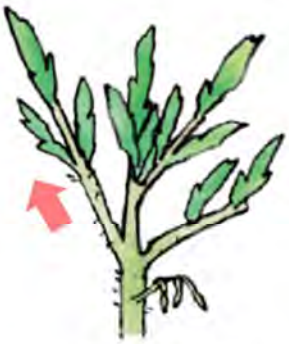
Current Recommendation (kg/100m2)

Category	Item	Amount	Times	N	P	K	Ca	Mg	Mn
Basal	Dolomite	10	1				2.50	1.10	
	Compost*	200	1	2.00	4.00	2.00	4.00	1.00	1.00
Basal	NPK (16-16-16)	5	1	0.80	0.80	0.80			
	SP36 (0-36-0)	4	1		1.44				
Top-dressing	Urea (46-0-0)	0.4	8	1.47					
	KCl (0-0-60)	0.4	8			1.92			
		Total		**4.27**	**6.24**	**4.72**	**6.50**	**2.10**	**1.00**
		Standard		2.5-3.0	1.8-2.2	2.5-3.0	1.5	0.5	---

Nitrogen application for tomato

To apply nitrogen to tomato properly, the plant condition of the tomato should be observed. Both nitrogen deficiency and nitrogen excess cause poor growth and disease infections.

Nitrogen deficiency



The leaves become thin and grow upward. The leaf veins turn deep purple

Optimal Condition

The leaves grow horizontally.

Nitrogen Excess

Unevenness appears on the leaves. The leaves curl down.

Nitrogen deficiency

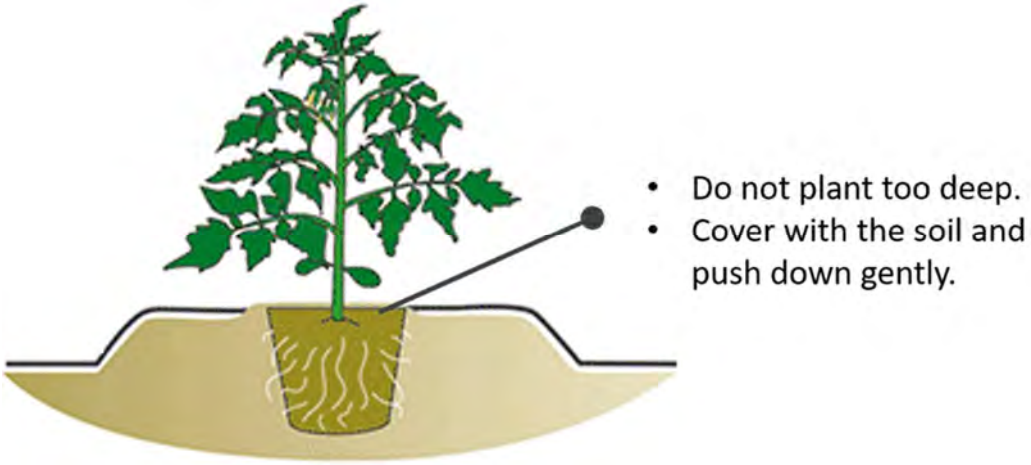
Nitrogen Excess

Transplanting of tomato

Transplant seedlings properly. Transplanting is a simple work, but it is very important for the seedling.

*Shallow planting: The plant may not take roots in the soil.

*Deep planting: Unnecessary roots may appear and the plants grow too strong.



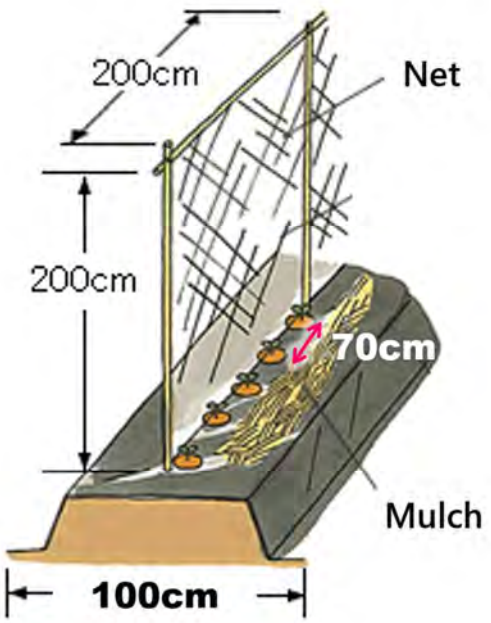
Trimming unnecessary leaves and vines

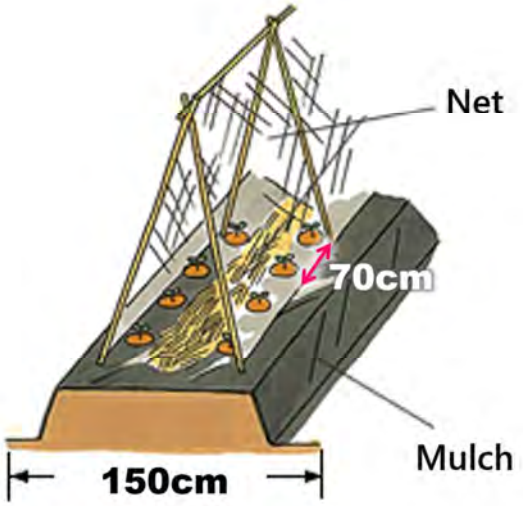
Trim unnecessary leaves and vines in the lower part of the plant. Scissors could transmit diseases. Do not use the same scissors for healthy plants and infected plants at the same time.

Kyuri

Planting space

Usually, a 50cm of the space between the plants is enough for Kyuri cultivation. However, more space is recommended in the rainy season. The number of plants in the field will decrease, but it is expected that each plant has more fruits in the preferable environment.





Basic plant management

Trim unnecessary leaves and vines in the lower part of the plant. (Do not pinch cotyledon.) Remove the infected leaves especially with powdery mildew, downy mildew as soon as it is found. After pollination, the vines near the fruit is not necessary. To save the nutrients and to keep enough space for the plant, cut them out.

Kabocha

Planting space

Usually, a 60cm of the space between the plants is enough for Kaboca vertical cultivation. However, more space is recommended in the rainy season. The number of plants in the field will decrease, but it reduces the risk of disease infection. Since Kabocha prefers dry conditions, the higher bed should be prepared.

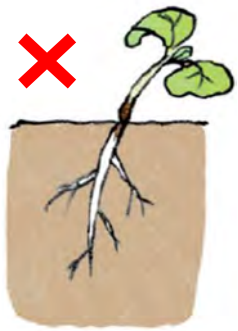
Basic plant management

Trim unnecessary leaves and vines in the lower part of the plant. (Do not pinch cotyledon.) Remove the infected leaves especially with powdery mildew, downy mildew as soon as it is found. After pollination, the vines near the fruit is not necessary. To save the nutrients and to keep enough space for the plant, cut them out.

Broccoli

Healthy seedling

Using healthy seedling is very important. The soil for the nursery bed should be fungus free. Use new soil or sterilize the soil. For transplanting, select good seedlings that are not affected by fungus disease.



The plant is infected with filamentous fungi, such as Rhizoctonia solani.

Soil-borne disease

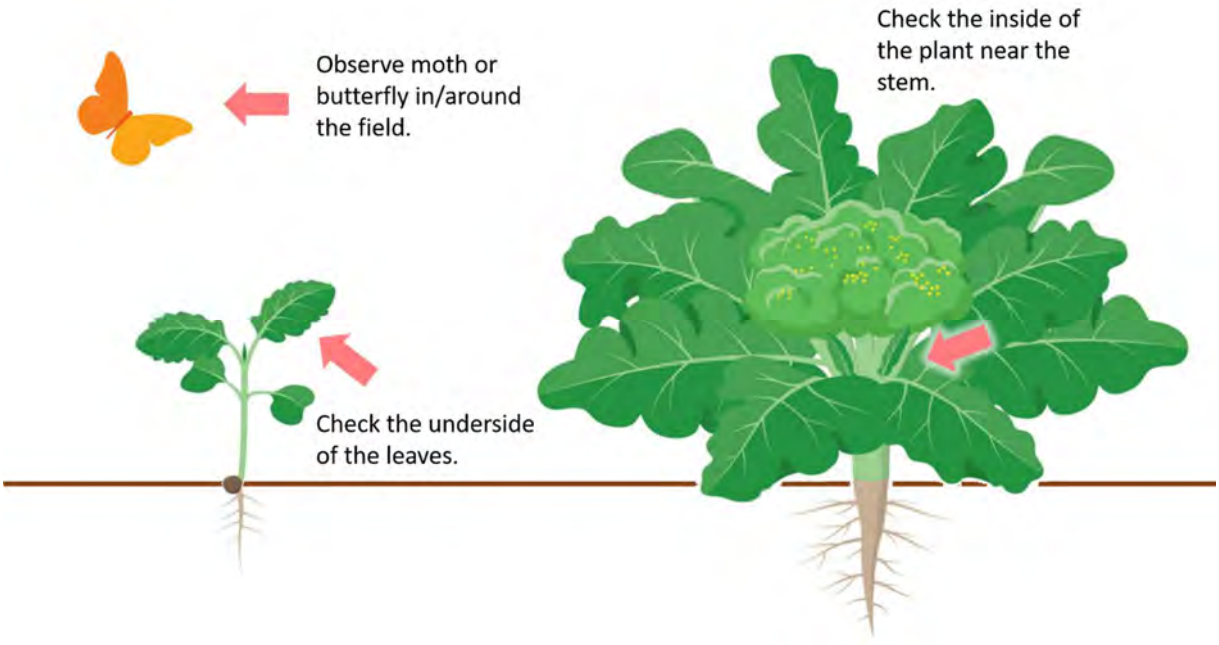
The field where root disease was observed in the previous season should be treated by Daconil. Or plant the other plants such as onion, lettuce, and avoid planting brassica family.

Caterpillar control

Observation of the field is important to control worms and take immediate actions since spray type of insecticide does not work for prevention. Or cover the plants with a net. Using companion plants such as lettuce, carrot could reduce the density of worms.

Measures to control worms

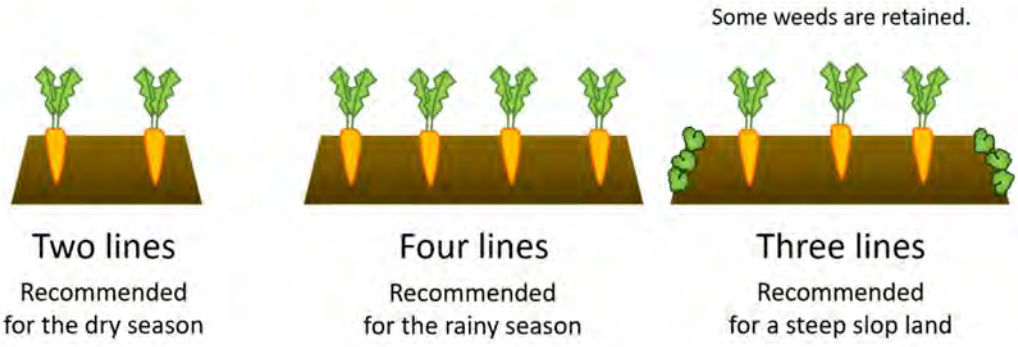
Step 1: Observe the field and check if a moth or butterfly, which is an adult insect of the worms, is flying around. Step 2: If moth or butterfly is observed in the field, check the underside of the leaves, and remove the small worms or eggs. Step 3: If worms are detected on the upper side of the leaves, spray insecticide. ・ Spray type of insecticide does not work for preventing caterpillars. Apply the insecticide directly to the worms. ・ Spray both sides of the leaves. ・ Avoid a rainy day for spraying the insecticide.



Carrot

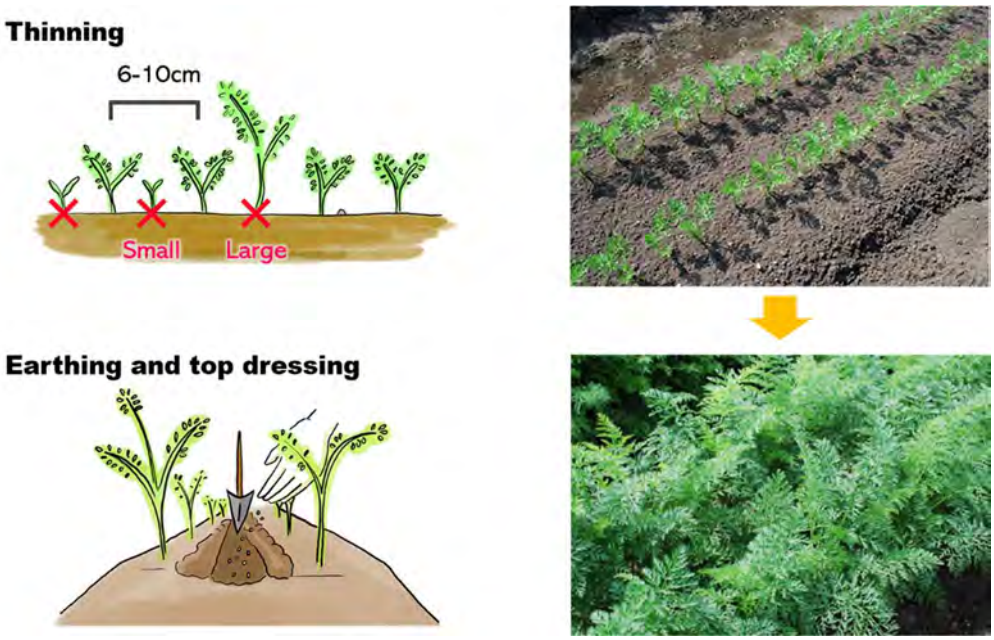
Bed preparation

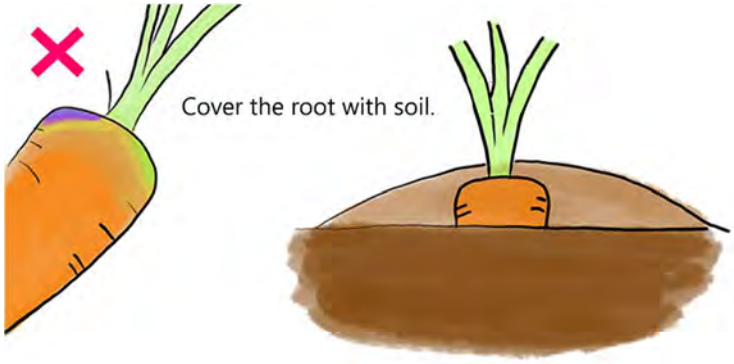
Prepare a large bed and plant carrot in four lines each bed.



Thinning, earthing, and top dressing

Do proper thinning to grow an optimal size of a carrot. Cultivate the soil between lows from time to time for aeration of the soil. Top-dressing can be done with earthing. It also effective to control the moisture of the soil.





Annex 8.2. Planting and Work Calendars

Planting and Work Calendar (Chili)

Code

Name Variety Area 100 ㎡

Farmer Group Address Desa Kec.

Work	Application	Quantity	Purpose	Scheduled Date	Applied Date
●Seed sowing				1-Oct	
●Seedlings Sterilization (fungicide)	Captan (Captan)	Dilution rate: x800 2L/m²	Preventive care for bacterial wilt	14-Oct	
●Pot-up				15-Oct	
(Land Preparation)					
Basal fertilization (100m2)	Compost	200kg/100㎡		7-Nov	
Basal fertilization (100m2)	NPK (16-16-16)	5kg/100㎡	Basal fertilizer	7-Nov	
Basal fertilization (100m2)	SP36 (0-36-0)	4kg/100㎡	Basal fertilizer	7-Nov	
Basal fertilization (100m2)	Dolomit	10kg/100㎡	Basal fertilizer	7-Nov	
●Seedlings Sterilization (fungicide)	DACONIL (TPN)	Dilution rate: ×1000 10～30L/100m²	Preventive care for bacterial diseases (Leaf mold)	13-Nov	
Pesticide application	Marshal (Carbosulfan granule)	2g/bibit Apply in planting hole	Preventive care for whiteflies	14-Nov	
Transplant				14-Nov	
Fungicide application	Funguran (Copper sulfate)	Dilution rate: x400 10～30L/100m²	Preventive care for bacterial diseases (Leaf mold)	5-Dec	
Start of harvest				13-Jan	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	14-Jan	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	24-Jan	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	3-Feb	
Fungicide application	DACONIL (TPN)	Dilution rate: x1000 10～30L/100m²	Preventive care for bacterial disease	3-Feb	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	13-Feb	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	23-Feb	
Fungicide application	Funguran (Copper sulfate)	Dilution rate: x400 10～30L/100m²	Preventive care for bacterial disease	23-Feb	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	4-Mar	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	14-Mar	
End of harvest				13-Mar	
Harvest		kg			
Harvest		kg			

I agree to grow a plant according to this planting schedule. ini.

Name _____ Signature _____

Planting and Work Calendar (Tomato)

Code

Name　　Variety　　Area　　㎡

Farmer Group　　Address　　Kec.

Work	Application	Quantity	Purpose	Scheduled Date	Applied Date
●Seed sowing				1-Oct	
●Seedlings Sterilization (fungicide)	Captan (Captan)	Dilution rate: x800 2L/m²	Preventive care for bacterial wilt	14-Oct	
●Pot-up				15-Oct	
(Land Preparation)					
Basal fertilization (100m2)	Compost	200kg/100㎡		7-Nov	
Basal fertilization (100m2)	NPK (16-16-16)	5kg/100㎡	Basal fertilizer	7-Nov	
Basal fertilization (100m2)	SP36 (0-36-0)	4kg/100㎡	Basal fertilizer	7-Nov	
Basal fertilization (100m2)	Dolomit	10kg/100㎡	Basal fertilizer	7-Nov	
●Seedlings Sterilization (fungicide)	DACONIL (TPN)	Dilution rate: ×1000 10～30L/100m²	Preventive care for bacterial diseases (Leaf mold)	13-Nov	
Pesticide application	Marshal (Carbosulfan granule)	2g/bibit Apply in planting hole	Preventive care for whiteflies	14-Nov	
Transplant				14-Nov	
Fungicide application	Funguran (Copper sulfate)	Dilution rate: x400 10～30L/100m²	Preventive care for bacterial diseases (Leaf mold)	5-Dec	
Start of harvest				13-Jan	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	14-Jan	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	24-Jan	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	3-Feb	
Fungicide application	DACONIL (TPN)	Dilution rate: x1000 10～30L/100m²	Preventive care for bacterial disease	3-Feb	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	13-Feb	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	23-Feb	
Fungicide application	Funguran (Copper sulfate)	Dilution rate: x400 10～30L/100m²	Preventive care for bacterial disease	23-Feb	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	4-Mar	
Top-dressing	Urea (46-0-0) KCl	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	14-Mar	
End of harvest				13-Mar	
Harvest		kg			
Harvest		kg			

I agree to grow a plant according to this planting schedule.

Name　　Signature

Planting and Work Calendar (Tomato)

Code

Name　　Variety　　Area

Farmers Group　　Address　Desa　　Kec.　　Kab.

Work	Application	Quantity	Purpose	Scheduled date	Applied date
●Seed sowing				1-Oct	
●Fungiside application (1)	Captan (Captan)	Dilution rate: x 800 2L/m²	Preventive care for bacterial wilt	14-Oct	
●Pot-up				15-Oct	
(Land Preparation)					
Basal fertilization	Dolomite	10kg/100m2	pH adjustment	30-Oct	
Basal fertilization	Compost	100kg/100m2	Basal fertilizer	30-Oct	
Basal fertilization	NPK (16-16-16)	3kg/100m2	Basal fertilizer	9-Nov	
Basal fertilization	SP36 (0-36-0)	4kg/100m2	Basal fertilizer	9-Nov	
Pesticide application	Marshal (Carbosulfan granule)	2g/seedling Apply in planting holes	Preventive care for whiteflies	13-Nov	
●Fungicide application (2)	DACONIL (TPN)	Dilution rate: ×1000 10～30L/100m²	Preventive care for bacterial diseases (Leaf mold)	14-Nov	
Transplant				14-Nov	
Fungicide application(3)	Funguran (copper sulfate)	Dilution rate: ×400 10～30L/100m²	Preventive care for bacterial diseases	24-Nov	
Start of harvest				13-Jan	
Top-dressing(1)	Urea (46-0-0) KCl	0.4kg/100m2 0.4kg/100m2	Top-dressing	13-Jan	
Fungicide application(4)	DACONIL (TPN)	Dilution rate: ×1000 10～30L/100m²	Preventive care for bacterial diseases (Leaf mold)	13-Jan	
Top-dressing(2)	Urea (46-0-0) KCl	0.4kg/100m2 0.4kg/100m2	Top-dressing	23-Jan	
Fungiside application(5)	Funguran (copper sulfate)	Dilution rate: ×400 10～30L/100m²	Preventive care for bacterial diseases	28-Jan	
Top-dressing(3)	Urea (46-0-0) KCl	0.4kg/100m2 0.4kg/100m2	Top-dressing	2-Feb	
Top-dressing(4)	Urea (46-0-0) KCl	0.4kg/100m2 0.4kg/100m2	Top-dressing	12-Feb	
Fungiside application(6)	Funguran (copper sulfate)	Dilution rate: ×400 10～30L/100m2	Preventive care for bacterial diseases	12-Feb	
Top-dressing(5)	Urea (46-0-0) KCl	0.4kg/100m2 0.4kg/100m2	Top-dressing	22-Feb	
Top-dressing(6)	Urea (46-0-0) KCl	0.4kg/100m2 0.4kg/100m2	Top-dressing	3-Mar	
Top-dressing(7)	Urea (46-0-0) KCl	0.4kg/100m2 0.4kg/100m2	Top-dressing	13-Mar	
End of harvest				13-Mar	
Harvest		kg			
Harvest		kg			

I agree to grow a plant according to this planting schedule.

Name　　Signature

Planting and Work Calendar (Carrot)

Code

Name　　Variety　　Area　100 ㎡

Farmers Group　　Address　Desa　Kec.　Kab.

Work	Application	Quantity	Purpose	Scheduled date	Applied date
Basal fertilization of the trial plot (100m^2)	Compost	200kg/100㎡		1-Oct	
Basal fertilization of the trial plot (100m^2)	NPK (16-16-16)	10kg/100㎡	Basal fertilizer	22-Oct	
Basal fertilization of the trial plot (100m^2)	Dolomite	10kg/100㎡	Basal fertilizer	22-Oct	
Pesticide application of the trial plot (Pesticide)	Marshal (Carbosulfan granule)	500g/100㎡	Preventive care for nematode	22-Oct	
Seed sowing				29-Oct	
Pesticide application of the trial plot (Fungicide)	DACONIL (TPN)	Dilution rate: ×1000 10～30L/100㎡	Preventive care for bacterial diseases	20-Nov	
Top-dressing of the trial plot	NPK (16-16-16)	3kg/100㎡	Top-dressing	29-Nov	
Pesticide application of the trial plot (Fungicide)	DACONIL (TPN)	Dilution rate: ×1000 10～30L/100㎡	Preventive care for bacterial diseases	10-Dec	
Top-dressing of the trial plot	NPK (16-16-16)	3kg/100㎡	Top-dressing	23-Dec	
Start of harvest				27-Jan	
End of harvest				28-Jan	
Harvest		kg			
Harvest		kg			

I agree to grow a plant according to this planting schedule.

Name　　Signature

Planting and Work Calendar (Bean)

Code

Name　　Variety　　Area　100 ㎡

Farmer Group　　Address　Desa　Kec.

Work	Application	Quantity	Purpose	Scheduled Date	Applied Date
●Seed sowing				1-Oct	
(Land Preparation)					
Basal fertilization (100m2)	Compost	200kg/100㎡		14-Oct	
Basal fertilization (100m2)	NPK (16-16-16)	8kg/100㎡	Basal fertilizer	14-Oct	
Basal fertilization (100m2)	SP36 (0-36-0)	2kg/100㎡	Basal fertilizer	14-Oct	
Basal fertilization (100m2)	Dolomit	10kg/100㎡	Basal fertilizer	14-Oct	
Fungicide application	Daconil	Dilution rate: x1000 10～30L/100㎡	Preventive care for Antrachnose	20-Oct	
Application pestisida plot percobaan (Pestisida)	Marshal (Carbosulfan granule)	2g/bibit Apply in planting hole	Preventive care for mite	21-Oct	
Transplant				21-Oct	
Top-dressing	Urea (46-0-0)	0.5kg/100㎡	Top-dressing	15-Nov	
Start of harvest				20-Nov	
Top-dressing	Urea (46-0-0)	0.5kg/100㎡	Top-dressing	12-Dec	
End of harvest				4-Jan	
Harvest		kg			

I agree to grow a plant according to this planting schedule.

Name　　Signature

Planting and Work Calendar (Broccoli)

Code

Name | Variety | Area 100 ㎡

Farmer Group | Address Desa Kec.

Work	Application	Quantity	Purpose	Scheduled Date	Applied Date
●Seed sowing				1-Oct	
●Pot-up				15-Oct	
(Land Preparation)					
Basal fertilization (100m2)	Compost	200kg/100㎡		28-Oct	
Basal fertilization (100m2)	NPK (16-16-16)	15kg/100㎡	Basal fertilizer	28-Oct	
Basal fertilization (100m2)	Dolomit	10kg/100㎡	Basal fertilizer	28-Oct	
●Seedlings Sterilization (fungicide)	DACONIL (TPN)	Dilution rate: x1000 10～30L/100㎡	Preventive care for bacterial disease	3-Nov	
Pesticide application	Marshal (Carbosulfan granule)	2g/bibit Apply in planting hole	Tindakan pencegahan terhadap insek	4-Nov	
Transplant				4-Nov	
Fungicide application	Funguran (Copper sulfate)	Dilution rate: x500 10～30L/100㎡	Preventive care for bacterial disease	18-Nov	
Top-dressing	Urea (46-0-0)	0.4kg/100㎡	Top-dressing	25-Nov	
Fungicide application	Funguran (Copper sulfate)	Dilution rate: x500 10～30L/100㎡	Preventive care for bacterial disease	9-Dec	
Top-dressing	Urea (46-0-0)	0.4kg/100㎡	Top-dressing	14-Nov	
Start of harvest				3-Jan	
End of harvest				17-Jan	
Harvest		kg			

Planting and Work Calendar (Red Cabbage)

Code

Name | Variety | Area 100 ㎡

Farmers Group | Address Desa Kec. Kab.

Work	Application	Quantity	Purpose	Scheduled date	Applied date
●Seed sowing				1-Oct	
●Pot up				15-Oct	
(Land Preparation)					
Basal fertilization of the trial plot (100m2)	Compost	200kg/100㎡		28-Oct	
Basal fertilization of the trial plot (100m2)	NPK (16-16-16)	15kg/100㎡	Basal fertilizer	28-Oct	
Basal fertilization of the trial plot (100m2)	Dolomite	10kg/100㎡	Basal fertilizer	28-Oct	
●Sterilization of seedlings (Fungicide)	DACONIL (TPN)	Dillution rate: x1000 10～30L/100㎡	Preventive care for bacterial diseases	3-Nov	
Pesticide application of the trial plot (Pesticide)	Marshal (Carbosulfan granule)	2g/seedling Apply in planting holes	Preventive care for insects	4-Nov	
Transplant				4-Nov	
Pesticide application of the trial plot (Fungicide)	Funguran (copper sulfate)	Dillution rate: x500 10～30L/100㎡	Preventive care for bacterial diseases	18-Nov	
Top dressing of the trial plot	Urea (46-0-0)	0.4kg/100㎡	Top Dressing	25-Nov	
Pesticide application of the trial plot (Fungicide)	Funguran (copper sulfate)	Dillution rate: x500 10～30L/100㎡	Preventive care for bacterial diseases	9-Dec	
Top dressing of the trial plot	Urea (46-0-0)	0.4kg/100㎡	Top Dressing	14-Nov	
Start of Harvest				3-Jan	
Harvest		kg			

I agree to grow a plant according to this planting schedule.

Name _____ Signature _____

Planting and Work Calendar (Head Lettuce)

Code

Name Variety Area 100 ㎡

Farmers Group Address Desa Kec. Kab.

Work	Application	Quantity	Purpose	Scheduled date	Applied date
●Seed sowing	On cell tray			1-Oct	
(Land Preparation)					
Basal fertilization of the trial plot (100m2)	Compost	200kg/100㎡		14-Oct	
Basal fertilization of the trial plot (100m2)	NPK (16-16-16)	15kg/100㎡	Basal fertilizer	14-Oct	
Basal fertilization of the trial plot (100m2)	Dolomite	10kg/100㎡	Basal fertilizer	14-Oct	
●Sterilization of seedlings (Fungicide)	DACONIL (TPN)	Dillution rate: x1000 10～30L/100㎡	Preventive care for bacterial diseases	20-Oct	
Pesticide application of the trial plot (Pesticide)	Marshal (Carbosulfan granule)	2g/seedling Apply in planting holes	Preventive care for insects	21-Oct	
Transplant				21-Oct	
Pesticide application of the trial plot (Fungicide)	Funguran (copper sulfate)	Dillution rate: x500 10～30L/100㎡	Preventive care for bacterial diseases	4-Nov	
Top dressing of the trial plot	Urea (46-0-0)	0.4kg/100㎡	Top Dressing	11-Nov	
Pesticide application of the trial plot (Fungicide)	Funguran (copper sulfate)	Dillution rate: x500 10～30L/100㎡	Preventive care for bacterial diseases	25-Nov	
Top dressing of the trial plot	Urea (46-0-0)	0.4kg/100㎡	Top Dressing	31-Oct	
Start of Harvest				10-Dec	
Harvest		kg			
Harvest		kg			

I agree to grow a plant according to this planting schedule.

Name _____ Signature _____

Planting and Working Calendar (Kyuri)

Code

Name : Variety : Saema Area : 100 ㎡

Farmer Group : Address : Desa Kec. Kab.

Work	Application	Quantity	Purpose	Schedule	Applied Date
●Seed Sawing				1-Oct	
●Sterilization of seedlings (Fungicide)	Captan (Captan)	Dilution rate: × 800, 2L/m²	Preventive care for bacterial wilt	8-Oct	
●Pot-up				9-Oct	
(Land Preparation)					
Basal fertilization of the trial plot (100m^2)	Compost	300kg/100㎡		19-Oct	
Basal fertilization of the trial plot (100m^2)	NPK (16-16-16)	13kg/100㎡	Basal fertilizer	19-Oct	
Basal fertilization of the trial plot (100m^2)	Dolomite	10kg/100㎡	Basal fertilizer	19-Oct	
●Sterilization of seedlings (Fungicide)	DACONIL (TPN)	1000 times 10～30L/100㎡	Preventive care for bacterial diseases	28-Oct	
Pesticide application of the trial plot (Pesticide)	Marshal (Carbosulfan granule)	2g/plant Saat tanam	Preventive care for whiteflies	29-Oct	
Transplant				29-Oct	
Pesticide application of the trial plot (Fungicide)	Funguran	400 times 10～30L/100㎡	Preventive care for bacterial diseases	19-Nov	
Start of harvest				28-Nov	
Top-dressing of the trial plot	Urea(46-0-0) KCL	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	29-Nov	
Weeding					
Top-dressing of the trial plot	Urea(46-0-0) KCL	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	9-Dec	
Top-dressing of the trial plot	Urea(46-0-0) KCL	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	19-Dec	
Pesticide application of the trial plot (Fungicide)	DACONIL (TPN)	1000 times 10～30L/100㎡	Preventive care for bacterial diseases	19-Dec	
Top-dressing of the trial plot	Urea(46-0-0) KCL	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	29-Dec	
Top-dressing of the trial plot	Urea(46-0-0) KCL	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	8-Jan	
Pesticide application of the trial plot (Fungicide)	Funguran	400 times 10～30L/100㎡	Preventive care for bacterial diseases	8-Jan	
Top-dressing of the trial plot	Urea(46-0-0) KCL	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	18-Jan	
Top-dressing of the trial plot	Urea(46-0-0) KCL	0.4kg/100㎡ 0.4kg/100㎡	Top-dressing	28-Jan	
End of harvest				27-Feb	
Harvest		kg			
Harvest		kg			

I agree to grow and deliver the commodity to the designated collection center as stated above.

Name _____ Signature _____

Planting and Work Calendar (Nasu)

Code

Name　　Variety　　Area　400 ㎡

Farmers Group　　Address　Desa　Kec.　Kab.

Work	Application	Quantity	Purpose	Scheduled date	Applied date
●Seed sowing				1-Oct	
●Sterilizasi seedling (Fungicide)	Captan(Captan)	Dillution rate: x800 2L/m²	Preventive care for bacterial wilt	7-Oct	
●Pot up				8-Oct	
Basal fertilization of the trial plot (100m2)	Compost	800kg/400m²		5-Nov	
Basal fertilization of the trial plot (100m2)	NPK （16-16-16)	48kg/400m²	Basal fertilizer	5-Nov	
Basal fertilization of the trial plot (100m2)	SP36 (0-36-0)	5.6kg/400m²	Basal fertilizer	5-Nov	
Basal fertilization of the trial plot (100m2)	Dolomite	40kg/400m²	Dillution rate　(adjust pH 6 -6.5)	5-Nov	
●Sterilization of seedlings (Fungicide)	DACONIL (TPN)	Dillution rate: ×1000 10～30L/100m²	Preventive care for bacterial diseases (leaf mold)	11-Nov	
Pesticide application of the trial plot (Pesticide)	Marshal (Carbosulfan granule)	2g/seedling Apply in planting holes	Preventive care for whiteflies	12-Nov	
Transplant				12-Nov	
Fungicide application of the trial plot	Funguran (copper sulfate)	Dillution rate: x400 10～30L/100m²	Preventive care for bacterial diseases	26-Nov	
Start of Harvest				22-Dec	
Top dressing of the trial plot	Urea (46-0-0) KCL SP36	1.6kg/400m² 1.6kg/400m² 0.8kg/400m²	Top dressing	23-Dec	
Top dressing of the trial plot	Urea (46-0-0) KCL SP36	1.6kg/400m² 1.6kg/400m² 0.8kg/400m²	Top dressing	2-Jan	
Top dressing of the trial plot	Urea (46-0-0) KCL SP36	1.6kg/400m² 1.6kg/400m² 0.8kg/400m²	Top dressing	12-Jan	
Fungicide application of the trial plot	DACONIL (TPN)	Dillution rate: ×1000 10～30L/100m²	Preventive care for bacterial diseases (leaf mold)	12-Jan	
Top dressing of the trial plot	Urea (46-0-0) KCL SP36	1.6kg/400m² 1.6kg/400m² 0.8kg/400m²	Top dressing	22-Jan	
Top dressing of the trial plot	Urea (46-0-0) KCL SP36	1.6kg/400m² 1.6kg/400m² 0.8kg/400m²	Top dressing	1-Feb	
Fungicide application of the trial plot	Funguran (copper sulfate)	Dillution rate: ×400 10～30L/100m²	Preventive care for bacterial diseases	1-Feb	
Top dressing of the trial plot	Urea (46-0-0) KCL SP36	1.6kg/400m² 1.6kg/400m² 0.8kg/400m²	Top dressing	11-Feb	
End of harvest				21-Mar	
Harvest		kg			
Harvest		kg			

I agree to grow a plant according to this planting schedule.

Name　　Signature

Planting and Work Calendar (Piman)

Code

Name　　Variety　　Area

Farmers Group　　Address　Desa　　Kec.　　Kab. Cianjur

Work	Application	Quantity	Purpose	Scheduled date	Applied date
●Seed sowing				1-Oct	
●Sterilizasi seedling (Fungicide)	Captan(Captan)	Dillution rate: x800 2L/m²	Preventive care for bacterial wilt	14-Oct	
●Pot up				15-Oct	
Basal fertilization of the trial plot (100m2)	Compost	200kg/100m²		7-Nov	
Basal fertilization of the trial plot (100m2)	NPK (16-16-16)	12kg/100m²	Basal fertilizer	7-Nov	
Basal fertilization of the trial plot (100m2)	SP36 (0-36-0)	3kg/100m²	Basal fertilizer	7-Nov	
Basal fertilization of the trial plot (100m2)	Dolomite	10kg/100m²	Dillution rate (sesuaikan pH 6 -6.5)	7-Nov	
● Sterilization of seedlings (Fungicide)	DACONIL (TPN)	Dillution rate: ×1000 10～30L/100m²	Preventive care for bacterial diseases (leaf mold)	13-Nov	
Pesticide application of the trial plot (Pesticide)	Marshal (Carbosulfan granule)	2g/seedling Apply in planting holes	Preventive care for whiteflies	14-Nov	
Transplant				14-Nov	
Fungicide application of the trial plot	Funguran (copper sulfate)	Dillution rate: x400 10～30L/100m²	Preventive care for bacterial diseases	28-Nov	
Start of Harvest				24-Dec	
Top dressing of the trial plot	Urea (46-0-0) KCl	0.8kg/100m² 0.6kg/100m²	Top dressing	25-Dec	
Top dressing of the trial plot	Urea (46-0-0) KCl	0.8kg/100m² 0.6kg/100m²	Top dressing	4-Jan	
Top dressing of the trial plot	Urea (46-0-0) KCl	0.8kg/100m² 0.6kg/100m²	Top dressing	14-Jan	
Fungicide application of the trial plot	DACONIL (TPN)	Dilution rate: ×1000 10～30L/100m²	Preventive care for bacterial diseases (leaf mold)	14-Jan	
Top dressing of the trial plot	Urea (46-0-0) KCl	0.8kg/100m² 0.6kg/100m²	Top dressing	24-Jan	
Top dressing of the trial plot	Urea (46-0-0) KCl	0.8kg/100m² 0.6kg/100m²	Top dressing	3-Feb	
Fungicide application of the trial plot	Funguran (copper sulfate)	Dillution rate: ×400 10～30L/100m²	Preventive care for bacterial diseases	3-Feb	
Top dressing of the trial plot	Urea (46-0-0) KCl	0.8kg/100m² 0.6kg/100m²	Top dressing	13-Feb	
End of harvest				23-Mar	
Harvest		kg			
Harvest		kg			

I agree to grow a plant according to this planting schedule.

Name　　Signature

Planting and Working Calendar (Kaocha)

Code

Name : Variety : Area:

Farmer Group : Address : Kec.

Work	Application	Quantity	Purpose	Schedule	Applied Date
●Seed Sowing				1-Oct	
●Pot-up				8-Oct	
(Land Preparation)					
Basal fertilization	Dolomite	100g/m2	pH adjustment	16-Oct	
Basal fertilization	Compost	1kg/m2	Basal fertilizer	16-Oct	
Basal fertilization	NPK (16-16-16)	25g/m2	Basal fertilizer	26-Oct	
●Fungicide application (1)	DACONIL (TPN)	1000 times 10～30L/100㎡	Preventive care for bacterial diseases	30-Oct	
Pesticide application	Marshal (Carbosulfan granule)	2g/plant transplanting	Preventive care for aphids, mites etc.	31-Oct	
Transplanting				31-Oct	
Pruning and thining				6 - 26 Nov	
Top-dressing(1)	NPK (16-16-16)	10g/m2	Top-dressing	10-Nov	
Fungicide application(2)	Funguran	400 times 10～30L/100m2	Preventive care for bacterial diseases	10-Nov	
Fungicide application(3)	DACONIL (TPN)	1000 times 10～30L/100m2	Preventive care for bacterial diseases	20-Nov	
Pollination				30-Nov	
Fungicide application(4)	Funguran	400 times 10～30L/100m2	Preventive care for bacterial diseases	30-Nov	
Top-dressing(2)	NPK (16-16-16)	10g/m2	Top-dressing	10-Dec	
Start of harvest				**10 - 20 Dec**	
End of harvest				24-Jan	
Harvest		kg			
Harvest		kg			

I agree to grow and deliver the commodity to the designated collection center as stated above.

Name Signature:

Planting and Working Calendar (Melon)

Code

Name : Variety : Area:

Farmer Group : Address : Kec.

Work	Application	Quantity	Purpose	Schedule	Applied Date
●Seed Sowing				1-Oct	
●Pot-up				8-Oct	
(Land Preparation)					
Basal fertilization	Dolomite	100g/m2	pH adjustment	16-Oct	
Basal fertilization	Compost	2kg/m2	Basal fertilizer	16-Oct	
Basal fertilization	NPK (16-16-16)	25g/m2	Basal fertilizer	26-Oct	
●Fungicide application (1)	DACONIL (TPN)	1000 times 10～30L/100㎡	Preventive care for bacterial diseases	31-Oct	
Pesticide application	Marshal (Carbosulfan granule)	2g/plant transplanting	Preventive care for aphids, mites etc.	31-Oct	
Transplanting				31-Oct	
Pruning and thining				6 - 16 Nov	
Fungicide application(2)	Funguran	400 times 10～30L/100m2	Preventive care for bacterial diseases	15-Nov	
Pollination				15-Nov	
Fungicide application(3)	DACONIL (TPN)	1000 times 10～30L/100m2	Preventive care for bacterial diseases	20-Nov	
Top-dressing	NPK (16-16-16)	10g/m2	Top-dressing	25-Nov	
Fungicide application(4)	Funguran	400 times 10～30L/100m2	Preventive care for bacterial diseases	30-Nov	
Start of harvest				30-Dec	
End of harvest				9-Jan	
Harvest		kg			
Harvest		kg			

I agree to grow and deliver the commodity to the designated collection center as stated above.

Name Signature:

Planting and Working Calendar (Watermelon)

Code

Name : Variety : Area:

Farmer Group : Address : Kec.

Work	Application	Quantity	Purpose	Schedule	Applied Date
●Seed Sowing				1-Oct	
●Pot-up				8-Oct	
(Land Preparation)					
Basal fertilization	Dolomite	100g/m2	pH adjustment	16-Oct	
Basal fertilization	Compost	2kg/m2	Basal fertilizer	16-Oct	
Basal fertilization	NPK (16-16-16)	50g/m2	Basal fertilizer	26-Oct	
●Fungicide application (1)	DACONIL (TPN)	1000 times 10～30L/100㎡	Preventive care for bacterial diseases	31-Oct	
Pesticide application	Marshal (Carbosulfan granule)	2g/plant transplanting	Preventive care for aphids, mites etc.	31-Oct	
Transplanting				31-Oct	
Pruning and thining				6 - 16 Nov	
Fungicide application(2)	Funguran	400 times 10～30L/100m2	Preventive care for bacterial diseases	10-Nov	
Top-dressing(1)	NPK (16-16-16)	10g/m2	Top-dressing	10-Nov	
Pollination				20-Nov	
Top-dressing(2)	NPK (16-16-16)	10g/m2	Top-dressing	20-Nov	
Fungicide application(3)	DACONIL (TPN)	1000 times 10～30L/100m2	Preventive care for bacterial diseases	20-Nov	
Top-dressing(3)	NPK (16-16-16)	10g/m2	Top-dressing	25-Nov	
Fungicide application(4)	Funguran	400 times 10～30L/100m2	Preventive care for bacterial diseases	30-Nov	
Start of harvest				5-Dec	
End of harvest				15-Dec	
Harvest		kg			
Harvest		kg			

Work and Planting Calendar (Crystal Guava)

Code

Name Variety Area 20 plant

Farmer Group Address Desa Kec. Kab.

Work	Application	Quantity	Purpose	Schedule Date	Application Date
Finish Harvest					
Prunning/Pinching				1-Oct	
Fungicide	AMISTAR TOP (Azoksistrobin and Difenokonazol)	1 L/ plants	Anthracnosa, Pestalotia Phytophthora	3-Oct	
Fertilization	Compost	20 Kg / plants	Top Dressing	8-Oct	
Fertilization/Liming	lime	based on soil pH	Top Dressing	8-Oct	
Fertilization	Jeranti (NPK 16-16-16)	400 g/plants	Top Dressing	8-Oct	
Fertilization	KCl	100 g/plants	Top Dressing	8-Oct	
Fertilization	Calsium Super (Ca, Mg, B)	1 L/ plants (3 g/L)	Top Dressing	8-Oct	
Fungicide	Dithane m-45 (Mankozep)	1 L/plants (2 g/L)	pestalotia	11-Oct	
Insecticide	KANON (Demetoat)	1 L/ plants	Fruit Fly, White Fly	21-Oct	
Akaricide	Samite (Piridaben)	1 L/ plants	Mites	21-Oct	
Fungicide	AMISTAR TOP (Azoksistrobin and Difenokonazol)	1 L/ plants	Anthracnosa, Pestalotia Phytophthora	2-Nov	
Insecticide	KANON (Demetoat)	1 L/ plants	Fruit Fly, White Fly	5-Nov	
Akaricide	Samite (Piridaben)	1 L/ plants	Mites	5-Nov	
Fungicide	Dithane m-45 (Mankozep)	1 L/plants (2 g/L)	pestalotia	5-Nov	
Foliar Fertilization	KNO3 (1g/ L)	1 L/ plants	Fruit Quality	9-Nov	
Fruit trimming	leave 1 or 2 fruit sets			10-Nov	
Bagging				10-Nov	
Fungicide	AMISTAR TOP (Azoksistrobin and Difenokonazol)	1 L/ plants	Anthracnosa, Pestalotia Phytophthora	17-Nov	
Insecticide	Agrimec (abamectin)	1 L/plants	Aphids, White Fly, Fruit Fly, Thrips	20-Nov	
Akaricide	Samite (Piridaben)	1 L/ plants	Mites	20-Nov	
Foliar Fertilization	KNO3 (1g/ L)	1 L/ plants	Fruit Quality	24-Nov	
Fungicide	Dithane m-45 (Mankozep)	1 L/plants (2 g/L)	pestalotia	25-Nov	
Fungicide	AMISTAR TOP (Azoksistrobin and Difenokonazol)	1 L/ plants	Anthracnosa, Pestalotia Phytophthora	2-Dec	
Insecticide	Agrimec (abamectin)	1 L/plants	Aphids, White Fly, Fruit Fly, Thrips	5-Dec	
Akaricide	Samite (Piridaben)	1 L/ plants	Mites	5-Dec	
Foliar Fertilization	KNO3 (1g/ L)	1 L/ plants	Fruit Quality	9-Dec	
Fungicide	Dithane m-45 (Mankozep)	1 L/plants (2 g/L)	pestalotia	10-Dec	
Fungicide	AMISTAR TOP (Azoksistrobin and Difenokonazol)	1 L/ plants	Anthracnosa, Pestalotia Phytophthora	17-Dec	
Insecticide	Agrimec (abamectin)	1 L/plants	Aphids, White Fly, Fruit Fly, Thrips	20-Dec	
Akaricide	Samite (Piridaben)	1 L/ plants	Mites	20-Dec	
Foliar Fertilization	KNO3 (1g/ L)	1 L/ plants	Fruit Quality	24-Dec	
Fungicide	Dithane m-45 (Mankozep)	1 L/plants (2 g/L)	pestalotia	25-Dec	
Fungicide	AMISTAR TOP (Azoksistrobin and Difenokonazol)	1 L/ plants	Anthracnosa, Pestalotia Phytophthora	1-Jan	
Insecticide	KANON (Demetoat)	1 L/ plants	Fruit Fly, White Fly	4-Jan	
Akaricide	Samite (Piridaben)	1 L/ plants	Mites	4-Jan	
Fertilization	Compost	20 Kg / plants	fertilization for dry season preparation	6-Jan	
Fertilization	Jeranti (NPK 16-16-16)	400 g/plants	Top Dressing	6-Jan	
Fertilization	KCl	100 g/plants	Top Dressing	6-Jan	
Fertilization	Calsium Super (Ca, Mg, B)	1 L/ plants (3 g/L)	Top Dressing	6-Jan	
Foliar Fertilization	KNO3 (1g/ L)	1 L/ plants	Fruit Quality	8-Jan	
Fungicide	Dithane m-45 (Mankozep)	1 L/plants (2 g/L)	pestalotia	9-Jan	
Fungicide	AMISTAR TOP (Azoksistrobin and Difenokonazol)	1 L/ plants	Anthracnosa, Pestalotia Phytophthora	16-Jan	
Insecticide	KANON (Demetoat)	1 L/ plants	Fruit Fly, White Fly	19-Jan	
Akaricide	Samite (Piridaben)	1 L/ plants	Mites	19-Jan	
Foliar Fertilization	KNO3 (1g/ L)	1 L/ plants	Fruit Quality	23-Jan	
Fungicide	Dithane m-45 (Mankozep)	1 L/plants (2 g/L)	pestalotia	24-Jan	
Prunning/leaf shoot trimming				29-Jan	
Fungicide	AMISTAR TOP (Azoksistrobin and Difenokonazol)	1 L/ plants	Anthracnosa, Pestalotia Phytophthora	31-Jan	
Start harvest				1-Feb	

I agree to plant it based on this work and planting caledar

Name _____ sign _____

Pesticide Application for Paprika Name: No. of Plants: Ver.1

No.	Day	Planned Date	Applied Date	Name of Agrochemical	Active Ingredient	Type		Purpose	Times	Categories
	-30									
1	0	1-Oct		Marshal	Carbosulran			Transplanting	1/1	1A
2	30	31-Oct		Demolish	Abamectin	Macrolide	Contact	control the number of thrips	1/3	6
3	45	15-Nov		Arrivo	Cypermethrin		Contact		1/5	3A
4	60	30-Nov		Delouse	Imidacloprid	Neonicotinoid	Systemic	Rotation of 3 pesticide	1/2	4A
5	65	5-Dec		Match	lufenuron	IGR	Contact	when thrips are endemic	1/4	15
6	70	10-Dec		Endure	Spinetoram	Macrolide	Systemic		1/2	5
7	85	25-Dec		Abenz	Emamectin		Contact	control the number of thrips	1/2	6
8	95	4-Jan		Rampage	Chlorfenapyr		Contact		1/2	13
9	105	14-Jan		Kateve	Nitenpyram	Neonicotinoid	Systemic	Rotation of 3 pesticide	1/3	4A
10	110	19-Jan		Match	lufenuron	IGR	Contact	when thrips are endemic	2/4	15
11	115	24-Jan		Rampage	Chlorfenapyr		Contact		2/2	13
12	130	8-Feb		Demolish	Abamectin	Macrolide	Contact	control the number of thrips	2/3	6
13	140	18-Feb		Arrivo	Cypermethrin		Contact		2/5	3A
14	150	28-Feb		Delouse	Imidacloprid	Neonicotinoid	Systemic	Rotation of 3 pesticide	2/2	4A
15	155	4-Mar		Match	lufenuron	IGR	Contact	when thrips are endemic	3/4	15
16	160	9-Mar		Endure	Spinetoram	Macrolide	Systemic		2/2	5
17	175	24-Mar		Abenz	Emamectin		Contact	control the number of thrips	2/2	6
18	185	3-Apr		Arrivo	Cypermethrin		Contact		3/5	3A
19	195	13-Apr		Demolish	Abamectin	Macrolide	Contact		3/3	6
	205									
	215									

Annex 8.3. Planting and Shipping Calendars

Planting Calendar: Bean **Place: Sukabumi**
Variety: Tresna

Sowing | Transplant | Cultivation | Harvest Period

	Name	Field (m2)	5		6		7		8		9		10	
1. Ciloa														
1	Eyeh Sureja	100	5/8	5/29		6/26			8/10					
2	Manaf	100	5/8	5/29		6/26			8/10					
3	Hendra	100	5/8	5/29		6/26			8/10					
4	Oban	100	5/8	5/29		6/26			8/10					
5	Omay	100	5/8	5/29		6/26			8/10					
		500												
2. Hikmah Tani (1~2), Bumi Mekar (3~5)														
1	Mulyana	100		5/22	6/12		7/10			8/24				
2	Ujang	100		5/22	6/12		7/10			8/24				
3	Dudum	100		5/22	6/12		7/10			8/24				
4	Yopi	100		5/22	6/12		7/10			8/24				
5	Nuryaman	100		5/22	6/12		7/10			8/24				
		500												
3. Pandan Arum														
1	Amin	100			6/10		7/1	7/29			9/12			
2	Ajud	100			6/10		7/1	7/29			9/12			
3	Badrudin	100			6/10		7/1	7/29			9/12			
4	Holid	100			6/10		7/1	7/29			9/12			
		400												
4. Al Mujahidin														
1	H. Ade	100				6/24	7/15		8/12			9/26		
2	Yasin	100				6/24	7/15		8/12			9/26		
3	Encep	100				6/24	7/15		8/12			9/26		
4	Sopian Hadi	100				6/24	7/15		8/12			9/26		
5	Nunu	100				6/24	7/15		8/12			9/26		
		500												
5. Mucekil														
1	Ece	100					7/8	7/29		8/26			10/10	
2	Jamaludin	100					7/8	7/29		8/26			10/10	
3	Karnudin	100					7/8	7/29		8/26			10/10	
4	Ujang	100					7/8	7/29		8/26			10/10	
5	Muhtar	100					7/8	7/29		8/26			10/10	
6	Husen	100					7/8	7/29		8/26			10/10	
7	Busro	100					7/8	7/29		8/26			10/10	
		700												
		2,600												

* Market **HSI**
* Expected yield from the trial field (100m2) **300~500 kg (70~100 kg per week per member)**
* Amount of Shipment **300~500 kg per week**

Planting Calendar: Tomato **Place: Sukabumi**
Variety: Servo

Sowing | Transplant | Cultivation | Harvest Period

	Name	Field (m2)	5		6		7		8		9		10	
1. Sugih Mukti														
1	Dayat	100	5/6			6/17			8/1			9/30		
2	Ujang	100	5/6			6/17			8/1			9/30		
		200												
		200												

* Market: **Local Market**

Planting Calendar: Bean **Place: Bogor**

Variety: Tresna

Sowing Transplant Cultivation Harvest Period

	Name	Field (m2)	5		6		7		8		9		10	
1. Citra Tani Kencana														
1	Dayah	100	5/8	5/29		6/26			8/10					
2	Rohman	100	5/8	5/29		6/26			8/10					
3	Panji	100	5/8	5/29		6/26			8/10					
		300												
2. Tunas Tani Panggrango														
1	Dede Supria	100	5/13		6/3		7/1		8/15					
2	Asep Abdurahman	100	5/13		6/3		7/1		8/15					
3	Makil	100	5/13		6/3		7/1		8/15					
4	Kaharudin Akoh	100	5/13		6/3		7/1		8/15					
5	Empud	100	5/13		6/3		7/1		8/15					
6	Rahmat	100	5/13		6/3		7/1		8/15					
7	Pardi	100	5/13		6/3		7/1		8/15					
8	Burhanudin	100	5/13		6/3		7/1		8/15					
		800												
3. Rukun Tani														
1	Jamil	100	5/13		6/3		7/1		8/15					
2	Asep	100	5/13		6/3		7/1		8/15					
3	Awang	100	5/13		6/3		7/1		8/15					
4	Bubun	100	5/13		6/3		7/1		8/15					
5	Inen	100	5/13		6/3		7/1		8/15					
		500												
4. Bakti Madiri														
1	Ade Gunawan	100		5/30		6/20		7/17		8/31				
2	Jimmy Ulima	100		5/30		6/20		7/17		8/31				
3	Hatta	100		5/30		6/20		7/17		8/31				
4	Suryadi	100		5/30		6/20		7/17		8/31				
5	Ohmad Buras	100		5/30		6/20		7/17		8/31				
6	Ahmad	100		5/30		6/20		7/17		8/31				
		600												
		2,200												

* Market **Local Market**

Planting Calendar: Momotaro, Nasu **Place: Cianjur**

Sowing Transplant Cultivation Harvest Period

	Name	Field (m2)	No. of Plants	5		6		7		8		9		10		11	
1. Momotaro																	
1	Supendar (1)	200	400	5/4			6/15			8/14				10/13			
2	Herlan	130	260	5/4			6/15			8/14				10/13			
3	Asep (1)	130	260	5/4			6/15			8/14				10/13			
4	Supendar (2)	200	400		5/30			7/11				9/9					11/8
5	Asep (2)	180	360		5/30			7/11				9/9					11/8
		840	1,680														
2. Nasu																	
1	Dadan	400	520	5/4			6/15		7/25						10/23		
2	Didin Silahudin	400	520	5/4			6/15		7/25						10/23		
3	Acep (Saluyu)	100	130	5/4			6/15		7/25						10/23		
4	Usep Nurjaya	400	520		5/30			7/11			8/20						11/18
5	Endang	400	520		5/30			7/11			8/20						11/18
		1,700	2,210														
		2,540	3,890														

* Market **Papaya**

* Amount of Shipment

Tomato	200	plants/m2
Nasu	130	plants/m2

Planting Calendar: Broccoli **Place: Cianjur**

Variety: 1) Lucky Bejo, 2) Green Magic

Sowing Transplant Cultivation Start Harvest

	Name	Field (m2)	5		6		7		8		9		10	
1. Saluyu														
1	Adi Sunarya	100	5/4		6/1				7/31					
2	Ade Sopandi	100	5/4		6/1				7/31					
3	Ujang H.	100	5/4		6/1				7/31					
4	H. Dayat	100	5/4		6/1				7/31					
5	Atip	100	5/4		6/1				7/31					
		500												
2. Utama														
1	Ayi Misbah	100		5/18		6/15				8/14				
2	Uuy Hasanudin	100		5/18		6/15				8/14				
3	Ayi Najmudin	100		5/18		6/15				8/14				
4	Moh. Ramdan	100		5/18		6/15				8/14				
5	Maman	100		5/18		6/15				8/14				
6	Ee Sulaeman	100		5/18		6/15				8/14				
		600												
3. Saridona 2 (1~4), Saluyu (5~6)														
1	H Yeyen	100			6/1		6/29				8/30			
2	Dahlan	100			6/1		6/29				8/30			
3	Nandar	100			6/1		6/29				8/30			
4	Toto Ismail	100			6/1		6/29				8/30			
5	Ijang	100			6/1		6/29				8/30			
6	Dani	100			6/1		6/29				8/30			
		600												
		1,700												

* Potential Market: **PT. Sayuran Siap Saji**

* Amount of Shipment **200 kg per week from mid-August to mid-September**

Planting Calendar: Cauliflower **Place: Cianjur**

Variety: Aquina

Sowing Transplant Cultivation Start Harvest

	Name	Field (m2)	5		6		7		8		9		10	
1. Saridona 2														
1	Enoh A	100	5/4		6/1				7/31					
2	Apid	100	5/4		6/1				7/31					
3	Deni	100	5/4		6/1				7/31					
4	H Lomrah	100	5/4		6/1				7/31					
		400												
2. Mujagi														
1	Dadan	100		5/18		6/15				8/14				
2	Didin Silahudin	100		5/18		6/15				8/14				
3	Usep Nurjaya	100		5/18		6/15				8/14				
4	Endang	100		5/18		6/15				8/14				
		400												
		800												

* Potential Market: **PT. Sayuran Siap Saji**

* Amount of Shipment **200 kg per week from early August**

Planting Calendar: Carrot **Place: Cianjur**
Variety: Kuroda

Preparation Sowing Cultivation Start Harvest

	Name	Field (m2)	5				6				7				8				9				10			
1. Mujagi																										
1	Suhendar 1	1,000			5/20												8/18									
2. Utama																										
1	Yasir	400				5/27												8/25								
2	Wandi	400				5/27												8/25								
3	Andi	400				5/27												8/25								
4	M Cecep	400				5/27												8/25								
5	Ayi	100				5/27												8/25								
		1,700																								
3. Mujagi																										
1	Suhendar 2	1,000					6/3												9/1							
4. Saridona 2																										
1	Yoyen	1,000						6/10												9/8						
		4,700																								

* Market: **PT. Sayuran Siap Saji (Bogor)**
* Amount of Shipment: **500 kg per shipment**
2 times per week from mid-August to mid-September

Planting Calendar: Bean **Place: Cianjur**
Variety: Tresna

Sowing Transplant Cultivation Harvest Period

	Name	Field (m2)	5		6		7		8		9		10	
1. Padajaya														
1	Ujang Dayat	100	5/8	5/29		6/26			8/10					
2	Epan S	100	5/8	5/29		6/26			8/10					
3	Ajib	100	5/8	5/29		6/26			8/10					
4	Cep Dadang	100	5/8	5/29		6/26			8/10					
5	Muslim	100	5/8	5/29		6/26			8/10					
		500												
2. Mujagi														
1	Herlan	100	5/8	5/29		6/26			8/10					
		100												
3. Mucekil														
1	Ajang	100		5/22	6/12		7/10			8/24				
2	Lalan	100		5/22	6/12		7/10			8/24				
3	Wandi	100		5/22	6/12		7/10			8/24				
		300												
		900												

* Market **Local trader**

Planting Calendar: Carrot **Place: Garut**

Variety: Kuroda

Preparation Sowing Cultivation Start Harvest

	Name		Field (m2)	5				6				7				8				9				10			
1. Group A																											
1	Asep K.	Yosen	400			5/20												8/18									
2	Agus		400			5/20												8/18									
3	Asep	Hitda Mandiri	400			5/20												8/18									
4	Hendi		400				5/27												8/25								
5	Dadang		400				5/27												8/25								
6	Ade		400				5/27												8/25								
			2,400																								
2. Group B																											
1	Dede	Mukti Tani Jando	400					6/3												9/1							
2	Toto		400					6/3												9/1							
3	Jajang		400					6/3												9/1							
4	Ade Isak		400					6/3												9/1							
5	Dadang	Hitda Mandiri	400						6/10												9/8						
6	Undang	Cikandang Agro	400						6/10												9/8						
7	Anang		400						6/10												9/8						
			2,800																								
			5,200																								

* Market: **PT. Agro Selaras Abadi (Garut)**

* Amount of Shipment: **500~1,000 kg per week from mid-August to mid-September**

Planting Calendar: Tomato **Place: Garut**

Variety: 1) Warani, 2) Agatha

Sowing Transplant Cultivation Harvest Period

	Name	FG	Field (m2)	5		6		7		8		9		10		Variety
1. Group A																
1	Teten	Cikandang Agro	100	5/6		6/17				8/1		9/30				
2	Ayip		100	5/6		6/17				8/1		9/30				
3	Dede	Hitda Mandiri	100	5/6		6/17				8/1		9/30				
4	Dedi		100	5/6		6/17				8/1		9/30				
5	Enjang	Mukti Tani Jando	100	5/6		6/17				8/1		9/30				
			500													
2. Group B																
1	Ade Tatang	Mukti Tani Jando	100		5/20			7/1			8/15			10/14		
2	Mulyana		100		5/20			7/1			8/15			10/14		
3	Hamdani		100		5/20			7/1			8/15			10/14		
4	Maman		100		5/20			7/1			8/15			10/14		
5	Aceng	Yosen	100		5/20			7/1			8/15			10/14		
6	Apid	Hitda Mandiri	100		5/20			7/1			8/15			10/14		
			600													
3. Barokha Karunia Tani																
1	Sholehudin		100	5/6		6/17				8/1		9/30				
2	Anwar		100	5/6		6/17				8/1		9/30				
3	Endang		100		5/20			7/1			8/15			10/14		
4	Mastur		100		5/20			7/1			8/15			10/14		
5	Rony		100		5/20			7/1			8/15			10/14		
			500													
4. Mekar Tani																
1	Nurdin		100	5/6		6/17				8/1		9/30				
2	Ceng Somad		100	5/6		6/17				8/1		9/30				
3	Amang		100		5/20			7/1			8/15			10/14		
			300													
			1,900													

* Market: **PT. Sayuran Siap Saji**

* Specification **100~120g per fruit (7~8 fruits per kg)**

* Amount of Shipment **150~200 Kg per week**

Planting Calendar: Carrot **Place: Bandung**
Variety: Kuroda

Preparation | Sowing | Cultivation | Start Harvest

	Name	Field (m2)	5				6				7				8				9				10			
1. Al Ittifaq																										
1	Setia Irawan	400		5/13												8/11										
2	Ruslan	400		5/13												8/11										
3	Dida	400		5/13												8/11										
4	Toat	400			5/20												8/18									
5	Mudrik	400			5/20												8/18									
6	Sopian	400			5/20												8/18									
7	Hamdan	400					6/3												9/1							
8	Ilyas	400					6/3												9/1							
9	Ujang Bungsu	400					6/3												9/1							
10	Ujang Langkob	400						6/10												9/8						
		4,000																								
2. Hikmah Farm																										
1	Gandi	400				5/27												8/25								
2	Titi	400				5/27												8/25								
		800																								
3. Hataki																										
1	Nandang	400				5/27												8/25								
2	Riswati	400				5/27												8/25								
3	Cuandi	400						6/10												9/8						
4	Ade	400						6/10												9/8						
5	Oni	400						6/10												9/8						
		2,000																								
4. Mekar Tani																										
1	Amang Tarya	400							6/17												9/15					
2	Awaludin	400							6/17												9/15					
3	Asep Sucipto	400							6/17												9/15					
4	Endang Fermana	400							6/17												9/15					
5	Ginanjar	400							6/17												9/15					
		2,000																								
		8,800																								

* Market: **AEON and Super Indo through Al Ittifaq**
* Amount of Shipment: **500 kg per shipment**
3 times per week from mid-August to mid-September

Planting Calendar: Momotaro Tomato **Place: Bandung**

Sowing | Transplant | Cultivation | Harvest Period

	Name	Field (m2)	No. of Plants	5		6		7		8		9		10	
1. Lyco Farm															
1	Cece	165	330	5/4			6/15			8/14				10/13	

* Market **Yogya**
* Amount of Shipment

Planting Calendar: Broccoli **Place: West Bandung, Panen Lestari FG**

Variety: Lucky Bejo

Sowing Transplant Cultivation Start Harvest

	Name	Field (m2)	5		6		7		8		9		10	
1. Panen Lestari 1														
1	Jajat Jatmika	100	5/6		6/3				8/2					
2	Dena	100	5/6		6/3				8/2					
3	Iying	100	5/6		6/3				8/2					
4	Dayat	100	5/6		6/3				8/2					
5	Endang	100	5/6		6/3				8/2					
		500												
2. Panen Lestari 2														
1	Oden	100		5/20		6/17				8/16				
2	Jonih M.	100		5/20		6/17				8/16				
3	Acep	100		5/20		6/17				8/16				
4	Ajat	100		5/20		6/17				8/16				
5	Herman	100		5/20		6/17				8/16				
		500												
3. Panen Lestari 3														
1	Adi	100			6/3		7/1				9/1			
2	Ade	100			6/3		7/1				9/1			
3	Aca	100			6/3		7/1				9/1			
4	Dalih	100			6/3		7/1				9/1			
5	Ano (old member)	100			6/3		7/1				9/1			
		500												
4. Panen Lestari 4														
1	Udi	100				6/17		7/15				9/15		
2	Ano (new member)	100				6/17		7/15				9/15		
3	Asep	100				6/17		7/15				9/15		
4	Uay	100				6/17		7/15				9/15		
5	Ija	100				6/17		7/15				9/15		
		500												
		2,000												

* Market: **Total Buah Segar**

* Amount of Shipment **200 kg per week (60 ~ 70kg per shipment)**

3 times per week from mid-August to mid-October

Planting Calendar: Bean **Place: West Bandung, Sinar Mukti FG**

Variety: Logawa

Sowing Transplant Cultivation Harvest Period

	Name	Field (m2)	5		6		7		8		9		10	
1. Sinar Mukti 1														
1	Nani R.	100	5/6	5/27		6/24			8/8					
2	Popong W.	100	5/6	5/27		6/24			8/8					
3	Titing S.	100	5/6	5/27		6/24			8/8					
4	Ika WS	100	5/6	5/27		6/24			8/8					
5	Emi Solehah	100	5/6	5/27		6/24			8/8					
		500												
2. Sinar Mukti 2														
1	Aris W.	100		5/27	6/17		7/15			8/29				
2	Angga A.	100		5/27	6/17		7/15			8/29				
3	Farid M.R.	100		5/27	6/17		7/15			8/29				
4	Encep Andi	100		5/27	6/17		7/15			8/29				
5	Dede Hermawan	100		5/27	6/17		7/15			8/29				
		500												
		1,000												

* Market **PT. Mahkota Multi Mandiri**

* Expected yield from the trial field (100m2) **300~500 kg (70~100 kg per week per member)**

* Amount of Shipment **400~500 kg per week**

Planting Calendar: Tomato **Place: West Bandung, Sinar Mukti FG**

Variety: Warani

Preparation | Sowing | Cultivation | Start Harvest

	Name	Field (m2)	5			6			7			8			9			10		
1. Sinar Mukti 1																				
1	M. Taufik	100	5/6			6/17						8/1					9/30			
2	Abdul Kohar	100	5/6			6/17						8/1					9/30			
3	Ajang W.	100	5/6			6/17						8/1					9/30			
4	Malina	100		5/13			6/24						8/8					10/7		
5	Hendra	100		5/13			6/24						8/8					10/7		
		500																		
1. Sinar Mukti 1																				
1	Entin	100			5/20				7/1				8/15						10/14	
2	Nur	100			5/20				7/1				8/15						10/14	
3	Deden A.	100								7/8				8/22					10/21	
4	Kemal	100			5/27					7/8				8/22					10/21	
5	Dedi	100			5/27					7/8				8/22					10/21	
		500																		
		1,000																		

* Market **Rumah Sayuru**

Planting Calendar: Piman **Place: West Bandung**

Sowing | Transplant | Cultivation | Harvest Period

	Name	Field (m2)	No. of Plants	5		6		7		8		9		10	
1. FRT															
1	Deni	110	150	5/4			6/15		7/25				9/23		
		110	150												
2. Gerbang Emas															
1	Wilarto	50	70	5/4			6/15		7/25				9/23		
		50	70												
		160	220												

* Market **Papaya (Gerbang Emas)**

* Amount of Shipment

Annex 8.4. Summary of Wrap-Up Workshop

of the Trial Project 2017

Wrap-up Workshop for the Trial Project 2017

1. Objectives

- To present overall results of the trial project 2017, such as costs of each trial project, the amount of production, sales price, main marketing channels, and other information obtained from each group.
- To draw specific lessons (what worked and what did not work) from the trial project through self-analysis and discussion among trial project participants, project team, and staff of DINAS.
- To discuss and summarize future prospects or actions in terms of adaptation of cultivation technique introduced by the trial project as well as improvement of distribution and marketing system of horticulture products

2. Date and Place

The workshops will be held at each district from 22nd to 31st May 2018. Venue of the workshop will be confirmed.

Date	District	Venue	FGs participated in the Trial Project 2017
22 May (Tue.)	Garut	To be confirmed (place where accommodates around 50 persons)	Mekar Tani 2, Cikandang Agro, Cantigi, Silih Riksa IV, Rawit Jepang
23 May (Wed.)	West Bandung		Dewa Famili, Mitra Sukamaju, Lembang Agri, Wargi Panggupay, Gerbang Emas
24 May (Thu.)	Bandung		Lyco Farm, Al-Ittifaq, Barokah Tani, Katata, Saribhakti
28 May (Mon.)	Bogor		Jambu Kristal Mandiri, SUbur Makmur, Bakti Mandiri Sukajadi, Tani Mukti, Mitra Jaya (Kota Bogor)
30 May (Wed.)	Cianjur		Mujagi, Utama, Mandiri, Cemerlang, Okiagaru
31 May (Thu.)	Sukabumi		Kota: Maju Terus 2, Mitra Utama, Kabpaten: Adi Tani Jaya, Hikmah Tani, Muni Mekar

3. Participants

- Farmers who joined and completed the trial project in dry and rainy season.
- Representative of DINAS (maximum 3 persons)
- Representative of DG of Horticulture and the Project team

4. Program

Time	Activity
~ 09.00	• Registration
9:00 ~ 9:05	• Opening remarks
9:05 ~ 9:20	• Presentation by the Project (objectives, recapitulation of trial projects)
9:20 ~ 9:50	• Poster presentation (6 posters) by selected farmers
9.50 ~ 10:50	• Discussion on results and findings from the trial projects and draw lessons
10:50 ~ 11:00	• Break
11:00 ~ 11:30	• Wrap up of discussions and summary of lessons learned from the trial project
11:30 ~ 12:00	• Preparation of an action plan by each participant
12:00 ~ 12:10	• Closing

5. Others

- Any fees/compensation such as transport cots shall **NOT** be paid to participants. The Project expects only interested farmers shall participate in the workshop.

Number of Workshop Participants

Garut	No.	Bandung	No.	West Bandung	No.
Mekartani 2	3	Katata	3	Dewa Famili	0
Barokah Tani	0	Saribhakti	2	Lembang Agri	6
Cikandang Agro FG Association	7	Lyco Farm	3	Wargi Panggupay	4
Cantigi	5	Barokah Tani	6	Koperasi Gerbang Emas	10
Silih Riksa IV	0	Koperasi Al-Ittifaq	15	Koperasi Mitra Sukamaju	1
Rawit Jepang	6				
Sub-Total (Farmer)	**21**	**Sub-Total (Farmer)**	**29**	**Sub-Total (Farmer)**	**21**
DINAS	4	DINAS	8	DINAS	6
DG Horticulture	0	DG Horticulture	3	DG Horticulture	5
TOTAL	**25**	**TOTAL**	**40**	**TOTAL**	**32**
Bogor	**No.**	**Sukabumi**	**No.**	**Cianjur**	**No.**
Jambu Kristal Mandiri	8	Maju Terus 2	4	Multi Tani Jaya Giri	14
Subur Makmur	5	Mitra Utama FG Association	3	Mandiri	7
Bakti Mandiri Sukajadi	3	Adi Tani Jaya FG Association	2	Okiagaru	6
Tani Mukti	0	Hikmah Tani	7	Cemerlang	4
Mitra Jaya	2	Bumi Mekar	8	Utama	8
Sub-Total (Farmer)	**18**	**Sub-Total (Farmer)**	**24**	**Sub-Total (Farmer)**	**39**
DINAS	11	DINAS	9	DINAS	4
DG Horticulture	4	DG Horticulture	0	DG Horticulture	2
TOTAL	**33**	**TOTAL**	**33**	**TOTAL**	**45**

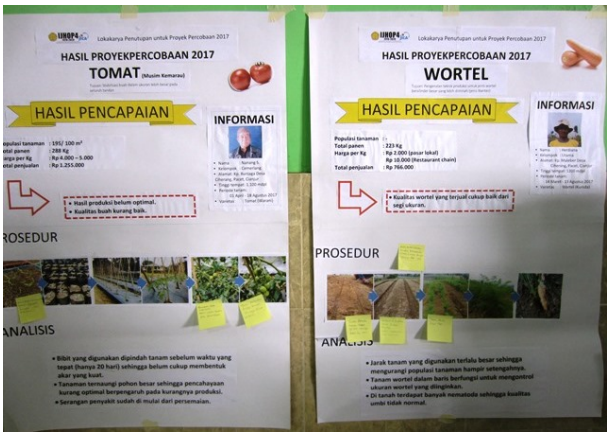
Wrap-up Workshop (Photo)

1. Poster Session

Preparation by farmer (Bandung)

Poster discussion among participants (Bogor)

Poster discussion among participants (Sukabumi)



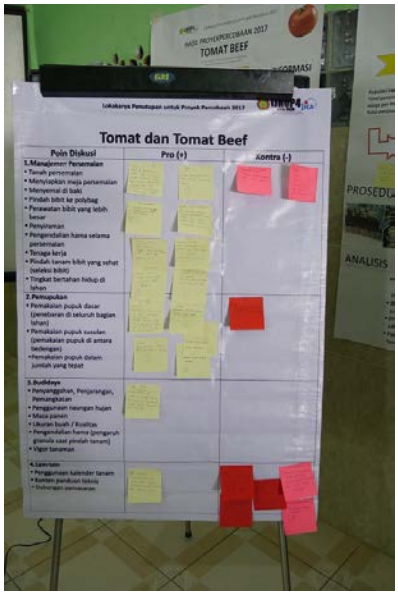
Comments by participants posted on the poster (yellow paper) (Cianjur)

2. Discussion on the Result and Findings (divided into 4 groups by the trial projects)

Group discussion on the carrot project (Garut)

Group discussion on the bean project (Sukabumi)
(Participants write comments on yellow (pros)/red (cons) papers)

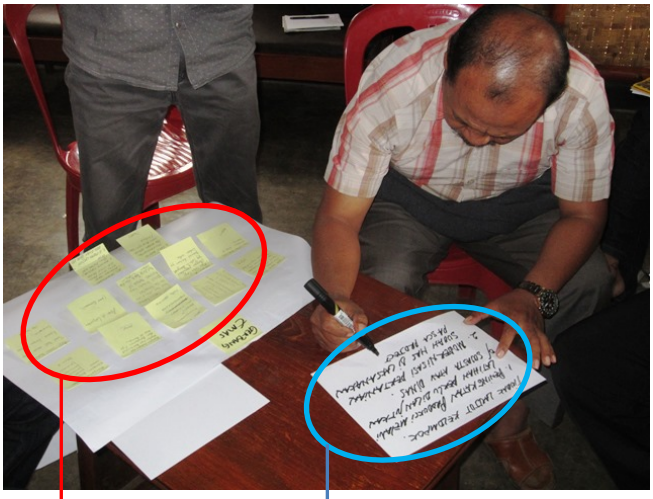
Presentation of findings by tfarmer (Cianjur)



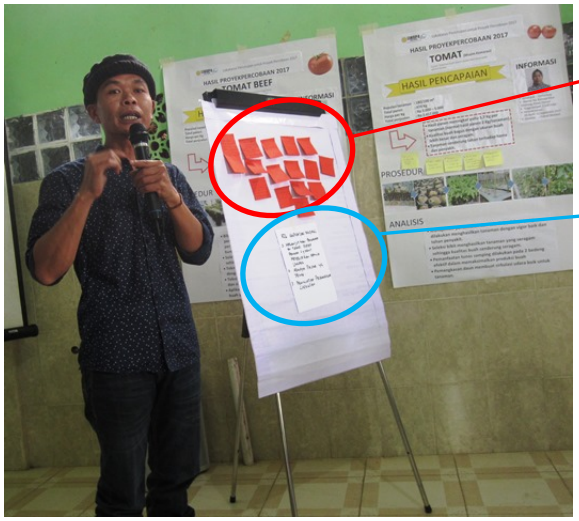
Results of discussion on the tomato project (Cianjur)

3. Preparation of Action Plan by Each Famers' Group

Discussion among members of each farmers' group (Garut)



Preparation of the action plan (West Bandung)



Presentation of the action plan (Cianjur)

Action plan/personal commitment of individual members

Action plan of the Farmers' Group

Technical Review of the Trial Project 2017

1. Beef Tomato

Comments from farmers	Feedback from the project team
Nursery management	
• Nursery is effective for protecting seedlings from pest and disease. (+) • Rearing bigger seedlings fasten the harvest with less work. (+) • Seedling in a tray is better located in an open space. (-) • Seedlings grew too big (spindly growth) before transplanting. (-)	• The objective of nursery management is to protect seedlings from insects and diseases, so the plants should be covered. • Farmers should avoid spindly growth of seedlings by following the adequate rearing method under proper cultivation conditions.
Fertilization	
• The fertilizer for top-dressing was not enough. (-)	• Excess application of fertilizer rather inhibits the growth of the plants. • The amount of top-dressing should be modified based on the target yield.
Cultivation	
• Lateral shoot utilization and pruning make the maintenance easier. (+) • Lateral shoot utilization increased the number of clusters. (+) • Strings will be better than bamboo sticks for training. (-)	• The method can be adjusted if the initial objectives are met, so strings can be another option if it can properly work for training.
Others	
• BTM variety is less resistant to pests and its shape and quality (such as color of fruits) do not match the market demand. Umagna is better. (-) • Marketing support is demanded.	• Umagna is not a registered variety, so the Project cannot support the purchase of Umagna. Even if farmers grow Umagna, however, the Project will be open for consultation and technical support.
Way Forward	
• Search for a better variety adequate for the market demand. • The Project supports the variety registration of Japanese tomato (Momotaro), which could be one of the alternatives.	

2. Tomato

Comments from farmers	Feedback from the project team
Nursery management	
• Soil media, which is a mixture of compost, rice husk, soil and cocopeat (if available), help the plants become more resistant to disease compared to the traditional seedlings only with soil. (+) • Selection of plants leads to a higher survival rate. (+) • On the other hand, it requires much more labor (one farmer said costs doubled) (-) • Sowing in the tray is not efficient compared to directly on the field. (-) • Installation of nursery bed is costly. (-) • Pot-up to polybags takes a long process and is costly. (-)	• Good management of the nursery is supposed to reduce labor after transplanting mainly in 2 ways: ➢ (1) Pesticide application is more efficient in the small nursery than on the large field, reducing the use of the pesticide; and ➢ (2) Growing healthy and strong seedlings in the nursery and transplanting only good seedlings lead to the plants more resistant to pests and diseases. As a result, the lower amount of pesticides/fungicides and

• More space required for nursery. (-) • This much care of the nursery is not feasible with a large amount of seedlings.. (-)	labor is required in the cultivation period. • Also, as farmers get used to the nursery management, the work will be more efficient and the cost will decrease. • The field may contain insects and disease, so the seedlings should be kept away from the field when they are susceptible. • Caring large numbers of seedlings at the nursery is even easier and cheaper than conducting the same care at the field after transplant.
Fertilization	
• Many appreciate the effectiveness of fertilization. (+) • Some farmers felt that more manure and fertilizer are needed. (-) • Getting a seedling out of a poly bag is difficult. (-) • Top-dressing is difficult on the steep land. (-)	• Excess application of fertilizer rather inhibits the growth of the plants. • Watering onto the land surface before top-dressing is recommended on the steep land since nutrients of fertilizers seep into the soil better from the wet surface.
Cultivation	
• Many agree that temporary rain shelter is effective because it decreases pest and disease infections. (+) • But it is also costly, requiring more labor to install the shelter. (-) • Plastic cover for the shelter was not good quality. (-) • Strong winds can blow the shelter. (-) • Onrole was effective to thrips and lice when applied to planting holes as granules at the time of transplanting. (+) • On the other hand, spraying Onrole during the cultivation did not have much impact especially on caterpillars. (-) • Some farmers doubt the twisting technique. (-)	• The Project introduced an idea of using the temporary rain shelter (with Takiron poles) to cover plants. Therefore farmers should explore more efficient way in cost and structure for making a temporary shelter. • Theoretically, the material cost of the rain shelter can be covered if the produce is increasing by around 80 kg. • The shelter was not installed properly, so farmers can improve it, for example, to strengthen it against the wind. • The Project introduced an idea of effective pest control, one of which is introduction of granules applied in the planting hole when transplanting. Pesticide application should be modified according to pest and disease conditions of the respective fields.
Others	
• Planting calendar and planting guide are very useful. (+) • Marketing is challenging, and the sales price is low considering the quality (no grading when sold to the local traders). (-) • Recommended pesticides are difficult to find in Sukabumi city. (-) • Some farmers felt that the recording of the cultivation was difficult. (-)	• The Project recommended keeping a proper cultivation record since it can be a marketing tool for modern markets.
Way Forward	
• Explore a better and economical method on how to protect plants from rain such as a temporary tunnel/shelter.	

3. Chilli

Comments from farmers	Feedback from the project team
Nursery management	

• Many farmers realized that good nursery management is effective to raise the survival rate. (+) • Some farmers would like to use Furadan (pesticide ingredient). (-) • Availability of charcoal husk and cocopeat for media and bamboos for the nursery bed is a problem in Sukabumi. (-) • Some did not see the effectiveness of compost in the media. (-) • Some worry that the seedlings can be easily too heated under the plastic cover. (-) • Labor cost is high. (-) • Some plants were still infected by fusarium wilt. (-)	• Furadan is not recommended because it is prohibited in Japan due to harmful contents. • Good management of the nursery is supposed to reduce labor after transplant mainly in 2 ways: ➢ (1) Pesticide application is more efficient in the small nursery than on the large field, reducing the amount of the pesticide; and ➢ (2) Growing healthy and strong seedlings in the nursery and transplanting only good seedlings lead to the plants more resistant to pests and diseases. As a result, the lower amount of pesticides/fungicides and labor is required in the cultivation period. • Also, as farmers get used to the nursery management, the work will be more efficient and the cost will decrease. • In the process of seedling selection, it is important not to transplant bad ones such as those infected by wilt. Farmers should not expect all seedlings to be transplanted. • A nursery site must be sterilized and maintained in clean condition. Seedlings infected by diseases should be eliminated if identified.
Fertilization	
• Many agree on the trial project's method of fertilization. (+) • Some felt they should use a more basal fertilizer than provided (amount and NPK). (-) • Some doubt the effectiveness of top-dressing. (-)	• Excess application of fertilizer rather inhibits the growth of the plants. • Top-dressing can promote the root growth by applying fertilizer to where root tip grows.
Cultivation	
• Application of Onrole at the beginning of cultivation is effective. (+) • Harvest period was lengthened. (+) • Heavy rain caused Anthracnose. (-) • Some farmers could not pinch the first flower because they do not want to lose any flowers (as flowers will become fruits). (-)	• It is necessary to check beforehand if the field for transplanting is not surrounded by plants with any virus or disease.
Others	
• The planting calendar and technical guide are useful. (+) • Marketing support is needed. (-)	
Way Forward	
• The Project should check fields of each member before planting in order to assess the cultivation environment for the trial project.	

4. Carrot (Kuroda)

Comments from farmers	Feedback from the project team
Seed planting	

• Many farmers think that planting 2 rows is easy to thin and weed/ (+) • Others feel that 2 rows waste too much space. (-) • Some farmers felt that soaked seeds germinated faster. (+) • But other farmers have the opposite opinion (germination delayed). (-) • Sowing was difficult. (-) • Keep the width of the row is difficult. (-) • Many seeds have to be wasted for thinning. (-) • Planting will be quite laborious for a larger scale. (-) • Some farmers wait for thinning a bit longer to sell thinned carrots as baby carrots.	• Farmers should not expect that all seeds can be harvested. The thinning is a necessary process to improve the quality and to control the size of carrots to fit the market demand. • The Project will explore a better sowing method. • Plant population of 2 row sowing method is not significantly different with that of the broadcasting method.
Fertilization	
• The introduced methods lead to a higher yield. (+) • Some farmers think that the amount of basal fertilizer was too much (especially after potato cultivation), which resulted in rotten fruits. (-) • Farmers felt an ineffective use of farmland if applying compost before 1 month of sowing. (-)	• Insufficient fertilizers undermines the quality of the Kuroda carrot (faded color etc.), leading to a rejection by the modern market. Hence a certain amount of basal fertilizer and top-dressing is necessary. • Considering the condition of the field such as the fertilization in the previous season, farmers should adjust the amount. • Compost must be decomposed before sowing (it takes at least 1 month).
Cultivation	
• Most agree that the result is better compared to the ordinary practice. (+) • Some mentioned the necessity of herbicides/fungicides for Kuroda. (-)	• Appropriate thinning to control the size is the most important process for high-quality Kuroda carrots that can meet the modern market requirements.
Others	
• Supermarkets as well as local markets rejected the Kuroda carrots, market is needed. (-) • Washing manually is not effective and hence a washing machine is needed. (-) • The field should be open for multi-cropping. (-)	• Kuroda carrots must be sold as Kuroda at a suitable price for Kuroda, different from the local variety. Otherwise, it will not be profitable. • The project team is now working on the installation of a carrot washing machine in Garut.
Way Forward	
• The Project explores a better sowing method in order to enable uniform germination. • Install a carrot washing machine in Garut, and share its information with farmers in and also outside Garut. • Marketing supports to link farmers to buyers who appreciate Kuroda carrots and buy them at a higher price than the local ones.	

5. Broccoli

Comments from farmers	Feedback from the project team
Nursery management	
• Some farmers think the nursery management reduces the cost. (+) • Others assume that the longer period in the nursery stage requires more labor and hence a higher cost. (-)	• Good management of the nursery is supposed to reduce labor after transplant mainly in 2 ways: ➢ (1) Pesticide application is more efficient in the small nursery than on

• Some feel the installation of a nursery bed is difficult and costly. (-) • Selection leads to fewer plants. (-) • Water flooded in the nursery tray. (-) • It takes time until transplanting. (-) • Transplanting was more difficult because the size of polybags were too large. (-)	the large field, reducing the amount of the pesticide; and ➢ (2) Growing healthy and strong seedlings in the nursery and transplanting only good seedlings lead to the plants more resistant to pests and diseases. As a result, the lower amount of pesticides/fungicides and labor is required in the cultivation period. • Also, as farmers get used to the nursery management, the work will be more efficient and the cost will decrease. • Farmers should prepare proper trays for seeding with making drainage holes.
Fertilization	
• Many farmers agree that fertilizers and top-dressing are effective. (+) Some farmers thought more fertilizers and compost should be applied. (-)	• Excess application of fertilizer rather inhibits growth of the plants.
Cultivation	
• Many farmers realized the rain shelter is effective to reduce the risk of disease and insects. (+) • Some farmers argue that pest was not controlled. (-) • A height of a takiron pole should be higher. Currently farmers extend the pole with bamboo sticks, which is laborious. The suitable length of the pole is 3 m or more. (-) • If the temperature inside of shelters got too high, plants became susceptible to wilt. (-) • Plastic was too thick and wide. (-) • Carrying large seedlings with polybags to the field for transplanting is troublesome (-)	• There is a higher Takiron pole available, which is more expensive.
Others	
• Planting calendar is a good reminder for pesticide application etc. (+)	
Way Forward	
• The Project modified the size of polybags (chose smaller polybags) adequate for broccoli. • Consider the use of the longer Takiron pole to heighten the shelter by comparing its cost and effectivity.	

6. Bean

Comments from farmers	Feedback from the project team
Nursery management	
• Soil media, which is a mixture of compost, rice husk, soil and cocopeat (if available), improved germination compared to the soil alone commonly used. (+) • Some farmers think that sowing in poly bags is too troublesome and time consuming. It is not feasible when the land is expanded. Usually they directly plant the	• Good management of the nursery is supposed to reduce labor after transplant mainly in 2 ways ➢ (1) pesticide application is more efficient in the small nursery than on the large field, reducing the amount of the pesticide; and ➢ (2) growing healthy and strong seedlings in the nursery and

seeds on the field, and some believe the result is still good enough. (-) • Charcoal husk and cocopeat are not available in Sukabumi. (-)	transplanting only good seedlings lead to the plants more resistant to pests and diseases. As a result, the lower amount of pesticides/fungicides and labor is required in the cultivation period. • The Project evaluates differences of survival rates and yields between transplanting and direct sowing.
Fertilization	
• The introduced method fastened the growth of the plants. (+) • Some think the method is effective in dry seasons, but not in rainy seasons. (-) • Rain can flush fertilizer away from the land. (-)	• Watering onto the land surface before top-dressing is recommended on the steep land since nutrients of fertilizers seep into the soil better from the wet surface.
Cultivation	
• The net stimulated the growth of plant and prolonged the harvest period. (+) • But the net is more expensive and its installation takes more time than bamboo sticks. (-) • Pinching enlarged the size of fruits and increased shoots, which lead to a better harvest. (+) • Some farmers did not agree to transplant only 2 out of 3 seedlings. They want to use all. (-) • Onrole did not work against *spodoptera* (worm) that is the worst trouble for bean (-)	• As long as the objective of promoting growth of the plant is met, the net can be replaced by something affordable, such as a few strings that can be horizontally stretched. • Farmers should understand effects of each agrochemical.
Others	
• Some farmers felt that the recording of the cultivation was difficult. (-)	• It is necessary to produce quality fruits and also to find a better market where good beans can be sold at a higher price.
Way Forward	
• Search for more affordable substitutes for the inputs to minimize the cost. • Marketing support to link farmers to buyers who appreciate the quality beans and buy them at a higher price.	

7. Paprika

Comments from farmers	Feedback from the project team
Nursery management	
• The net to cover the seedlings is effective to decrease the risk of thrips. (+) • Seedlings easily grow spindly because the net obstructs the sunlight. (-)	• In order to prevent the spindly growth of the seedlings, the Project recommends using a more transparent net such as a white one that can penetrate the sunlight better.
Pesticide application	
• Scheduled pesticide application reduced the production cost. (+) • Monitoring is not easy. (-) • Farmers are not familiar with the difference of functions and effects of pesticides. (-)	• Regular monitoring of the number of thrips is important, so each FG needs to consider a simplified monitoring method. • Farmers should understand more about function of pesticides so as to make appropriate design of pesticide application.
Others	
• Planting calendar is a good reminder. (+)	• The Project together with farmers should carry out more accurate analysis on cost

• Cost was reduced and the quality of produce was the same as before. (+)	and profit of the introduced pesticide application method.
Way Forward	
• Consider an easier monitoring system. • Evaluate the impact on the cost reduction. • Provide a technical guide of pesticides (such as information on functions and ingredients of pesticides).	

8. Kyuri

Comments from farmers	Feedback from the project team
Nursery management	
• Using seedling trays and polybags for nursery are effective. (+) • The nursery period recommended in the planting calendar should be shortened. (-) • Clay instead of soil as nursey media was good in the rainy season. (-)	• Appropriate or healthy seedlings produce better yield. • Rearing appropriate seedlings requires a proper nursery period. • Appropriate soil media is recommended. 100% clay may not be a good soil media for nursery.
Fertilization	
• On a steep area, fertilization becomes much more difficult. (-)	• Watering onto the land surface before top-dressing is recommended on the steep land since nutrients of fertilizers seep into the soil better from the wet surface.
Cultivation	
• The net can be easily blown by the wind. (-) • The cost in a rainy season is high. (-) • Takiron is expensive. (-) • Proper pesticide application is required.	• The Project introduced an idea of using the temporary rain shelter (with Takiron poles) to cover plants and using net to maximize the yield. Therefore farmers should explore more efficient way in cost and structure for making a temporary shelter and installing a net.
Others	
• Planting calendar (and technical guide) should be adjusted according to seasons and field topology. (-)	• The Project continues to explore better cultivation methods in consideration of cultivation environment.
Way Forward	
• Search for more affordable substitutes for the inputs to minimize the cost. • Marketing support to link farmers to buyers who appreciate the quality of kyuri and buy them at a higher price.	

9. Crystal Guava

Comments from farmers	Feedback from the project team
Fertilization	
• KCL sweetened the fruits. (+) • But some suggest KNO3 instead of KCL increase the sweet contents even more. (-) • Some farmers prefer manure to compost. (-) • The production still largely depends on the age of trees. (-) • Fertilization once in a month does not only increase the labor cost, but it is not good for growth of the plants. (-) • Compost was not enough. (-)	• Compost is important to hold and store fertilizer in soil until the harvest period. • Use of manure that is not fermented well instead of compost negatively affects the growth of the plants. • Farmers should understand the characters of manure and compost, by which the utilization of fertilizers will be more accurate.

Cultivation	
• Harvest was increased. (+) • Some farmers argue that training is not necessary for old or strong trees. (-)	• Appropriate training and pruning during cultivation are crucial to maintain the growth of shoots and the healthy conditions of the trees for better yield.
Pest and disease control	
• Star Lite (insecticide) is more effective than Kanon that did not kill worms. (-) • The fruit bag provided in the first season was not effective. (-) • But the net-foam in the second season was good. (+) • Some pesticides are difficult to find and expensive. (-)	• The kind of insects differs from one place to another, so farmers should adopt a suitable pesticide for their own land. • The fruit bag used in the first season was defect.
Others	
• Planting calendar and guide are helpful. (+) • Marketing support is needed.	• The effectiveness of the introduced growing methods is already proven scientifically by the academic research institute such as Bogor Agriculture University (IPB), so following the methods is highly recommended.
Way Forward	
• Take the age of each tree more into account. • Monitor the condition of pruned trees at the demonstration sites in order to identify an optimal method.	

10. Shallot

Comments from farmers	Feedback from the project team
Nursery management	
• The nursery bed protected the seedlings from pests and disease, resulted in a higher survival rate. (+) • The surviving rate of germinated plants was lower. (-) • More labor is needed. (-) • A wet place is required for the nursery. (-)	• Nursery soil should be sterilized in order to maintain healthy condition of seedlings.
Transplanting	
• Farmers well understand the merits of new techniques. (+)	
Cultivation	
• Fruits became more uniform when growing from the seeds. (+) • Planting takes a longer time (4 months). (-) • Labor cost of growing from the seeds is slightly lower than from the bulbs. (+) • Following the instruction lead to a lower yield. Seedlings were more susceptible to drought and pests. (-) • Growth is slower. (-)	• A much longer cultivation period was highlighted as a serious drawback of growing from the seeds. Thus the cultivation method the trial project introduced must be reconsidered.
Others	
• Planting calendar is useful. (+)	
Way Forward	
• Reconsider the entire cultivation method.	

Summary of the Action Plan Session at the Wrap-up Workshop

During the wrap-up workshop, all participating farmers identified their personal commitments/plan for farm activities based on results and lessons learned from the trial project. Each farmers' group (FG) discussed an action plan to strengthen group's capacity on collectively conducting cultivation and marketing activities.

1. Summary of commitments made by FGs (28 FGs)

Commitments made by FGs can be categorized into four major areas as below:

1) Improvement of quality and yield by following techniques learned through the trial project.
   - 23 FGs expressed their commitments to the improvement of cultivation technique and farm management methods.
   - Techniques learned through the trial project can be fully or partially adopted or modified by FGs based on the situation of each farm field.
   - Many FGs expressed their wish to receive continuous support and guidance from the Project.
     - Some FGs mentioned the importance of ensuring quality vegetable's seeds' availability.

2) Improvement of access to the better markets, either modern markets or local markets, where farmers can sell their products at a good price.
   - 18 FGs mentioned about marketing issues.
   - All 5 FGs from Sukabumi mentioned the marketing issue. Two of them try to involve more members to sell products through the group.
   - 3 FGs each from Bogor, Cianjur, Bandung and Garut presented commitment to improve marketing.
   - Saribhakti, Bandung District, proposed to cooperate with other FGs to enhance marketing and procure agro inputs collectively.

3) Expansion of the cultivating area to meet the market demand.
   - 12 FGs are interested in expansion of their cultivation area.
   - Some FGs plan to rent land to expand the cultivating area.
   - Some FGs want to get loans to expand the cultivation area.

4) Improvement of access to finance.
   - 10 FGs (Garut: 3FGs, Sukabumi: 3FGs, Bogor 2FGs, West Bandung 1FG and Cianjur 1FG) expressed their needs of access to finance.
   - Some FGs mentioned the needs of finance to expand the cultivating area as mentioned above.

2. Candidate follow-up activities by the Project

In response to the commitments made by FGs, the Project considers the following follow-up activities.

1) Follow-up on improvement of production

Activity	Description
Follow-up monitoring by the Project	• The Project will conduct the follow-up monitoring for the selected FGs to check if they could apply the knowledge and skills from the trial project at their own field and provide technical support if necessary. (This activity is subject to manpower of the Project staff to carry out monitoring.)

Interaction among farmers' groups	• Among FGs, this activity can enhance the learning process of techniques learned from the trial project. During the trial project some farmers succeed while other farmers failed to achieve good results even though they were following the instructions from the Project. As necessary, the Project will facilitate interaction among FGs within a district to learn each other. • FGs can collaborate each other to procure agro inputs collectively.
Support on variety registration	• The Project will support registration of new Japanese seed varieties, including tomato, mizuna, nasubi and piman, which could enable continuous cultivation of those vegetables to meet the specific demand from modern markets.

2) Follow-up on strengthening marketing

Activity	Description
Business Forum	• The Project will invite target FGs, who completed the trial project in 2017, to the business forum to link them with the modern markets.
Linkage between suppliers and FGs	• The Project will facilitate to link between suppliers and the target farmers.
Enhancement of FG's marketing activity	• FGs of Sukabumi try to organize themselves to conduct group marketing. They can learn from other FGs which conduct group marketing. The Project will provide them learning opportunities from successful cases by other FGs. • FGs, which have been already active in group marketing, can cooperate with other FGs to conduct marketing together to meet the required amount by the markets. As necessary, the Project will facilitate linkages among those groups taking specific demands of the markets into consideration.

3) Follow-up on improvement of access to finance

Activity	Description
KUR loans	• In order to meet farmers' and FGs' financial needs such as the fund for expansion of the farmland, the Project continue to facilitate the KUR loans application for the target farmers / FGs.
Collaboration with Fintech Companies	• The Project will explore the collaboration with Fintech companies, which have different financial services for the agriculture sector, to meet target farmers' financial needs.

Annex 8.5. Project Sheets

<1. Chili>

1. Project Title

Stabilization of quality and quantity in chili production by the introduction of appropriate nursery practices

2. Purpose and Expected Outcomes of the Trial Project

(1) Purpose of the project

Improve cultivation practices, especially seedling production, to stabilize the quality and quantity so that the seasonal fluctuation may be reduced.

(2) Expected outcomes

- Seasonal fluctuation of supply reduced by more stable productivity
- The quality of produce is maintained at the most demanded grade
- Production during the low-season is maintained at a higher level than before
- Access to more advantageous market is improved due to stable production

3. Focuses of the Trial Project

(1) Current practices to be targeted (products, varieties, cultivation methods, post-harvest methods, etc.)

- Farmers usually transplant small seedling. Quality of those transplanted seedlings are relatively low, so the seedlings are susceptible to climate during initial stage of growth. Consequently, productivity becomes unstable. The price of chili fluctuates drastically since its quality and quantity (the supply) highly fluctuate with natural conditions. The productivity decreases during rainy season due to the lower survival rate of the plant. If farmers can maintain better quality and quantity in the production during rainy season, their revenue fluctuation can be mitigated. The productivity could be maintained at a higher level, if more appropriate cultivation techniques especially in seedling production be introduced. This will improve farmers' access to the more advantageous market, and consequently improve their incomes.

(2) Changes to be brought in the trial project (usage of fertilizer, chemicals, equipment or materials, plot design, etc.)

- Farmers will be encouraged to grow seedlings of adequate size. Selection of good seedlings for transplanting will be executed to achieve a higher survival rate and stable production.

- More systematic application of fertilizers and pesticides will be introduced along with nursery management. Among others, pest control during rainy season will be looked into since the low productivity from pest damage in wet condition seems the major reason for the fluctuation of productivity.

<2. Beef Tomato>

1. Project Title

Production of high quality beef tomatoes demanded by high-end market

2. Purpose and Expected Outcomes of the Trial Project

(1) Purpose of the project

Enlarge the fruit size from 125-200g/fruit to the most demanded grade in high-end market (200-250g/fruit)) to improve unit sales and profitability

(2) Expected outcomes

- The standard fruit size is enlarged to the most demanded size (200-250g/fruit)
- Training, pruning, thinning and fertilization techniques to maintain high fruit quality are widely practiced
- Farmers acquire technique to produce grafted seedling
- Access to high-end market is improved
- Profitability of farmers is improved

3. Focuses of the Trial Project

(1) Current practices to be targeted (products, varieties, cultivation methods, post-harvest methods, etc.)

- The most demanded grade for high-end market of beef tomatoes is 200-250g in size; however, the majority of current production is below 200g. The targeted grade is expected to be obtained by utilizing appropriate techniques in thinning, pruning, training and fertilization. Those appropriate techniques will be introduced to meet more advantageous market, which will benefit both farmers and buyers.

- The lack of supply of grafted seedlings limits the production of beef tomatoes. On-farm production of grafted seedlings will enable more appropriate planning of cultivation according to the farm and market conditions.

(2) Changes to be brought in the trial project (usage of fertilizer, chemicals, equipment or materials, plot design, etc.)

- Training, pruning and thinning out of the tomato plants to control fruits quantity and allocation will enable the balancing of the plant condition and the number of fruit so that fruits of the demanded size can be obtained.

- The design of the type, quantity and application method of fertilizers is optimized in order to increase productivity in obtaining fruits of the most demanded size.

- In the places where farmers are dependent on a limited number of suppliers, a nursery will be developed so that farmers can produce grafted seedlings by themselves.

<3. Tomato: Dry Season>

1. Project Title

Stabilize fruits at larger size for all clusters

2. Purpose and Expected Outcomes of the Trial Project

(1) Purpose of the project

Stabilizing the fruit size at more demanded grade (6 ~ 8 fruits / kg) to attain higher price for all harvesting season

(2) Expected outcomes

- Fruits will stabilized to the most demanded size (125-180g/fruit) for all harvest season
- Appropriate nursery management will be adopted for better seedling production
- Farmer will understand criteria of good seedling for stabilizing fruits quality
- Harvest period of larger size fruits is prolonged
- Unit price of harvested fruits will improved by producing more demanded quality

3. Focuses of the Trial Project

(1) Current practices to be targeted (products, varieties, cultivation methods, post-harvest methods, etc.)

- Price of local tomato is generally higher for larger size over 125g per fruit. Farmers are trying to produce larger fruits, but there is no specific technique to attain this objective. Local farmers generally experiencing harvest of good size fruits for 1st and 2nd clusters of fruits, but fruits size of 3rd cluster and later tend to become smaller. Quality of tomato is generally considered become higher after 3rd cluster. Therefore, local practice should be modified to attain general characteristics of tomato growth

(2) Changes to be brought in the trial project (usage of fertilizer, chemicals, equipment or materials, plot design, etc.)

- Appropriate nursery management will be introduced to induce better later growth of tomato plants to prolong the yield of more appropriate size fruits.

- Current method of transplanting young seedlings will be modified to more appropriate size to induce reproductive growth instead of vegetative growth condition observed in many fields. Transplanting a young seedling to farm indicates excessively vigorous growth, which may be causing short yield period. So, seedling size should be modified to grown up to 1st flower appears. Other necessary techniques to rare right size seedling is introduced as well.

<4. Tomato: Rainy Season>

1. Project Title

Temporary use of plastic tunnels for off-season tomato production

2. Purpose and Expected Outcomes of the Trial Project

(1) Purpose of the project

Utilize locally available materials (plastic tunnels) to cover tomato plants for efficient rain protection to produce adequate quality tomato during rainy season without a greenhouse facility.

(2) Expected outcomes

- Tomatoes of adequate quality are successfully produced during rainy season
- Rain-caused diseases are controlled by the application of plastic tunnels
- With this cultivation technique successfully disseminated among group member farmers, the group has better access to advantageous markets.

3. Focuses of the Trial Project

(1) Current practices to be targeted (products, varieties, cultivation methods, post-harvest methods, etc.)

- There is a high demand for off-season tomatoes; however, the production is limited due to natural conditions. Rain is the major element that inhibits the production. If farmers can protect tomato plants from direct rainfall at a reasonable cost, they may be able to increase the production of high quality tomatoes for the high-end market.

(2) Changes to be brought in the trial project (usage of fertilizer, chemicals, equipment or materials, plot design, etc.)

- Plastic tunnels (stakes and plastic film), of which the materials are locally available, will be used to cover and protect tomatoes from rain.

<5. Paprika>

1. Project Title

Introduction of appropriate pest control to reduce pesticide application to meet safety standard of cultivation

2. Purpose and Expected Outcomes of the Trial Project

(1) Purpose of the project

Introduce scheduled application of pesticide for efficient control of thrips to limit the overdose of chemicals while maintaining appropriate harvest.

(2) Expected outcomes

- Damage on paprika especially from thrips is reduced by appropriate pest control
- Maintain or improve production of appropriate quality (no scar on fruits from pest damages) of harvest under less application of pesticide
- Safety standard of chemical residues in fruits is attained
- Cost of pesticide is reduced

3. Focuses of the Trial Project

(1) Current practices to be targeted (products, varieties, cultivation methods, post-harvest methods, etc.)

- The increasing population of thrips deteriorates the quality of paprika in the current production areas. Over application of same pesticide is causing to develop strong tolerance against available chemicals; therefore, efficiency of pesticide is severely deteriorated. Over use of pesticide is causing not only developing tolerance of chemicals against thrips, but also incurring cost of production for farmers. Appropriate control of pest is important not only for attaining profitable production but more to secure consumers and farmers safety.

(2) Changes to be brought in the trial project (usage of fertilizer, chemicals, equipment or materials, plot design, etc.)

- Scheduled application methods of insecticides to be introduced to control the population of thrips in order to reduce current over use practice of pesticide.
- Pest control based on IPM will be introduced to tackle this specific problem. In order to control the population of thrips, the condition of greenhouses will be improved through a combination of measures such as the installation of proper screens around the greenhouses, weeding, soil sterilization, traps, and appropriate application methods of insecticides.

<6. Carrot>

1. Project Title

Introduction of the production techniques of more demanded large cylinder type carrots (Nantes type)

2. Purpose and Expected Outcomes of the Trial Project

(1) Purpose of the project

Develop and introduce appropriate cultivation and post-harvest techniques of Nantes carrots, of which the demand is growing, in order to capture the advantageous market.

(2) Expected outcomes

- Adequate quality Nantes carrots are produced by target farmers and supplied to the high end market
- Locally adoptable Nantes carrot cultivation techniques are developed and widely practiced
- Nantes carrots are continuously supplied to the market (by utilizing the refrigerator at STA where possible)

3. Focuses of the Trial Project

(1) Current practices to be targeted (products, varieties, cultivation methods, post-harvest methods, etc.)

- Nantes carrots, newly introduced to this area, are becoming more popular in the market, but local farmers are not familiar with their cultivation techniques. Farmers need to modify their cultivation practices from the traditional style in order to grow adequate quality Nantes carrots.

(2) Changes to be brought in the trial project (usage of fertilizer, chemicals, equipment or materials, plot design, etc.)

- General practices of growing carrots in Japan will be modified and introduced to the target areas to enable farmers to cultivate Nantes carrots.
- The Project will design a utilization plan of the refrigerator at STA to support stable delivery of produce.
- Sowing seeds at a specific interval for row to row (2 rows each 75cm) and plant to plant (3cm) will be introduced.
- An appropriate quantity of specific types of fertilizers will be applied at designated timing.
- Weeding and tillage methods will be modified.

<7. Bean>

1. Project Title

Introduction of appropriate training techniques to improve quality and productivity of beans.

2. Purpose and Expected Outcomes of the Trial Project

(1) Purpose of the project

Introduce net training methods with proper pruning in order to increase the efficiency in the utilization of growing spaces. Improve the growing condition in order to increase productivity and obtain a higher quality.

(2) Expected outcomes

- Training method utilizing net will be understood and accepted by farmers
- Appropriate plant management techniques, such as nursery, fertilization, training, pruning and thinning, are practiced by farmers
- Quantity as well as quality of fruit are improved by the application of the techniques
- A healthy growing condition is ensured for a longer harvesting period
- Access to a better market is ensured through the continuous production of higher quality produce

3. Focuses of the Trial Project

(1) **Current practices to be targeted** (products, varieties, cultivation methods, post-harvest methods, etc.)

- Trained cultivation is a common practice for local farmers; however, their current method is not appropriate. Since shoots are growing freely without appropriate allocation, not only are the spaces utilized inefficiently but also is the growing condition left improper. Utilization of net training method will provide a healthier growth environment by balancing the fruit density. Proper allocation of shoots will also improve the aeration, which ensures an efficient plant protection environment. The improved growing environment by appropriate training is expected to increase the per-unit area productivity as well as the fruit quality.

(2) **Changes to be brought in the trial project** (usage of fertilizer, chemicals, equipment or materials, plot design, etc.)

- Net training method along with top pinching, shoot selection, shoot allocation, pruning, and thinning, will be introduced and modified to provide better growing environment .
- Fertilization will be adjusted according to the quantity of fruit production since the plant will require more nutrients for more harvest.
- Nursery practice is introduced to enhance shoots flower growth

<8. Broccoli Dry season>

1. Project Title

Introduction of appropriate cultivation management to improve quality of broccoli

2. Purpose and Expected Outcomes of the Trial Project

(1) Purpose of the project

Introduce appropriate techniques in nursery, fertilization and pest control to attain quality suitable for market demand

(2) Expected outcomes

- Appropriate fruit size of broccoli is produced
- Improved cultivation techniques in nursery management, fertilization and pest control will be practiced by target farmers
- Higher prices and profits are attained by target farmers by fulfilling demanded quality in the market

3. Focuses of the Trial Project

(1) Current practices to be targeted (products, varieties, cultivation methods, post-harvest methods, etc.)

- Various sizes of broccoli are demanded from each specific market. Some markets demand larger size, while many others demand smaller ones. However, growth condition under traditional practice tends to produce ununiform fruits. Uneven seedling and inappropriate fertilization seem to inhibit uniform growth of fruits. Cultivation techniques to maintain uniform and heather growth needs to be introduced to attain higher quality fruits at more uniform condition.

(2) Changes to be brought in the trial project (usage of fertilizer, chemicals, equipment or materials, plot design, etc.)

- Nursery management technique will be introduced to grow uniform and healthier seedling in order to attain uniform growth of plant.
- Fertilization method will be modified to sustain the adequate growth until later stage
- An appropriate plant spacing will be determined for each demanded size.
- The design of pest control in the application of pesticide will be designed according to each condition of the field. Other measures for pest control such as proper weeding will be encouraged.

<<9. Crystal Guava>

1. Project Title

Introduction of improved cultivation management of guava for higher production at better marketing quality of fruits

2. Purpose and Expected Outcomes of the Trial Project

(1) Purpose of the project

Introduce more appropriate cultivation management of guava tree in fertilization pruning and pest control techniques for increasing productivity at higher quality .

(2) Expected outcomes

- Adequate fertilization and pruning techniques are adopted
- An appropriate application of fruit bagging is introduced and practiced
- Efficient pest control by Integrated Pest Management (IPM) such as weeding is practiced
- More efficient application methods of pesticide such as the rotation system are introduced
- Productivity of higher quality fruits such as less pest damages and higher brix will be increased

3. Focuses of the Trial Project

(1) Current practices to be targeted (products, varieties, cultivation methods, post-harvest methods, etc.)

- Traditional practice of guava cultivation in West Java is basically grown by no technical input. Farmer has no specific fertilization design, no systematic pruning nor appropriate pest management. Consequently, the productivity is lower than what it should be, and quality of fruits are not at optimal grade.
- Pest damage is also very common, so the majority of fruits are graded at lower grade. Introduction of more appropriate cultivation management is recommended for improvement in general condition of guava cultivation.

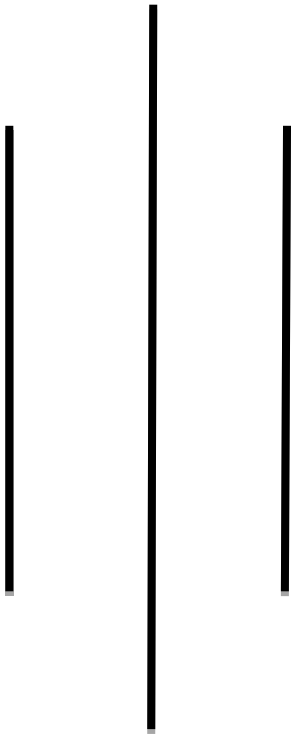
(2) Changes to be brought in the trial project (usage of fertilizer, chemicals, equipment or materials, plot design, etc.)

- Fertilization technique such as kind, quantity, timing and allocation method will be introduced.
- Pruning technique will be modified to induce more new shoots and maintaining appropriate shape for efficient sunlight
- The Project will also look into fertilization to improve the condition of trees so that resistance and tolerance to other pest damage is increased.

Annex 8.6. Reports on the Short-term Training for Level C Farmers' Groups

ACTIVITY REPORT

AGRICULTURE CULTIVATION TRAINING



OISCA SUKABUMI TRAINING CENTER

1. **ORGANIZER**
   IJHOP4 & OISCA Sukabumi Training Center

2. **DURATION**
   08-10 May 2017 (Sukabumi)
   11-13 May 2017 (Bogor)
   14-16 May 2017 (Cianjur)
   17-19 May 2017 (Garut)

3. **VENUE**

   OISCA Sukabumi Training Center
   Address: Cimenteng Sub-Village, RT 01/05, Sukamulya Village, Cikembar Sub-District, Sukabumi District

4. **THEME**

   Agriculture Cultivation Training
   Public-Private-Partnership Project for Improvement of Marketing and Distribution System of Agriculture Product

5. **PARTICIPANTS**
   - Farmer Groups from Sukabumi City and District, Bogor City and District, Cianjur District and Garut District

6. **OBJECTIVE**

   a. Giving understanding regarding the importance of land improvement for agriculture cultivation sustainability and applying it to Horticulture cultivation activity.
   b. To make the farmers able to apply agricultural cultivation by making use of the potentials of their environment.
   c. It is expected that the farmers can apply what they learned from the training in each agriculture activity so that they can increase their income and improve their welfare.

a. **TRAINING CONTENTS**
   Content on the First Day

- Introduction of Basic of Agriculture
  a. About organic farming in horticulture point of view
  b. Background why does it have to be organic
  c. Differences of Agriculture between organic and chemical

- Theory of Soil Ecology
  Explanation about characteristic of soil physically and biologically, and practice on soil differences between organic and chemical use.

- Soil Ecology Practice

  Few things which were practiced:

  a. Cappilary
  b. Water-pressing Capacity
  c. Aeration

- Practice of organic liquid fertilizer making

  Introduction of organic liquid fertilizer explaining that the liquid fertilizer making is very easy with the materials which are easy to get. Practices of liquid fertilizer include:

  a. Snail Organic Liquid Fertilizer
  b. Maja Fruit Organic Liquid Fertilizer
  c. Papaya Organic Liquid Fertilizer
  d. Bamboo Shoots Organic Liquid Fertilizer
  e. Banana Hump Organic Liquid Fertilizer

- Definition of Nursery

  Explanation about nursery, how to seeding and obstacles also solution in nursery. With the existing media how to seed the horticulture seed properly is also practiced.

Comments by participants:

- The material given in the training is very good and easy to understand, especially simulation and the practice (Sukabumi).
- Very happy to be able to learn organic farming, soil ecology, practice of liquid organic fertilizer making with the materials which are easy to get, how to seed with a simple media (Bogor).
- How to make organic fertilizer and pesticide can be applied in Cianjur area because it is very easy to make it by using cheap materials and very easy to get materials. Theory delivered on the first day is also easy to understand because the practices were fun (Cianjur).

Suggestions by participants:

- If possible the practice doesn't involve only 1 or 2 persons but it will be better if all participants can do the practices (Sukabumi).

Contents on the Second Day

- Chili Cultivation Theory

Explaining about technique of chili cultivation with Black-Silver Mulching Sheet, from nursery until harvest, pest and disease which attack the chili and how to handle it.

- Explanation about Effective Bamboo Micro-organism, Compost and Bokashi

Practice on how to make Effective Bamboo Micro-organism, Compost and Bokashi.

- Theory on how to make bio-pesticide

  Explanation on how to control pest and disease, on how to make bio-pesticide including used materials, and cultivation technique solving.

- Organic Livestock Theory

  Explanation about organic livestock, feed making, herbal drink making and soybean bacteria.

Comments by participants:

- This is the first time learning about how to make bacteria therefore the participants are very happy. It is easy, cheap and fast (Sukabumi).
- Very happy, and interesting because first time learning about organic livestock, how to make herbal drink and soybean bacteria, and for the theory of compost, bokashi and Bamboo Micro-Organism is very useful, how to make bio-pesticide and acknowledge the pest and disease on the plant (Bogor).
- Getting new knowledge about compost, bokashi and effective bamboo micro-organism making which is good by using waste which is usually never used. Beside, how to make feed for organic livestock and chicken herbal drink is very interesting (Cianjur).

Suggestions by participants:

- For bokashi the used materials are too difficult to get (rare) (Sukabumi).

Contents on Third Day

- Filling out Questionnaire

  Filling out comments and suggestions from participants during the training.
- Theory about how to make planting plan.

  Explaining about the agriculture concept which is environmental friendly and production system of agriculture result.

Comments by participants:

- With the proper planting plan we can get more benefits. Thank you to OISCA for teaching us many things especially about how to maintain the environment with organic farming cultivation (Sukabumi).
- Using the theory of how to make planting plan, it is very useful for calculating the plan time with harvest result which is giving more benefits (Bogor).
- Training gives us a very useful theory, so that we can start applying the knowledge in each area (Cianjur).

b. RESULT OF ACTIVITY

All contents were delivered as planned. The training activity is implemented successfully. Participants acknowledged the contents of the training. Comments from the participants and observers are in line with the objective of the training. Farmers can understand about agriculture cultivation and environmental friendly concept very well, they can interact with other groups and contents were delivered with practice and simulation. Comment from one of the observers from Agriculture Dinas about the cultivation training is very evolving, the participants were very communicative (Sukabumi).

All materials were delivered as planned. Participants could accept the training and contents well, and the participants were also very communicative, but on the second day, two participants Mr. Soemadi and Mr. Ade Sunanjar from Cisarua Bogor couldn't join the training due to the traffic (Bogor).

All contents were delivered as planned. Participants could join training activity well and understand the content well. Besides, the participants were also very communicative and enthusiast in implementing activity from this training, so that the knowledge can be useful for the future (Cianjur and Garut).

c. COMMENTS AND SUGGESTIONS BY PARTICIPANT

Comments:

- Thank you for giving us lessons of organic farming cultivation by using organic waste. With this lesson we could understand the necessity of organic cultivation for our children and grand-children. The knowledge is very useful, hopefully we can directly apply it (Sukabumi).
- Very thankful can follow this training, can meet other farmer groups, and very useful to get many experiences and learning especially about organic farming which is environmental friendly with existing system at OISCA. Thank you OISCA (Bogor).
- Get many new things and very useful and very easy to be applied in cultivation. Open a knowledge in organic cultivation in a fun and understandable way. The teacher is very friendly and interactive. Very impressed with the discipline of OISCA. Very happy to be able to be participant of this training (Cianjur).
- Very satisfied with the training at OISCA and very fun, very understandable and open our mind to consider about the environment and health with organic farming. The environment is very suitable for training, OISCA people are very friendly in giving good service, giving more friends (Garut).

Suggestions:

- If there is another training if possible the practice doesn't involve only 1 or 2 persons but it will be better if all participants can try the practices so we all will understand (Sukabumi).
- Do not stop developing every useful thing, and should consider the facility during the training, and keep the spirit to guide young generation in agriculture to improve the current agriculture (Bogor).
- It is expected that this activity can be done in routine way and can be an annual program to increase the capacity of the farmers in Indonesia. Please improve the facility of the training. To OISCA, please don't stop giving understanding to community about organic farming. Keep disseminating benefits for Indonesian community (Cianjur).
- Keep up the simplicity and please improve the accommodation because during the day it is very hot and also please improve the toilet especially the water. It is expected that OISCA can open its branch in Garut District so that it will ease the consultation and develop the organic farming at each dub-district, then giving enlightenment about organic farming so that can be the gate of organic farming which can be disseminated all over Indonesia (Garut).

d. TRAINING PARTICIPANT ASSESMENT

- In this agriculture cultivation training we recommend Farmer Group from ***Gunung Puyuh Sub-District*** (**Leles**) because their land is still wide and the support from the government is quite supportive and the participants were also active during the training activities (Sukabumi).

- In this agriculture cultivation training we recommend Farmer Groups from ***Tanah Sareal Sub-District*** farmer group KENCANA because the support from government to the group is quite good and participants were also active during the training (Bogor).
- In this training we recommend Farmer Group from ***Cipanas and Cugenang Sub-District*** as the best participant in this training, besides, the government' support is very good and also the participants were active and enthusiast during the training (Cianjur).
- In this agriculture cultivation training we recommend the Farmer Group from ***Cikajang and Luwu Sub-District*** as the best participant in this training, because very active in doing all activities practiced during the training (Garut).

APPENDIX

Name of Participants and Observers of Agriculture Cultivation Training

Sukabumi

NO	NAME	STATUS	ADDRESS
1	Wawin	Training Participant	Leles, Sukabumi
2	Encep. S	Training Participant	Leles, Sukabumi
3	Nurjaman	Training Participant	Cikundul, Sukabumi
4	Kamal	Training Participant	Leles, Sukabumi
5	Eben	Training Participant	Cikundul, Sukabumi
6	Hendra Irwansyah	Training Participant	Leles, Sukabumi
7	Aim	Training Participant	Cikundul, Sukabumi
8	Jamaludin	Training Participant	Leles, Sukabumi
9	Ece. Munawar	Training Participant	Leles, Sukabumi
10	Fahri Ahsan	Training Participant	Cibeureum, Sukabumi
11	Ade Sukardi	Training Participant	Cibeureum, Sukabumi
12	Yoki	Training Participant	Cibereum, Sukabumi
13	Muplihin, S.P,M.M	Observer	Karangtengah, Sukabumi
14	Komarudin	Observer	Cibeurem, Sukabumi
15	Nuryamin Solahudin	Training Participant	Kadudampit, Sukabumi
16	Usep Suparman	Training Participant	Kadudampit, Sukabumi
17	Abdul Karim, S.P.	Observer	Sukabumi
18	Tata Andriana	Training Participant	Kadudampit, Sukabumi
19	Ikmal Kosasih	Training Participant	Sukabumi
20	Cecep Rapih, S.P, M.M	Observer	Sukabumi
21	M. Hardiansyah	JICA Field Staff	Sukabumi
22	Desti Rahmaniar	JICA Field Staff	Sukabumi
23	Kardiansyah	Observer	Sukabumi
24	Ir. Komarudin	Observer	Sukabumi

Bogor

NO	NAME	STATUS	ADDRESS
1	Suniadi	Training Participant	Cisarua, Bogor
2	Ade Sunanjar	Training Participant	Cisarua, Bogor
3	Supri Haryoko	Training Participant	Cisarua, Bogor
4	Iwan	Observer	Cisarua, Bogor
5	M. Hasby	Observer	Cisarua, Bogor

NO	NAME	STATUS	ADDRESS
6	Ogie Satriadi	JICA Field Staff	Bogor
7	Dade Priatna	Training Participant	Ciawi, Bogor
8	Reza Rialdi	Training Participant	Ciawi, Bogor
9	Ahmad Kosim	Training Participant	Ciawi, Bogor
10	Syamsuri	Training Participant	Bogor
11	Dayah	Training Participant	Bogor
12	Romlih	Training Participant	Bogor
13	Wardoyo	Observer	Distan Kota Bogor
14	Deni Suherlan	Training Participant	Megamendung, Bogor
15	Hendri	Training Participant	Megamendung, Bogor
16	Jamal	Training Participant	Megamendung, Bogor
17	Mulyadi	Training Participant	Megamendung, Bogor
18	Iwan. S	Training Participant	Megamendung, Bogor
19	Saepulloh	Training Participant	Megamendung, Bogor
20	Ujang	Training Participant	Megamendung, Bogor

Cianjur

NO	NAME	STATUS	ADDRESS
1	Hj. N.Tiktik Sartika	Observer	Cipanas Cianjur
2	Ayep Hidayat	Training Participant	Cipanas, Cianjur
3	Lela Komala	Observer	Pacet, Cianjur
4	Rian R.H	Training Participant	Cipanas, Cianjur
5	M. Ikbal Ramdan	Training Participant	Cipanas, Cianjur
6	Jajang	Training Participant	Cipanas, Cianjur
7	Asep Mulyadi	Training Participant	Cipanas, Cianjur
8	Lili	Training Participant	Cipanas, Cianjur
9	Jujun Junaedi	Training Participant	Cipanas, Cianjur
10	Herher Suherman	Training Participant	Pacet, Cianjur
11	Dendi Suntara	Training Participant	Pacet, Canjur
12	Hisyam	JICA Field Staff	West Bandung
13	Idham	JICA Field Staff	Training Participant
14	Ajat Sudrajat	JICA Field Staff	Training Participant
15	Ujang Dayat	Training Participant	Training Participant
16	Dani	Training Participant	Training Participant
17	Ujang. H	Training Participant	Training Participant
18	Acep Sopyan Hadi	Training Participant	Cugenang, Cianjur
19	U. Gumilar	Training Participant	Cipanas, Cianjur
20	A.Darwis	Training Participant	Cipanas, Cianjur
21	Ahmad Ridwan	Training Participant	Cipanas, Cianjur

NO	NAME	STATUS	ADDRESS
22	Njanjang H. Anuary	Training Participant	Cipanas, Cianjur
23	Fatah Fathurohman	Training Participant	Cipanas, Cianjur
24	Setyo Budi wibowo	Training Participant	Cugenang, Cianjur

Garut

NO	NAME	STATUS	ADDRESS
1	Ujang S	Training Participant	Bayongbong Sub-District
2	Hadi Ahmad	Training Participant	Bayongbong Sub-District
3	Andri, SP	Training Participant	Bayongbong Sub-District
4	H. Adang	Training Participant	Cisurupan Sub-District
5	Husnil Umam Efendi	Training Participant	Cisurupan Sub-District
6	Dika Purnama	Training Participant	Cisurupan Sub-District
7	Muhamad Mardiana	Training Participant	Cisurupan Sub-District
8	Lukman Nulhakim	Training Participant	Cisurupan Sub-District
9	Aep Saepulrohman	Training Participant	Cisurupan Sub-District
10	Darman	Training Participant	Cisurupan Sub-District
11	Enan Suherman	Training Participant	Cisurupan Sub-District
12	Diman	Training Participant	Cisurupan Sub-District
13	Saban Mardiana	Training Participant	Cilawu Sub-District
14	Taufik Saleh	Training Participant	Cilawu Sub-District
15	Iqbal Fadlurahman	Training Participant	Cilawu Sub-District
16	Dayat Wigena	Training Participant	Cikajang Sub-District
17	Oman Suparman	Training Participant	Cikajang Sub-District
18	Farid	Training Participant	Cikajang Sub-District
19	Soleh Mamun	Training Participant	Cikajang Sub-District
20	Dedi Saripudin	Training Participant	Cikajang Sub-District
21	Ajang Somantri	Training Participant	Cikajang Sub-District
22	Ucu Sumiarsa	Training Participant	Cigedug Sub-District
23	Dede Suryana	Training Participant	Cigedug Sub-District
24	Solihin	Training Participant	Cigedug Sub-District
25	Feisal Rachman Soedibja	JICA Field Staff	JICA
26	Nugi Nugraha	Observer	Dinas
27	Muhamad Ali Ramdan	Observer	Dinas

PHOTO

Opening

Theory of Agricultural Introduction

Liquid Organic Fertilizer Making

Compost, Effective Bamboo and Bokashi Making

Theory of Planting Plan Making

Theory of Nursery

Capillary Practice

Installation of Black-Silver Mulching Sheet

Group Photo (Bogor)

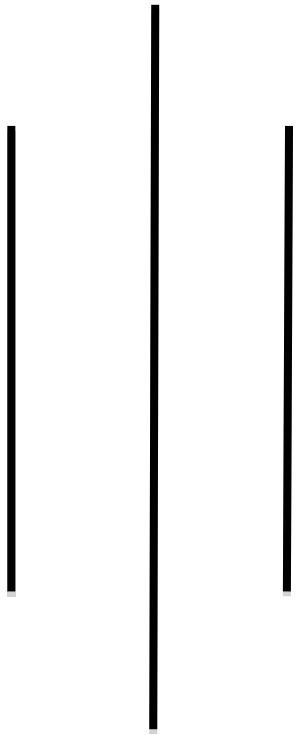
Group Photo (Sukabumi)

Certificate Hand-Over (Cianjur)

Group Photo (Garut)

ACTIVITY REPORT

TRAINING OF AGRICULTURE



OISCA SUKABUMI TRAINING CENTER

01 – 12 July 2018

1. COMITTEE

IJHOP4 & OISCA Sukabumi Training Center

2. TIME

Date 01 - 12 July 2018

- Participants from Sukabumi 01 – 03 July 2018
- Participants from Bogor 04 – 06 July 2018
- Participants from Cianjur 07 – 09 July 2018
- Participants from Garut 10 – 12 July 2018

3. VENUE

OISCA Sukabumi Training Centre
Kp. Cimenteng Rt. 01/05, Sukamulya Village, Cikembar Sub-District,
Sukabumi District

4. MAETRIALS

4.1. Materials of First Day

- Basic Introduction of Sustainable Agriculture
  Introduction about the importance of organic agriculture and the hazard of chemical fertilizer and pesticide usage continually.

- Theory of Soil Ecology
  Explanation about physical and biological characteristic of soil for soil improvement to allow cultivation.

- Practice of Soil Ecology
  Some practiced things were:
  - Soil capillary test
  - KMA (*Kapasitas Menekan Air*/ Water Pressure Capacity)
  - Soil aeration test
  - Practice on making liquid organic fertilizer

- Introduction on liquid organic fertilizer and the easy way to make it and accessible raw materials, practices included:
  - Making EMB (*Efektif Mikroorganisme Bambu*/ Effective Bamboo Microorganism)
  - Bamboo Shoot Mole
  - Banana Shoot Mole
  - Papaya Mole
  - Definition of nursery

- This topic explained about nursery, obstacles and solutions in conducting nursery for vegetables in the field.

Impression

SUKABUMI: Theory was understandable enough and participants were enthusiastic to practice it.

BOGOR: Theory was understandable and participants were enthusiastic to practice it, lack of question because was only conducted in class.

CIANJUR: Theory was understandable enough and participants were enthusiastic to practice it.

GARUT: Theory was understandable and participants were enthusiastic enough during class.

Message

SUKABUMI: Please add time for basic introduction of agriculture, and it should be better to add theory of nursery field in nursery theory.

CIANJUR: Please add time for basic introduction of agriculture, and it should be better to add theory of nursery field in nursery theory.

GARUT: Please add time for basic introduction of agriculture, and it should be better to add theory of nursery field in nursery theory.

4.2. Materials of Second Day

- Theory of cultivation method for chili and tomato, pest and disease, and then explain about how to cultivate plants conventionally and semi-organically in the field.

- Theory and practice in making **compost and bokashi**
  Explain about how to make and practice the application of bamboo bacteria for making compost and bokashi, as well as the benefit for plants.

- Practice of cultivating chili and tomato in the field (making beds, broadcasting basal fertilizer, *etc*).

- Practice of cultivating soil (making beds, broadcasting basal fertilizer, installing MPHP (*Mulsa Plastik Hitam Perak*/ Silver Black Plastic Luch)) and planting chili and tomato.

Impression

SUKABUMI: Participants were enthusiastic to practice making EMB (*Efektif Mikroorganisme Bambu*/ Effective Bamboo Microorganism) due to its easiness, cheap, and quick. Participants were also active in asking questions during theory session of pest and disease on chili plants. They were very enthusiastic.

CIANJUR: Participants were enthusiastic to practice making EMB due to its easiness, cheap, and quick. Participants were active in asking questions. They were very enthusiastic.

GARUT: Participants were enthusiastic to practice making EMB due to its easiness, cheap, and quick. Participants were active in asking questions. They were very enthusiastic.

Message

SUKABUMI: All persons should implement practice in the field.

CIANJUR: All persons should implement practice in the field.

GARUT: All persons should implement practice in the field, do not just stayed preventing sunlight during practice session in the field.

4.3. Materials of Third Day

- Material about method in spraying and mixing pesticide properly.
- Theory about planning a planting and plant rotation.
- Making and presenting action plan.

Impression

SUKABUMI: Participants were very enthusiastic with theory of planning and plant rotation because they can produce continuously in the field by implementing them.

BOGOR: Participants were very enthusiastic with theory of planning and plant rotation because they can produce continuously in the field by implementing them.

CIANJUR: Participants were very enthusiastic with theory of planning and plant rotation because they can produce continuously in the field by implementing them.

5. RESULT OF ACTIVITY

SUKABUMI: All materials could be delivered optimally. Activity implementation was very good so that participants could properly understood about doing agriculture properly and eco-friendly, could interact with other groups, and materials were delivered through practice and simulation.

BOGOR: Materials were delivered properly based on schedule even though participants from Bogor were not only vegetables farmers, but also fruits farmers (crystal guava and red guava), the result was quite good and lively during discussion due to different background of farmers.

CIANJUR: All materials could be delivered optimally. Activity implementation was very good, groups interacted each other, and materials were delivered through practice and field practice.

GARUT: Materials could be delivered optimally, participants understood about agriculture properly and eco-friendly, since participants came from different farmers group, they could interact each other through discussion and exchanged opportunity in doing farming.

6. IMPRESSION AND MESSAGE

Impression

SUKABUMI: This training was really helpful for farmers, especially farmers from Sukabumi City and District were very satisfied for the knowledge that hopefully God blessed it. Aamiin.

BOGOR: Participants were quite interested in making bamboo bacteria because it was easy, cheap, and quick to be applied on all types of plants. Vegetables farmers were quite active in asking during theory session of cultivating and pest and disease of chili, and they were enthusiastic to implement the knowledge.

CIANJUR: Were very appreciated and motivated by the training, hopefully the knowledge that we received will be useful for us and can be implemented to local people and each environment. We hope that the trainers and resource persons are always healthy, blessed with fortune, and protected by Allah SWT, Aamiin.

GARUT: Participants really thanked to JICA that had provided training and a bit understood about the importance of organic agriculture for the future and will be more enthusiastic to implement it.

Message

SUKABUMI: We hoped that the activity can be sustained in the future for farmers and farmers groups, and we hoped that there will be a partnership for participants who had joined the training to be facilitated in cooperating with supplier companies to sell products to supermarket. And we asked management of OISCA to periodically visit farmers groups which joined the training.

BOGOR: We asked all participants should join practice in the field, so that can be more noticed that learning by doing in the field is better, and if possible, materials do not only focus on cultivating vegetables.

CIANJUR: Time was too short that less optimal in delivering materials. We hope, there will an additional panel discussion or a session to answer what had been learnt after material. We also want to share experience about agriculture and marketing of organic products wo that we can be motivated in farming.

"Proud to be a Farmer, Rise Farmers"

GARUT: Guidance for groups should be increased to improve production at each field.

7. EVALUATION TO TRAINING PARTICIPANT

SUKABUMI: Participants from Sukabumi City and District were quite good in accepting materials and the farmers were still not familiar with agriculture technology and have never conducted partnership pattern, thus we hoped that they can get more guidance in selecting type of vegetable to be cultivated, and can introduced to partnership with marketing institution in accessing modern market.

BOGOR: In implementing the training, some participants had joined the same activity last year, that caused interaction in delivering materials and practice was less attractive, besides the participants are not vegetables farmers but crystal guava farmers, while most of the materials were about cultivating vegetables.

CIANJUR: Participants from Cianjur were well-organized farmers groups with good eager to learn, there were many questions and they were very active during discussion that the session became lively and many knowledge and farmers' experiences became comparison among groups. Dinas and JICA Field Staff were also very active in supporting and motivating the farmers.

GARUT: All participants were enthusiastic in following the activity, that was proved by their enthusiastic and activeness during some discussions in the class and in the field, and usually they would immediately apply what they had learnt from the training and committed to reduce usage of chemical ingredients in producing vegetables in the field.

8. NAMES OF PARTICIPANTS AND GUIDES

Sukabumi City and District (01-03 July 2018)

NO	NAME	POSITION	ADDRESS
1	Yana Supriatna	Training Participant	Cibereum, Sukabumi
2	Ismet Tullah	Training Participant	Cibereum, Sukabumi
3	Heriansyah	Training Participant	Cibereum, Sukabumi
4	Cacam Saipul Hamdi	Training Participant	Gunung Karang, Sukabumi
5	Ramlan Saehudin	Training Participant	Kadudampit, Sukabumi
6	Najmudin	Training Participant	Kadudampit, Sukabumi
7	Asep	Training Participant	Kadudampit, Sukabumi
8	Tonsa Hidayat	Training Participant	Sukabumi
9	Abullah	Training Participant	Sukabumi
10	Ali	Training Participant	Sukabumi
11	Didi Suhandi	Training Participant	Sukalarang, Sukabumi
12	Ujang Sulaeman	Training Participant	Sukalarang, Sukabumi
13	Maman Soematri	Training Participant	Sukalarang, Sukabumi
14	Saripah	Training Participant	Sukabumi
15	Taufik M. Ardiansyah	Training Participant	Sukabumi
16	Yoga Gunawan	Training Participant	Sukabumi
17	Andri Aliyudin	Guide	Sukabumi
18	Mupihin	Guide	Sukabumi
19	M. Arif Fatah, S.P.	Guide	Sukabumi
20	Moch. Dicky Wirawijaya	Guide	Sukabumi
21	M. Hardiansyah	JICA Field Staff	

Bogor District (04-06 July 2018)

NO	NAME	POSITION	ADDRESS
1	A. Suryadi	Training Participant	Bogor
2	Karim	Training Participant	Bogor
3	Ahmad Kosim	Training Participant	Bogor
4	Hendri	Training Participant	Bogor
5	Dade Priatna	Training Participant	Bogor
6	Mulyadi	Training Participant	Bogor
7	Erwin	Training Participant	Bogor
8	Saepulloh	Training Participant	Bogor
9	Maman Lesmana	Training Participant	Bogor
10	Junandi	Training Participant	Bogor
11	Soemadi	Training Participant	Bogor
12	Uus	Guide	Bogor

13	Wardoyo	Guide	Bogor
14	Asril Tinambunan	Guide	Bogor
15	Rony Ramdany	JICA Field Staff	

Cianjur District (07-09 July 2018)

NO	NAME	POSITION	ADDRESS
1	Jaja Rojana	Training Participant	Cipanas Cianjur
2	Hadi Sifaat	Training Participant	Cipanas, Cianjur
3	Wandi Ali Warnoto	Training Participant	Pacet, Cianjur
4	Deden A. J.	Training Participant	Cipanas, Cianjur
5	Odin	Training Participant	Cipanas, Cianjur
6	H. Harun Rosid	Training Participant	Cugenang, Cianjur
7	N. Suparman	Training Participant	Cipanas, Cianjur
8	Jejen Jaenudin	Training Participant	Cipanas, Cianjur
9	Asep Kostalani	Training Participant	Cugenang, Cianjur
10	Andi Cahyadi	Training Participant	Pacet, Cianjur
11	Ahmad Yasir Kurniawan	Training Participant	Pacet, Canjur
12	Ajang	Training Participant	Cugenang, Cianjur
13	Wandi	Training Participant	Cugenang, Cianjur
14	Lalan	Training Participant	Cugenang, Cianjur
15	Nanang Suhendar	Training Participant	Pacet, Cianjur
16	Denden. S	Training Participant	Pacet, Cianjur
17	Encep Komarudin	Training Participant	Pacet, Cianjur
18	R. Lela Kosmala, S.P.	Guide	Cianjur
19	Hj. Tiktik Sartika, S.P., M.P.	Guide	Cianjur
20	Ilyas Munawir	Guide	Cianjur
21	Yoko Asakawa	Guide	Cianjur
22	Ridwannulloh	JICA Field Staff	

Garut District (10-12 July 2018)

NO	NAME	POSITION	ADDRESS
1	Amas	Training Participant	Garut
2	Dedi	Training Participant	Garut
3	Iwan	Training Participant	Garut
4	Ujang Dindin Nasrudin	Training Participant	Garut
5	Ujang Koswara	Training Participant	Garut
6	Nadin	Training Participant	Garut
7	Ayi Sadili	Training Participant	Garut
8	Dedih Heryanto	Training Participant	Garut
9	H. Undang	Training Participant	Garut
10	Entis Sutisna	Training Participant	Garut
11	Depi	Training Participant	Garut
12	Gunawan	Training Participant	Garut
13	Rangga Pengestu Pratama	Training Participant	Garut
14	Asep Gofur	Training Participant	Garut
15	Acu Hariri, S.Pd	Training Participant	Garut
16	Wawan Hermawan	Training Participant	Garut
17	Ade Yana Surtiyana, S.Pt	Guide	Garut
18	Gita Maiza, S.P.	JICA Field Staff	
19	Ogie Satriadi	JICA Field Staff	

9. PHOTOS OF ACTIVITIES

Soil Ecology Theory (Sukabumi Round)

Soil Ecology Theory (Bogor Round)

Theory and Practice of Making Organic Liquid Fertilizer (Cianjur Round)

Theory and Practice of Making Organic Liquid Fertilizer (Sukabumi Round)

Nursery Theory (Garut Round)

Nursery Theory (Cianjur Round)

Theory and Practice in Cultivating Chili and Tomato (Bogor Round)

Theory and Practice in Cultivating Chili and Tomato (Sukabumi Round)

Practice in Making Bokashi and Compost (Garut Round)

Practice in Making Bokashi and Compost (Garut Round)

Theory and Practice of Planting Plan (Bogor Round)

Certification to Participants (Cianjur Round)

Annex 8.7. Summary of the Variety Registration Procedure in Indonesia

Variety Registration in Indonesia

Summary of the Variety Registration Procedures for 4 varieties of Japanese Vegetables

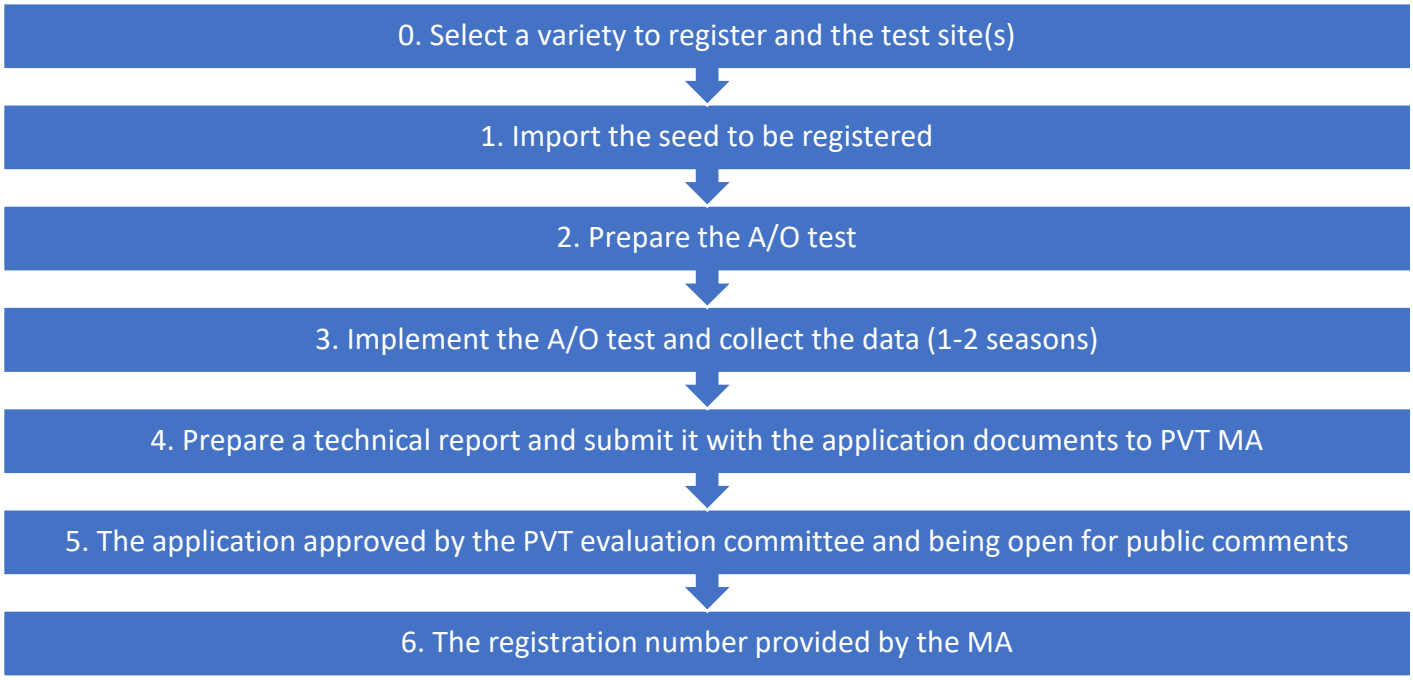
A seed importer is required to complete the variety registration of imported seeds in order to commercially sell the seeds. For the registration, a test of the imported variety is required for the evaluation of its adaptability to the local environment. There are two types of the test: the adaptation test and observation test. Some of the testing methods are different and which one to conduct depends on a commodity to be registered (specified in the variety registration guideline: *Pedoman Pendaftaran Varietas*.)

Two Types of Test for Variety Registration

	Adaptation Test	Observation Test
Test Site	3 (in 3 different districts)	1
Cultivation Season	1	2
Comparison with 2 local varieties	Required	Not required

In the adaptation test, two local varieties are also cultivated in the same field for the sake of comparison. In both the adaptation and observation test (A/O test), cultivation during the test must follow the Ministry of Agriculture's technical guide and the data should be collected according to the guideline. At the end of the test, a technical report must be prepared and along with the application documents submitted to the Plant Variety Protection Agency (PVT) of the Ministry of Agriculture (MA). The following flowchart shows the entire registration procedure.

Variety Registration Procedure



Example Case of the Project

Since May in 2018, the Project has supported a seed importer, PT. Tani Murni, in the registration of 4 Japanese varieties: tomato, *mizuna, nasu (eggplant),* and *piman (Japanese paprika)*. The expert team of Padjadjaran University (*Universitas Padjadjaran*: UNPAD) was invited as a partner mainly for making experimental design, data collection and preparation of the report. The observation test was conducted for *piman* while the adaptation test for tomato, *mizuna, nasu (eggplant)*. The entire process of the registration took around 1 year for the 3 varieties (adaptation test) and that of *piman* is expected around 1.5 years. The actual timeline of the registration is summarized below.

Chronological Events of Variety Registration

Procedure	Period	Time	
		Adaptation Test	Observation Test
0. Select a variety to register and test sites			
0-1. Select a variety to register and test sites		May 2018	
1. Import the seeds to be registered			
1-1. Apply for a recommendation letter from DINAS of each test site for the seed import	3 months	Late May	
1-2. Obtain a recommendation letter from DINAS of each test site for the seed import		Early June	
1-3. Apply for the import permit for the seeds		8 June,	
1-4. Obtain the import permit		16 July	
1-5. Import the seeds from Japan		23 August	
1-6. The seeds delivered to the Project from PT. Tani Murni		4 September	
2. Prepare the A/O test			
2-1. Prepare the arrangements of the test cultivation such as field preparation/layout, planting calendar, fertilizer application, pest management, 2 local varieties for comparison (adaptation test only), and monitoring and record-keeping methods	2 months	July to mid-August	
2-2. Hold a technical workshop to explain the arrangements to the participating FGs		14 August	
2-3. Visit the fields with UNPAD to check the field conditions and to explain the test procedures and the field layout to the farmers		11-12 September	
2-4. Procure the agricultural inputs for the test		Mid-September	
3. Implement the A/O test and collect the data (1-2 seasons)			
3-1. Start the test cultivation and collect the data	5 months / 9 months	Mid-September	Mid-September
3-2. Conduct periodical monitoring and data collection		~	~
3-3. Complete the test cultivation		Late February 2019	Mid-June 2019
4. Prepare a technical report and submit it with the application documents to PVT MA			
4-1. Prepare a technical report of the test	2 weeks / 1 month	~	~
4-2. Submit the application documents including the technical report to PVT MA		8 March	26 July
5. The application approved by the PVT evaluation committee and being open for public comments			
5-1. The application discussed in the PVT evaluation committee	1-2 month	22 March	23 August
5-2. The application being open for public comments (1 month)		~	~
5-3. The application approved by the committee		18 April	Late September
6. The registration number provided by the MA			
6-1. The registration number provided by the MA	2 months	13 June	
Total	1 year / 1.5 years		

Cost of the Registration

The actual cost of the registration of the 4 Japanese varieties amounted to IDR 116,927,800 as shown in the table below. The major cost was the data collection and reporting UNPAD dealt with. Since the Project found a market of the Japanese vegetables from the A/O test, the participating farmers could sell the vegetables at reasonable prices, for which no labor cost for the cultivation arose.

Costs of the Registration

Item	Cost (IDR)
Agro-inputs (seeds, fertilizer, pesticides, etc.)	16,767,800
Data collection and reporting (paid to UNPAD)	100,160,000
Total	116,927,800

Data Collection and Report Preparation

Each variety (both the subject variety and local varieties) in one location should have 3 replications of the plot. 11 - 12 plants from each plot were selected as samples in advance. At the time of harvest, the sample yield from every plot was recorded (weight and number of fruits for tomato, *nasu* and *piman*.)

UNPAD technical experts collected other required qualitative and quantitative data by periodic visits to the fields. The expert team observed and analyzed the characteristics of the varieties according to the Ministry of Agriculture's technical guide in order to prepare the report.

Annex 8.8. Examples of Business Negotiations during the Business Forum

Examples of Business Negotiations during the Business Forum

No	Area	FG	Market	Item	Notes
3rd	Bogor	Bina Tani Sepakat	Yogya Supermarket	Crystal guava	Yogya explained about Yogya's required specifications. Yogya set IDR 20,000 per kg of crystal guava for 5 shops in Bogor.
3rd	Cianjur	Utama	PT. Greenlife Indonesia	Broccoli	PT. Greenlife Indonesia (Brand name: "Healthy Veggie") and Utama agreed to further discuss on specification required by PT. Greenlife Indonesia and modality of orders.
3rd	Sukabumi	Al-Mujahidin Association	PT. Greenlife Indonesia	Carrot	PT. Greenlife Indonesia was interested in carrot so that they planned to take samples from the FG.
3rd	Bandung	Hikmah Farm	Boga Group	Kuroda carrot	Boga group was very interested in Kuroda carrot because it was large and suitable for catering. The company and FG decided to discuss the required quantity later.
3rd	West Bandung	All FGs	Lion Super Indo	General	The company needed 300 kg/week for all items and showed an interest particularly in paprika.
3rd	Garut	All FGs	PT. Sentra Panen Raya Prima	Tomato	The company needed 20 tons per week. Required specifications were 7-8 fruits per kg, and a mature level maximum at 80%.
4th	Bogor	Citra Tani Kencana	Agribusiness Development Station (ADS IPB)	Spinach	ADS asked about the price of spinach to Citra Tani Kencana. The price was IDR 17,000-20,000 per 5 kg.
4th	Sukabumi	Pandan Arum, Al Mujahidin	HSI	Tomato	HSI needed 5 tons of tomato per week.
4th	Cianjur	Utama	Alfamidi	Kuroda Carrot	Alfamidi was interested in Kuroda carrot of Utama. Alfamidi looked for carrots with a length of 10-15cm and a weight of around 100 g without any diameter specifications.[1]
4th	Bandung	Hikmah Farm	PT. Sentra Panen Raya Prima	Kuroda Carrot	The company was very interested in Kuroda carrot of Hikmah Farm. Hikmah Farm was ready to plant Kuroda again.
4th	West Bandung	Sinar Mukti	PT. Mahkota Multi Mandiri	Kenya Bean	The company and the FG made a deal for shipment of Kenya bean. The quantity was 500 kg/week.
4th	Garut	All FGs	PT. Sayuran Siap Saji	General	The company needed carrot, tomato, broccoli, and lettuce. The company would take samples from the field of Cikandang Agro, and then discuss further arrangements including price with the FG.

[1] The Project facilitated the business deal for Kuroda carrots between Alfamidi and Utama FG in Cianjur. After the negotiations, which began at the 4th business forum, they reached a business agreement in which the first delivery of Kuroda carrots to Alfamidi was planned on 26 Feb 2019 through Mujagi FG, a group that has been supplying Chili to Alfamidi. The order, however, was canceled suddenly due to internal issues on the Alfamidi side.

Annex 8.9. Results of Taste Testing at JETRO Consultative Meeting

JETRO Food and Agriculture Information Sharing Seminar

JICA IJHOP4 Questionnaire

7/25/2017

1. Comments

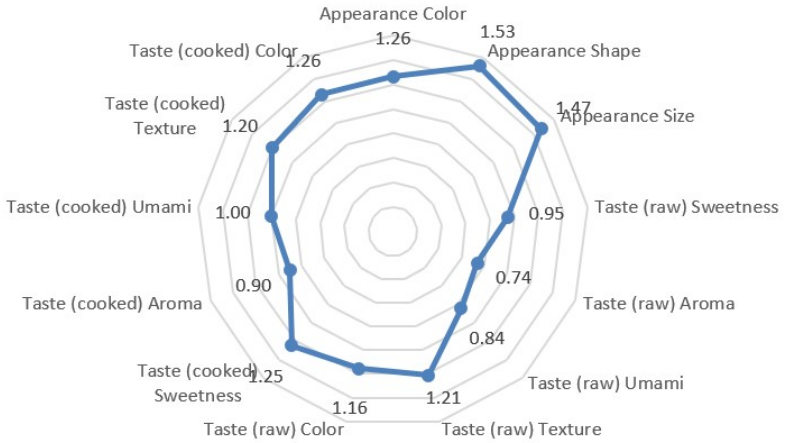
No	Company	Comments	JETRO/ Project
1	PT. MASUYA GRAHA TRIKENCANA	I was able to find that some local vegetables are improving their quality	J
2	PT. AEON INDONESIA	I was able to learn that the concept of Supply Chain Finance (SCF) is beginning to spread in Indonesia	J
		How will the project guarantee the standard of the vegetables? How do you plan to minimize the risk of unstable quality and irregular standards? If these questions are solved, we would be happy to begin negotiations with the suppliers	P
3	PT. VICTORY RETAILINDO	I was able to see that vegetables of this quality can be produced even under harsh Indonesian conditions. I saw the importance of applying technology and management for successful agriculture. I expect follow-up on the seedlings issue	J
		Thank you for the valuable opportunity. We appreciate the efforts put in to realize this event. The seminar was very informative. However, one of my concerns if we were to start a business with the farmers is on the management aspects of the production. Although I imagine that the project will be able to monitor the farmers for the next 3 years, will the farmers have the capacity to be able to manage their business on their own? I would like to learn more about this point in the future	P
4	PT. VICTORY RETAILINDO	The vegetables was of very good quality. I hope to see stable and continuous production of this quality	J
		My concern for the products is on the stability and continuity of the supply as well as the form of delivery to Jakarta. Although the first few productions are successful, as long as there remains the risk of not being able to maintain the same level of production (e.g. due to problem of soil or seedlings), we cannot start to deal with the farmers. The supply chain finance scheme may help the farmers meet our needs, but I would also like to see how we could discourage farmers from selling their produce off to other buyers. We have deals with farmers who are benefiting from foreign investment, but as long as the farmers are willing to work continuously to develop their production, we are happy to begin to create a good relationship with them	P
5	PT. YUSEN LOGISTICS INDONESIA	I was able to better understand JICA's project. I have always had high hopes for Indonesia when it comes to agriculture	J
		The vegetables we tried were all good in terms of taste and looks. We believe that Indonesia still faces issues of quality and stable supply. We believe that Yusen Logistics will be able to offer some help in this area	P

6	PT. YUSEN LOGISTICS INDONESIA	I was able to learn the activities of BTPN. I am hopeful that the farmers will continue to produce/cultivate high quality products	J
		We may be able to propose refrigerated or low temperature transport for sensitive products such as broccoli to endure long distance delivery. "The gravest issue in Indonesia is that related to logistics. Tackling this area will generate tremendous change for agricultural in Indonesia"	P
7	PT. INOVASI KULINER INDONESIA	If the project decides to produce Mizuna, we would like to purchase them	P
8	PT. OOTOYA INDONESIA	I look forward to the project as OOTOYA would like to offer its clients products of excellent taste and quality	J
9	PT. GOBEL SAGAMI INDONESIA	It appears that the quality of local vegetables is improving. I sincerely hope that the farmers can continuously offer high quality vegetables	J
10	Daisei Group Indonesia	I was able to gain valuable information since agriculture is one of our concerned area	J
		Indonesia's agriculture has large potentials. It may be able to export to neighboring countries like Singapore. Indonesia still relies largely on import (even soy beans). We would like to help the country develop into an exporter of agricultural products	P
11	Zensho	I would like to see the project support productions of vegetables such as onions and potatoes	J
12	Zensho	I was able to gain information on high quality vegetables in Indonesia	J
		Would it be possible to supply theses vegetables continuously through the year?	P
13	PT. APC International Indonesia	I was able to learn more about Indonesian agriculture	J
14	Riverside	The seminar offered valuable information to expand our choice of suppliers	J
15	PT. MCLEI	N/A	
16	PT. SRIBOGA MARUGAME INDONESIA	I would like to immediately start purchasing these products since instability and low quality/standard has always been a issue	J
		The vegetables are of good quality. As long as the price is competitive and the supply is stable, we would like to begin negotiations	P
17	PT. KEWPIE INDONESIA	N/A	
18	Jakarta Japan Club	N/A	
19	JICA Indonesia	It was very informative. I would like to hear more about how the project attempts to improve the supply chain and delivery of the products.	J
20	JICA Indonesia	The project highlighted some examples of Public Private Partnership initiatives.	J

Comments were received by JETRO and the JICA Project.
J: Comments received by JETRO.
P: Comments received by the JICA Project.

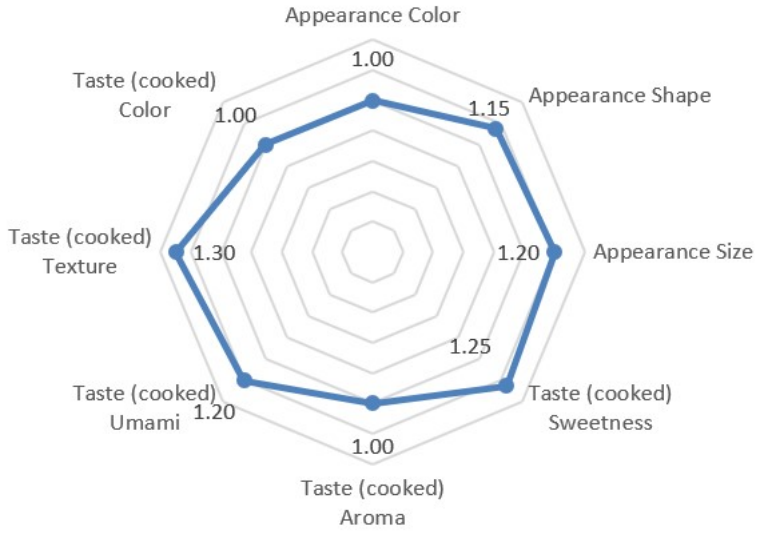
2. Evaluation per Product

Carrot



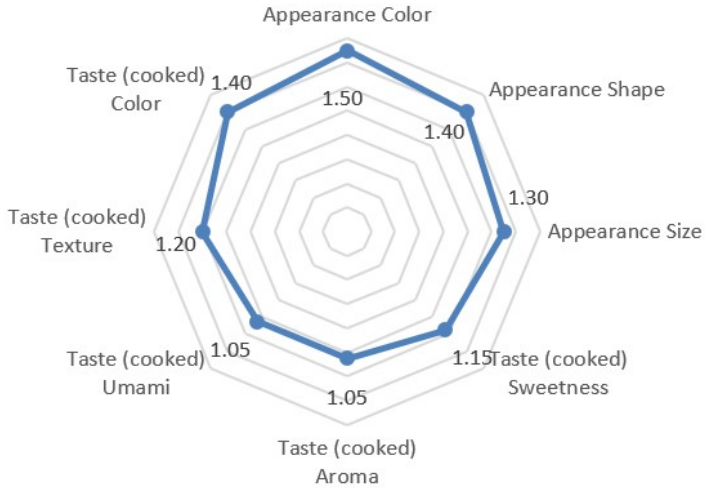
Positives	• The product will surely meet the customer's needs • The texture is very good. The taste is pleasant and is easy to eat • Good size and it has a slight sweetness which is also good • I have never seen local products with such size and sweetness • Good flavor • The size were even, the color was good, and the surface texture was smooth
Negatives	• The cooked ones have a slightly bitter taste • The shape is excellent but lacks sweetness • The cooked ones were slightly grassy

Beans



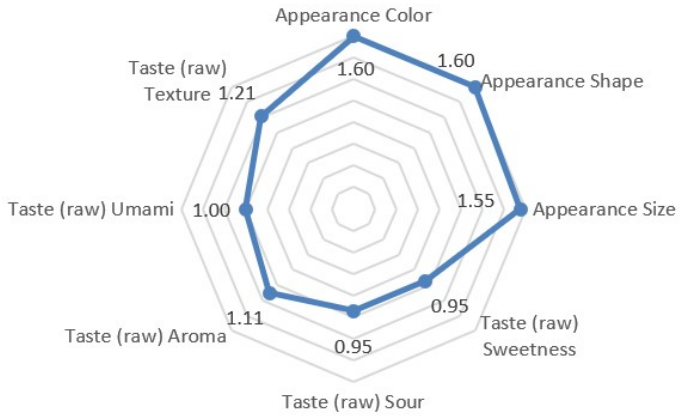
Positives	• Same with the carrots, the quality is very good • Good texture, good taste • It is crunchy, sweet and very good • Very similar to Japanese standards • Less bitter and enhanced sweetness • Very good • Not stringy and high in sweetness
Negatives	• The color needs improvement

Broccoli



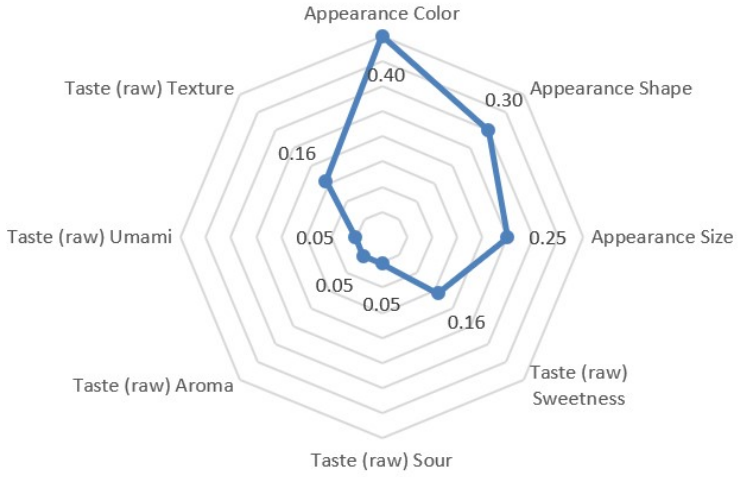
Positives	• Good texture • It's hard to believe they are locally produced • Good mass and weight • Good for a local product • Good color and sweetness • Good taste and appearance • While local products don't have good color and often comes with flowers, this one is of Japanese standards • Good with rich and thick taste • Juicy and very good
Negatives	• Good quality but not significant compared to other brands

Beef Tomato



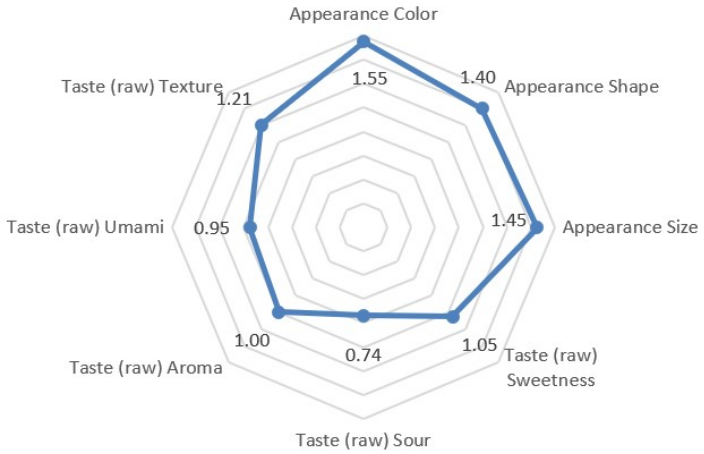
Positives	• Good taste. Because of its tough skin, it may be fit for cooking • Good texture and appearance. It could be a little sweeter • Skin was soft. Very juicy • Juiciness was good • Sweet, rich flavor. Texture of the meat is good • Very good. I think the quality of local tomatoes have improved in the last years • Sweetness and texture is good • Tasted like genuine tomato • Juicy and good taste
Negatives	• Shape is good. But a little sweeter, the better • For raw consumption, it may be better if it is a little sweeter. Juiciness was good • Better if it had more flavor • Better if it were sweeter

Tomato



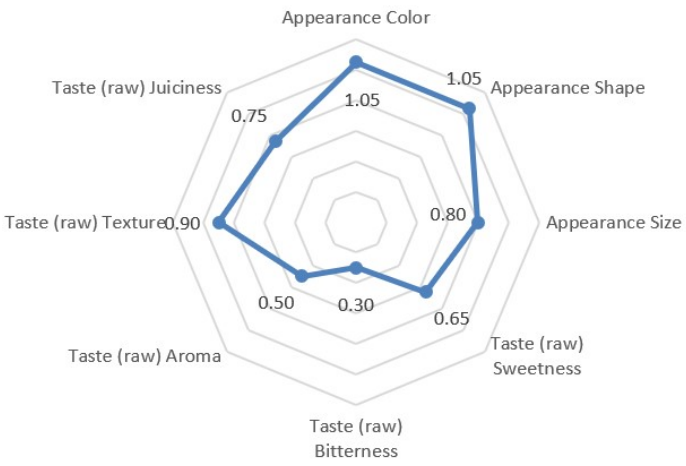
Positives	• More Umami (good taste) than the beef tomato • Not different from products sold at local supermarket but very tasty • Fresh and sweet • Fresh Indonesian tomato. I imagine that the locals prefer this variety • Good in the sense are equal and have no spots • Slightly harder than the beef tomato but better than those sold at local markets
Negatives	• Good quality but no different from those available in the market • Felt less tasty compared to the beef tomato

Paprika



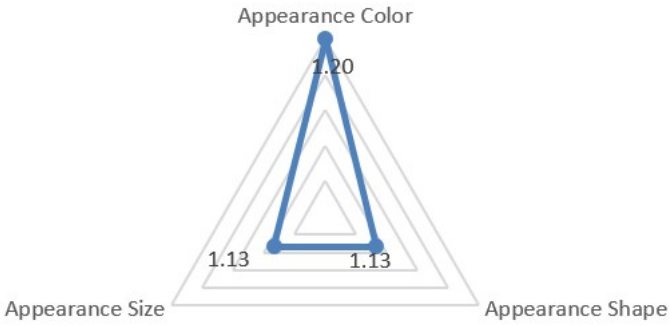
Positives	• Good appearance, good taste • Good appearance and texture. Sweet and easy to eat • Beautiful color. Good quality • Size and thickness, sweetness is good. Promoting recipes on paprika may increase demand • Since we have been depending on imports, we will be thrilled if this level of quality is available at a fair price • The green paprika was especially sweet and tasty • Good taste, good texture • Good taste and color
Negatives	• Good texture but a little stringy

Kyuri



Positives	• Juicy and rich texture • It was so good that it reminded me of the summer in Japan • Good that the shape is straight and even, and the seeds are not too large • Good shape. Overall is of Japanese standards
Negatives	• Good quality. Demand for thinner Kyuri is high. Thinner ones are preferred for Sushi • It seemed a little too soft • It was slightly bitter • Better if the skin is softer • Could be more juicy

Chili



Positives	• Good quality • Good taste with sufficient sweetness • Good that they are hot and sweet at the same time
Negatives	• No different from other local brands • Red ones were good. The green ones were slightly stringy

Annex 8.10. Management Options and Draft Lease Terms for Sukabumi STA

2017/08/09

Options for the Operation and Management of the Horticulture Section (sorting and packing space) of STA Sukabumi

	Option 1: Sublease to a the third party	Option 2: Operate under the current management system by the committee	Option 3: Delegate usufruct to ASPARTAN
1. Operation and Management	• DINAS exchanges a contract with a local company/trader, business person, or capable farmer's group in order to sublease the collection and packaging space located in the STA premises. • Duration of the sublease contract shall be in the medium term, 5~10 years, after 6 months or 1 year trial period. • DINAS receives a monthly rent from a lessor while all running costs shall be covered by a lessor. • A lessor of the space should be autonomous from the STA management committee in terms of operation and management of the facility (including financial management).	• Overall management responsibility for the collection and packing space in STA stays in the STA management committee while DINAS oversees the operation of STA. • A manager of the horticulture section of STA management committee is newly assigned to operate horticulture business by using facilities equipped in the space. • Other staff such as an accountant and workers (for sorting and packing of vegetables) should be hired by the STA management committee or the horticulture section.	• The horticulture section of STA is used by the ASPARTAN (association of farmers' market). • Under close supervision of the STA management committee and DINAS, ASPARTAN operates horticulture business in a larger scale compared to the current operation. • ASPARTAN is autonomous from the STA management committee in terms of operation and management (including financial management). • A memorandum of understanding shall be exchanged among 3 parties in order to specify detail operational arrangements.
2. Advantage	• The facility can be fully and properly utilized by a lessor according to the sublease contract. • DINAS and the STA management committee do not need to owe duties on STA operation. • A lessor will be able to invest necessary equipment or facilities if a medium term usufruct is secured under the lease contract.	• DINAS has authority to oversee the operation of STA and give instruction for proper management.	• The space can be utilized by the existing farmer-based association that has experiences in buying, packing and selling vegetables.
3. Disadvantage	• DINAS may not have authority to check if a lessor provides fair conditions (purchase price, payment terms, etc.) to farmers once a sublease contract is made. • It is unknown if a proper lessor can be found.	• There might be confusion in terms of management responsibilities due to overlapping of duties between the STA management committee and the horticulture section in STA. • It should be difficult to find a capable fulltime manager for operating business at the	• A scale of business will be rather small, considering capacity of ASPARTAN. • There might be confusion on or overlapping of roles between STA and ASPARTAN as a public institution.

		horticulture section.	
4. Remarks	• A monthly rent will be exempted during the start-up period (e.g. first 6 months) in order to ease financial burden of a lessor. • A lessor should have enough capital and experiences in horticulture business. • DINAS should widely advertise information through newspaper or public notice board for seeking a potential lessor of the space.	• A manager should have enough experiences in horticulture business. • Benefit sharing mechanism should be clarified between the STA management committee and the horticulture section since profits from horticulture business should be used for covering running costs of the sorting and packing space as well as investing new equipment.	• DINAS needs to clearly clarify mandates and roles of ASPARTAN in order to avoid confusion and overlapping of services. • DINAS should examine organizational structure of ASPARTAN to strengthen capacity (human and institutional) of operating horticulture business at STA.
5. Evaluation	○ (Recommended)	△	△

Terms and Conditions of Utilization of the Post-Harvest Facility of Sukabumi STA

	Conditions
1. Place	• Jl. Sarasa Sariksa, Limusnunggal, Cibeureum, Kota Sukabumi
2. Floor Area	• 130 m2
3. Equipment	• The facility is equipped with the following equipment. ✧ 2 wrapping machines, 2 digital scales, 1 analog scale (150 kg), 2 stainless tables (2000*700*850mm), 6 chairs, and 30 plastic boxes (605*424*463mm)
4. Rental Fee	• **Free of charge for 6 months** as a trial period (including utility costs) • After the trial period, a lessee will make a formal lease contract with Sukabumi City DINAS. • The amount of a rental fee will be proposed by Sukabumi City DINAS after a review of results of the trial period such as the amount of utility and other costs incurred for operation of the post-harvest facility.
5. Duration	• Duration of the trial period: 6 months • Duration of a lease contract after the trial period: medium term (negotiable)
6. Benefits	• The lessee is entitled to the privilege of exemption of rent, including utility costs, for 6 months as a trial period. • The lessee can receive the support from "*the Public-Private Partnership Project for the Improvement of the Agriculture Product Marketing*"[1] with regard to marketing of products and the linking with farmers' groups supported by the Project.
7. Qualification	• More than 1 year experience in marketing and distribution of horticulture products (procurement of products from farmers' groups, sorting and packing, and shipment to modern markets such as supermarkets, food industries, and other specific markets) • Have enough capital to start and continue the business • Have experiences in working with local farmers in the form of contract farming
8. Requirements	• A lessee should establish a fair arrangement with farmers/farmers' groups for conducting the business (such as price setting, means of transport, payment terms). • A lessee should be willing to accept any advice and recommendation from Sukabumi City DINAS in terms of operation of the facility.
9. Others	• A lessee is autonomous from the STA management committee with regard to operation and management of the leased facility. • A lessee should be fully responsible for disposal of wastes generated at post-harvest facility such as vegetable residues after sorting and packing.

Contact: Ms. Sanny Agustina

The Head of Processing and Marketing Section of Agriculture Product DKP3 Sukabumi City

[1] The Project has been implementing since April 2016 for 4 years by Directorate General of Horticulture, the Ministry of Agriculture in Indonesia, with technical support from JICA in order to modernize production and distribution systems of safe & high quality agricultural products that lead to an increase of farmers' incomes at the target areas.

Annex 8.11. Articles of KUR Recipients

KUR recipients from BTPN

April 26th 2018

Mandiri in Cianjur

Mr. Dedih Kusnadi

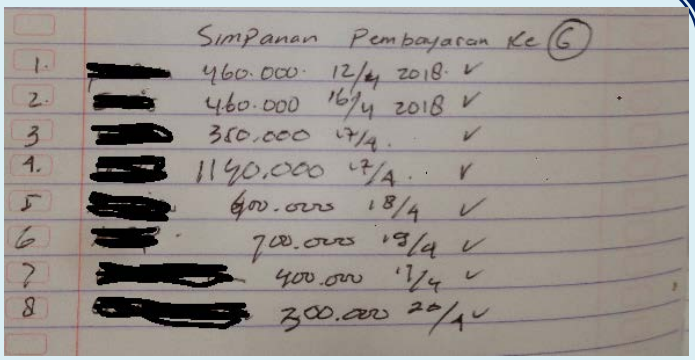
With the KUR, I was able to buy more mulching sheet and apply it to my 5,000m2 broccoli production. This helped me reduce the labor cost for weeding.
I would like to thank BTPN for giving me access to the loan.

Before KUR, we cultivated only 1,000m2. With the KUR, we have increased the area to 3,000m2. We are now able to grow a variety of crops such as chili, tomato, cabbage, horenso.
We would like to top-up our loan in the future as the KUR has been very helpful.

Mr. Udan

Mr. Mangsur

I am the leader of Mandiri. I make sure that all of my members will repay the KUR on time. I keep a notebook to check whether all members can complete the repayment. If some members have difficulty repaying, other members temporarily cover for them so that none of the repayments are late.



The KUR repayment is easy through WOW mobile service. We don't need to visit the bank branch.
The quality of the products the members produce has increased after the KUR, because they can buy enough inputs for the cultivation.
We are very satisfied with BTPN's KUR program, that we have recommended it to our three partner farmer groups. We hope that more members can use the service.

Mr. Udan

KUR recipients from BTPN

April 26th 2018

Mujagi in Cianjur

Mr. Didin

Mr. Sutisno

When we received the KUR, the whether was not appropriate for the plantation of beef tomato, so I used the KUR for the production of chili, cabbage, and onion.
I was able to buy mulching sheet and applied full fertilizer on basal fertilization. We also were able to buy good pesticides and fungicides.

Before the KUR, we used to mainly produce chili. But with KUR, were able to built a rain shelter and start the cultivation of beef tomato.
We can continue to use the rain shelter for next production.

Mr. Tatang

Mr. Gaos

Our group has an administration office that reminds the KUR members that their repayment is coming up. The group leader insists that we must help each other as members, so we make sure that everyone repays the KUR by the repayment deadline.

We have a fixed buyer that would buy our beef tomato, so it is important to commit to the production to satisfy our buyer. Building a rain shelter to improve production is important, and KUR has helped us realize this.

KUR recipients from BTPN

April 26th 2018

Utama in Cianjur

Mr. Herdi

Before the KUR, we cultivated vegetables only 2,100 m^2 and after KUR we expanded into 4,000 m^2. Our initial production of carrots using KUR was not good because the carrot market price fell. But now, we also have used the KUR to rent out an additional 3,000 m^2 as a group to produce broccoli. We hope that this production will yield good profit.
We have been repaying the KUR on time by helping each other.

I keep track of repayment of our member by recording on a notebook. If a member has difficulty repaying, the other group member helps them. I also make record of income and expense of our farming activity to make sure that we are making profit. Book keeping is very important in order to manage our farm.
We also promote the WOW service to our neighbors, and 10 people has opened their WOW account to make remittance and pay for their bills.
We thank BTPN for giving us the opportunity.

Mr. Ayi with Project's Field Coordinator

Annex 8.12. International and Local Good Practices for the Production and Distribution of High-quality Agriculture Products

Good Practice 1: Information Hub for Distribution

Location	Sariaya, Province of Quezon and Talavera, Province of Nueva Ecija, the Philippines
Implementer/Counterpart Institutions	E-Supportlink, Ltd., Department of Agriculture and Department of Agrarian Reform
Features of the good practice	An IT system was introduced to the wholesale market of fruits and vegetables in the Province of Quezon in the Philippines by E-Supportlink, Ltd, Japan through JICA's cooperation. The system has various functions including stock management, sales management, and the management of accounts receivables and payables. The system can manage a series of transactions from the arrival of products to the payment to farmers, from the records of which the system can generate useful information including sales tendency. The system is also able to facilitate fair trading by both sellers and buyers through the tracking of the evidences of all transactions.
Implication for the trial project	STA could play a role of the information hub for agricultural produce transactions in the area. Transactions can be recorded in terms of sales amount, volume, and types of vegetables. This information is useful for farmers' marketing activities towards modern markets. Transparent transactions at STA would help build trust between farmers and traders.

Good Practice 2: Highest Quality Vegetables Production in Collaboration with a Private Agribusiness Company

Location	Central Highlands, Lam Dong Province, Vietnam
Implementer/Counterpart Institutions	An Phu Lakue Co. Ltd. (A joint venture between Lacue Co. Ltd from Kawakami Village, Nagano Prefecture, JAPAN and a local partner in Vietnam)
Features of the good practice	In Dalat City, Vietnam Lacue Co. Ltd, Japan introduced Japanese lettuce cultivation methods such as preparation of a nursery garden, planting, plowing, and harvesting. Lettuce is sold at AEON MALL and other high-end supermarkets in Ho Chi Minh City at almost the same prices as in Japan because of extra efforts to produce high quality vegetables such as utilizing a vacuum machine to keep lettuce fresh. The produced high-quality lettuce is promoted at the tasting events held in Ho Chi Min City.
Implication for the trial project	The case of lettuce production in Dalat could be a role model for FGs aiming at high-quality vegetable production by introducing advanced cultivation technique, following the international agriculture standard for production such as Good Agricultural Practice (GAP), and using high-quality seeds and inputs.

Good Practice 3: Role of Local Traders to Strengthen a Supply Chain Network

Location	Chiang Mai Province, the northeast region, the western region, and Bangkok, Thailand
Implementer/Counterpart Institutions	Otento (Thailand) Co., Ltd.
Features of the good practice	Otento (Thailand) Co., Ltd. is engaged in agricultural production in Thailand, producing various Japanese vegetables, mangoes and bananas using Japanese farming techniques and sells domestically and exports bananas and mangoes to Japan. Otento organizes local FGs, providing them with guidance on safe and high-quality Japanese vegetable production as well as a logistic service for the collection and sorting of produce to be shipped to Bangkok.
Implication for the trial project	The case of Otento is considered as a role model for local traders in the project site such as Kaparindo in Bandung District. Otento's role in Thailand is similar to the role of traders who provide local farmers with technical support on the agricultural production to meet the market demand for high-quality and safe products.

Good Practice 4: Contract Farming Integrated into a Food Processing Industry

Location	San Patong District, Chiang Mai Province, Thailand
Implementer/Counterpart Institutions	Sun Sweet Co. Ltd.
Features of the good practice	Sun Sweet Co., Ltd in Thailand is a global sweet corn processor that exports its products throughout the world. Sun Sweet contracts with neighboring small-scale farmers to grow corns and other vegetables. The company collects, sorts and cleans farm products, and packages them for export. With Sun Sweet's products being mainly for export, farmers' products are required to meet the export standards.
Implication for the trial project	The practice of Sun Sweet's contract farming is useful for learning how small-scale farmers manage their production according to the instructions given by the company and ensure products' safety such as the level of chemical residue to meet the requirement of different certificates for export under the contract farming scheme.

Good Practice 5: Management and Coordination by the STA Management Committee Composed of Leaders of FGs and Local Traders

Location	Pemalang and Brebes, Central Java, Indonesia
Implementer/Counterpart Institutions	Pemalang STA, Brebes STA
Features of the good practice	• Pemalang STA in Central Java Province mainly deals with agricultural products for processing industries such as chilis and potatoes for Indofood. The association of traders and FGs manages the operation of the STA. Since the production of chilis in Pemalang District takes place only from December to March, Indofood also contracts with farmers in neighboring districts; chilis collected at STA from Pemalang District and neighboring districts are delivered to Indofood constantly at 30 tons per month throughout year. • Brebes STA in Central Java Province is a major collection point of shallot in the province. The area is well known to traders outside the Java island as a shallot production site. Although the production data is not computerized, the STA management knows the rough production volume of each FG, which enables STA to coordinate the transactions between traders and FGs. The STA facility includes a warehouse and drying spaces for shallots, which are also convenient for local farmers to bring their produce to STA.
Implication for the trial project	• Pemalang STA is a model case of a collection point that is used to maintain the supply of a particular commodity such as chili throughout a year. The integrated management body (STA management committee) composed of FGs and traders can satisfy both sides' interest. • Brebes STA's facility is rather simple, but is suitable for the purpose of handling shallots. The STA is well known to both farmers and traders as "a center for shallot" where the produce is collected at STA throughout a year. Securing a sufficient volume of produce of adequate quality is essential to link up the producers and markets.

Annex 8.13. Projects that Contribute to Modernization of Production and Distribution System

No.	Project	DGH/District/City	Brief Description of the Policy/Project	Status
1	Cultivation Training	Bogor City Dinas	This program is provided to FGs/FG associations in Bogor City for cultivation of mushroom, orchid, vegetables (edamame, chili, and leaf vegetables) 3 times a year.	On-going
2	Field School	Bogor City Dinas	DINAS provides technical training on cultivation activities through Field School.	On-going
3	Program for Horticulture Production Improvement	Bogor District Dinas	This program develops cultivation of vegetables, ornamental plants, medicinal plants, to utilize home yard.	On-going
4	Demonstration Plot	Bogor District Dinas	This program is a kind of trial project using demonstration plots for selected farmers.	On-going
5	Continued Trial Project	Sukabumi City Dinas	Sukabumi City Dinas develops JICA trial projects on bean and tomato, using same techniques and procuring the agro-input. There are 4 farmers groups involve in the project: Mekar Jaya FG (bean, 1,200 square meters), Sugih Mukti FG (tomato, 600 square meters), Mucekil FG (tomato, 1.400 square meters), and KAC (bean, 200 square meters).	On-going
6	Area of Red Chili	Sukabumi District Dinas	72 Ha of land was developed for red chili cultivation in year 2017.	Completed
7	Area of Bird's Eye Chili	Sukabumi District Dinas	24 Ha of land was developed for bird's eye chili cultivation in year 2017.	Completed
8	Chili GAP Field School	Sukabumi District Dinas	Field school for good agriculture practices (GAP) on chili in year 2018.	On-going
9	Area of Red Chili	Sukabumi District Dinas	50 Ha of land was developed for red chili cultivation in year 2018.	On-going
10	Area of Bird's Eye Chili	Sukabumi District Dinas	25 Ha of land was developed for bird's eye chili cultivation in year 2018.	On-going
11	Chili GAP Field School	Sukabumi District Dinas	Field school for good agriculture practices (GAP) on chili in year 2018.	On-going
12	STA Revitalization	Cianjur District Dinas	Revitalization of STA through repairing and re-lay outing facilities and functions of Cianjur STA. Now, the STA is managed by Agriculture Dinas of Cianjur District.	On-going
13	Demonstration Plot Development at FGs	West Bandung District Dinas	The programs is implemented using State Budget (APBN) and Local Government (APBD) with selected farmers.	On-going
14	Area Development of Chili, Kenya Bean, Orange, and Ornamental Plants	West Bandung District	The programs is implemented using State Budget (APBN) and Local Government (APBD) with selected farmers.	On-going
15	Development of Supply Chain Management for Chili	Garut District	This project was implemented through cooperation with Bank of Indonesia and Padjadjaran University.	Completed
16	Assistance and Coaching for Garlic	Directorate of Vegetables and Medicinal Plants	Garlic is one of commodities that contribute to national inflation. Thus, a program for area development for garlic production is designed at around 38 main production centers in Indonesia. Demand for garlic is to be met with domestic production by year 2023, while seed independency is to be achieved by year 2022.	On-going
17	Assistance and Coaching for Chili	Directorate of Vegetables and Medicinal Plants	Support is provided to farmers for improving quality and quantity of chili and distribution from farmers to market.	On-going
18	Area Development for National Shallot	Directorate of Vegetables and Medicinal Plants	The land for shallot cultivation is developed outside Java Island, while improvement in productivity focuses on cultivation inside Java Island. The project starts focusing on development of seed to reduce the level of dependence on bulb.	On-going
19	Area Development for Fruits	Directorate of Fruits and Floriculture	Area development for fruits to improve the production and productivity and quality. Focused commodities include orange, mango, mangosteen, durian, banana, papaya, pineapple, and longan. This program is implemented every year in production centers of the fruits.	On-going
20	Capacity Building for Farmers	Bandung District	Facilitating farmers to improve their capacity through field school and technical guidance.	On-going
21	Production Development	Bandung District	Provide farmers with facilities and infrastructures for agriculture production.	On-going

22	Development on Sustainable Living of Horticulture	Directorate of Horticulture Protection	Support by DG of Horticulture in developing sustainable horticulture is implemented through an activity named "Movement of Controlling Plants Infectious Organisms in Horticulture and Application of Integrated Pest Control". The activity is implemented by the Protection Center for Food Crops and Horticulture (UPTD BPTH) which is funded by National Budget Year 2020.	On-going
23	Development on Organic Agriculture	Directorate of Horticulture Protection	DGH developed an area in a village where organic agriculture was conducted between 2015 and 2019.	Completed
24	Modernization on Production System	Bandung District	The project facilitates farmers' use of agricultural machines and equipment for post-harvest to modernize horticultural production.	On-going
25	Distribution Improvement	Bandung District	Facilitate farmers in building partnership with market actors and supermarket.	On-going
26	Technical Guidance	Bogor District Dinas	Involve farmers in training (by Dinas or other institutions) in utilizing technology for marketing (online marketing), and any event that relates to entrepreneurship.	On-going
27	Capacity Building for Farmers and Dinas Officers	West Java Province Dinas	Knowledge of horticultural cultivation techniques, registration of farm/business field, GAP, packaging, partnership, products marketing, etc., was provided to farmers and Dinas staff. The project also improves their skills through demonstration plots, internships, and products promotions so that the obtained technology can be immediately practiced/applied.	On-going
28	Area Development for Chili	Cianjur District Dinas	175 Ha of land was developed in Cianjur District for chili cultivation to improve its production and quality.	Completed
29	Area Development for Garlic	Cianjur District Dinas	30 Ha in 2018 and 250 Ha in 2019 in Cianjur District was developed for garlic cultivation to improve its production and quality.	On-going
30	Training on Processing for Women Farmers Group	Bogor City Dinas	Training in food crop and horticulture commodities is provided to a women FG in year 2019.	On-going
31	Area Development for Ginger	Cianjur District Dinas	Land in Cianjur District area is developed for planting ginger to improve the production and quality.	On-going
32	Comparative Study	Cianjur District Dinas	Invite some farmers (not only horticulture farmers) in Cianjur District to comparative study of an auction market and agro-tourism in Solo, Central Java.	Completed
33	Provision of agricultural equipment	Directorate General of Horticulture West Bandung DINAS Bandung DINAS Sukabumi City DINAS	According to the request by the target farmers' groups, DG Horticulture facilitated procurement of necessary equipment in collaboration with DINAS. - West Bandung: Water pump - Bandung: Water pump, Hand tractor - Sukabumi City: Hand tractor	Completed

Annex 8.14. Events Related to Agricultural Distribution and Marketing

No.	Name of Event	DGH/District/City	When	Brief Description of the Event	Status
1	Farmers' Market	Bogor City	Once a month	The farmers' market was held once a month, using a car to go around the city until December 2017.	Completed
2	Business negotiation and business matching for processed food	Bogor City	Once a year	Bogor City Dinas holds meetings for women FGs and markets to have business negotiations, focusing on processed products. The last meeting with Super Indo resulted in a women FG supplying processed grass jelly, and guava juice and preserved guava to the supermarket.	On-going
3	Cooperates with Mandiri Bank	Bogor District	Year 2018	Cooperate with Mandiri Bank for providing Farmer Cards.	On-going
4	Exhibition	Bogor District	2 or 3 times a year	Involve FGs in any exhibition.	On-going
5	Bazaar	Bogor District	Based on certain event	Involve farmers under Dinas guidance.	On-going
6	Business matching	Bogor District	Averagely 4 times a year	DINAS facilitates business matching between farmers and buyers.	On-going
7	Bazaar	Cianjur District	Every Friday	Farmers are supported by Dinas Staff to sell vegetables in at the Dinas office.	Completed for 2018
8	Exhibition	Cianjur District	Based on invitation	Promote agricultural products, including horticultures, in the exhibition.	On-going
9	Business Forum	Sukabumi City	Every year	Invite farmers and banks to the DINAS office for business discussions.	On-going
10	Bazaar Dinas	Sukabumi City	Based on invitation	Support farmers in joining other Dinas' events where they can sell products.	On-going
11	Circular Marketing to Dinas	Sukabumi City	Since 2018	Sell farmers' products to all Dinas in Sukabumi City in cooperation with ASPARTAN.	On-going
12	Farmers' Market	Sukabumi City	Every Sunday	Farmers sell their products at Sukabumi STA.	On-going
13	Exhibition at District Level	Sukabumi District	2017	Support farmers in joining exhibitions for fresh and processed products at District level: 1) District Anniversary; 2) BBGRM; 3) Ramadhan Bazaar by DP2UKM; 4) Ramadhan Bazaar at Sukabumi District and DP3A of Sukabumi District; and 5) Moslempreneurs Festival.	Completed
14	Exhibition at Province Level	Sukabumi District	2017	Support farmers in joining exhibitions for fresh and processed products at Province level: 1) Ramadhan Bazaar/Farmers Market at Agriculture Dinas of West Java Province; and 2) HPS of Province Level.	Completed
15	National Exhibition	Sukabumi District	2017	Support farmers in joining exhibitions for fresh and processed products at national level: 1) Agrofood; 2) 11th Agrinex; 3) PENAS KTNA-XV; 4) Batam Expo; and 5) 37th HPS in Central Kalimantan.	Completed
16	Exhibition of District Level	Sukabumi District	2018	Support farmers in joining exhibitions for fresh and processed products at District level: 1) District Anniversary; 2) BBGRM; 3) Ramadhan Bazaar; and 4) Farmers Market.	Completed
17	Exhibition of Province Level	Sukabumi District	2018	Support farmers in joining exhibitions for fresh and processed products at Province level: 1) Ramadhan Bazaar; 2) The Syukron; 3) Ramadhan Bazaar by Bakorwil I; and 4) HPS of Province Level.	Completed
18	National Exhibition	Sukabumi District	2018	Support farmers in joining exhibitions for fresh and processed products at national level: 1) HPS of National Level; 2) Surabaya Expo; and 3) Pangan Nusantara (Nusantara Food).	Completed
19	Bazaar	West Bandung District	Based on invitation of exhibition by government or private company.	Promote farmers' fresh and processed products.	On-going
20	Bazaar	West Bandung District	Anniversary day of West Bandung District		Once a year
21	Daily Bazaar	West Bandung District	Agriculture Krida Day		Once a year
22	Farmers Market	Bandung District	Every day	Promote farmers' products (fresh and processed products) at the Dinas office	On-going
23	Bazaar ASPARTAN	Garut District	Every month	Promotion and sale of farmers' products in cooperation with ASPARTAN at the Garut DINAS office or the Province DINAS office.	On-going
24	Bazaar Car Free Day	Garut District			Completed
25	Fruits and Vegetables Festival	DG of Horticulture	October 12-13, 2016	Supported farmers in selling their products in the events held at shopping malls.	Completed
26	Love Local Fruits and Vegetables	DG of Horticulture	November 18-26, 2017		Completed

27	Mall to Mall	Bandung District	Based on schedule from DGH/ASPARTAN	Promotion of farmers' products at the event in cooperation with ASPARTAN (Association of Farmers' Markets).	On-going
28	Agriculture Krida Day	Bandung District	Every year	Promote farmers' products in the event at Bandung District Dinas and West Java Province Dinas.	On-going
29	Monthly Bazaar	Bandung District	Based on schedule from West Java Province Dinas	Promote farmers' products, both fresh and processed ones at the West Java Province Office.	On-going
30	Bazaar on World Food Day	Bandung District	Every year	Promote farmers' products in the event at the Bandung District Dinas, West Java Province Dinas, and Ministry of Agriculture.	On-going
31	Promotion	Bogor District		Publish and distributes promotional brochures of farmers' products in any event/occasion.	On-going
32	Farmers Market	West Java Province Dinas	Every month	Promote farmers' products at the West Java Province Dinas office.	On-going
33	Mall to Mall	West Java Province Dinas	Depends on schedule by ASPARTAN	Event is managed by ASPARTAN, and Dinas coordinates to involve the farmers in joining the event.	On-going
34	Exhibition and Bazaar	West Java Province Dinas	Based on invitation	Province DINAS supports farmers in joining exhibitions and bazaars held by private companies or other institutions to sell their products.	On-going
35	Auction Market	DG of Horticulture	Since May 2018	The auction market aims to reduce the number of intermediary actors in supply chains and facilitating transparent and fair transactions between farmers and buyers so that farmers can receive the highest price.	On-going
36	Ramadhan Bazaar	Sukabumi District	21-22 May 2019	Promote farmers' fresh and processed agriculture products at other institutions' events.	Completed
37	Agribusiness and Innovative Food Exhibition	Sukabumi District	2019		Completed
38	Agro Expo/Agribusiness Exhibition	Sukabumi District	2019		Completed
39	Bazaar	Cianjur District	Since 2019	Promote farmers' fresh and processed products at the Dinas office.	On-going
40	Mall to Mall Farmers' Market	DG of Horticulture	Since 2018	DGH facilitates participants in promoting products. The last event was held in East Kalimantan Timur and Bandung.	On-going
41	Avocado Festival	Bogor City	December 2019	Hold a festival to promote avocado fruits which are produced by farmers in Bogor City.	Completed
42	Nusantara Flowers and Fruits Festival 2019 & IPB Agro Innovation	Bogor District	29 November-1 December 2019	Festival/exhibition to promotes flowers, fruits and processed products and innovation in agriculture from IPB, including various competitions, talk show, and carnival.	Completed
43	Sukabumi Agrocreative Expo (SAE) 2019	Sukabumi City	16-17 November 2019	Exhibition to promote all agriculture, livestock and fishery products which are produced in Sukabumi City.	Completed
44	Fruits Festival of Sukabumi District 2020	Sukabumi District	30 January-1 February 2020	Festival/exhibition to promote fruits that are produced from 47 sub-districts in Sukabumi District with theme "Movement to Encourage Production, Export and Sustainability" along with various competitions and talk show.	Completed
45	Fruits and Vegetables Festival of Bandung District Year 2020	Bandung District	Once a year from 2020	Promote agriculture products by inviting buyers, sponsors and public people. Theme of 2020: Millennial Farmers Arrange and Praise Farmers Market.	On-going

Annex 8.15. Summary of the Survey on Agricultural Mechanization Service

Survey Report on Agricultural Machinery Service

1. Background

COVID-19 outbreak hit agricultural production in Indonesia. Some farmers could not secure the capital, materials, and labor for their production during the social restrictions. Also, farmers are required to deal with market demand changes during/after COVID-19. To enhance the resilience and sustainability of a farmer's business, saving production costs and improving the efficiency of works are significant, and introducing agricultural machinery could be a solution. Therefore, the Project decided to conduct a survey on agricultural machinery service in the current project sites. The Project interviewed a total of 24 farmers in Bogor, Sukabumi, Cianjur, Bandung, West Bandung, and Garut. The interview focused on the current situation of machinery use and farmer's attitude to introducing machinery in their fields.

2. Current machinery use

Among agriculture machinery, cultivator, water pump, and sprayer are used most. More than 60% of the farmers are using a cultivator but the ownership rate of it is low (13%). Since it is not used frequently, most of the farmers are renting from the Farmer's Group (FG) or others. A cultivator is required mainly from September to December since many farmers start new cultivation in this season. A water pump is also essential for the cultivation in the dry season (from April to August), and 67% of the farmers are using it. The ownership rate of it is also not high (29%) since most farmers use it only in the dry season. Whereas, a sprayer is required throughout the year for applying chemicals to control insects or diseases. Therefore, the personal ownership rate of the sprayer is higher than other machinery (67%). Other than the machinery discussed above, post-harvest machinery such as potato seed sorter and sweet potato washer is introduced by a few farmers, but most farm works such as fertilization, ridging, mulching, sowing, weeding, harvesting are done manually.

Figure 1. Current situation of machinery usage (n=24)

3. Cost for cultivation

Table 1 shows the estimated cost for cultivating 1,000m^2 of land. The cost is calculated based on the information collected by the interview during this survey. The capacity of the machinery is affected by the field condition. Also, each FG set a different rental fee for the machinery. As mentioned above, around 60% of the farmers are using machinery for cultivation. In contrast, around 40% of the farmers

are cultivating fields manually by hiring laborers. The average daily wage for the laborers is 56,905 IDR/day for males and 35,000 IDR/day for females. The wage depends on works, and the laborers work for 5 hours per day usually. Regarding manual cultivation, several interviewees in Sukabumi mentioned that they pay 300,000 IDR for 400m^2 of cultivation. This fact indicates that the cost of cultivation for 1,000m^2 is 750,000 IDR. Whereas, the cost of using a tractor and cultivator is estimated less than 240,000 IDR and 200,000 IDR respectively. Besides, using a tractor or cultivator also has an advantage in terms of efficiency. A tractor cultivates three times faster than a cultivator, and a cultivator does 20 times faster than a laborer. It means around 20 laborers are needed to have the same performance as a cultivator. Since payment for renting a tractor or cultivator is calculated per day, it may not be reasonable to apply them to a small field that requires less than 5 hours for cultivation. However, the results clearly show that introducing machinery is significantly cost-effective and efficient.

Table 1. Cost estimation for cultivating 1,000m^2 of land

Item	Price of machinery (IDR)	Capacity (m^2/hour)	Operation cost* (IDR/day=5hours)	Estimated Cost** (IDR/1,000m^2)
4 wheels tractor	300-400 million	1,000-1,500	700,000-1,200,000	93,000-240,000
Cultivator	10-30 million	300-500	150,000-300,000	60,000-200,000
Manual cultivation		15-20	40,000-80,000	400,000-1,066,000

*Operation cost includes the costs for fuel, operator, and renting.
** Round down less than 1000 IDR.

4. Needs of machinery

Other than cultivator, water pump, and sprayer, agricultural machinery is not much introduced currently. However, many farmers realized the necessity of it as Figure 2 shows. Among the types of works shown in the Figure, the necessity for a weeding machine was the highest. It suggests that weeding puts a heavy burden on farmers. Weeding should be done several times at a proper time during the cultivation. Other than weeding, around 50% of the farmers answered “Absolutely necessary” or “Interesting” to fertilization, ridging, mulching, and sowing, while around 20% of the farmers answered “Not necessary” to them. Some farmers consider that their land is too small to introduce the machinery. Also, some farmers have slopy land and the machinery can not be used. Besides the land condition, some farmers prefer manual works to provide job opportunities to the local people. In addition to the farmers mentioned above, around 30% of the farmers do not have an idea about machinery use. They might take an interest in the machinery if they have more information on the capacity and cost of it.

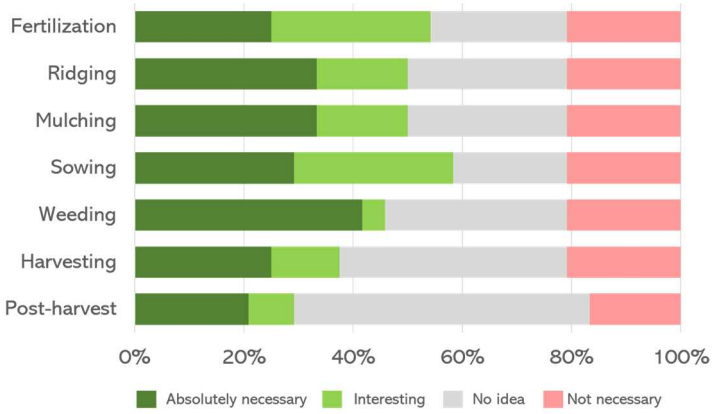


Figure 2. Needs for machinery (n=24)

5. Possibility of machinery use

The results and discussions suggest that agriculture machinery has the potential to enhance the resilience and sustainability of farming under the changing socio-economic situation. This survey also found that machine maintenance is properly done by the owner so far. It indicates that the machinery service business would be sustainable if it has enough demands from the users. In addition to machinery use, improvement of other agricultural tools should be considered for small or slopy land. Those tools would improve the efficiency of works such as weeding, mulching, and plant management.

Although machinery would improve work efficiency, opportunities for manual works could be important as social security for community people. Therefore, machinery should be introduced considering the social situation and it is important to achieve a balance between the efficiency of farming and employment of the local people (See also Figure 3). For example, saving costs on cultivation would motivate a farm owner to spend more costs on other farm management by hiring laborers, and it will contribute to the improvement of the product quality. Thus farmers are required to have a more concrete strategy to maintain the sustainabilities of their farming and community. Agriculture machinery would provide more options for it.

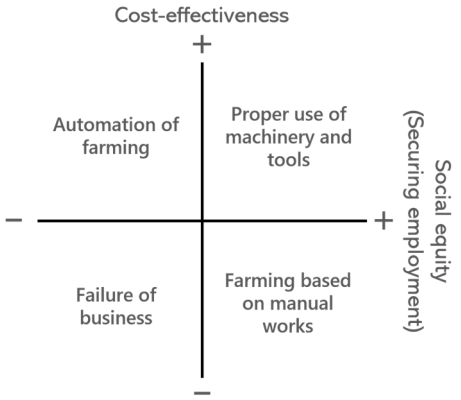
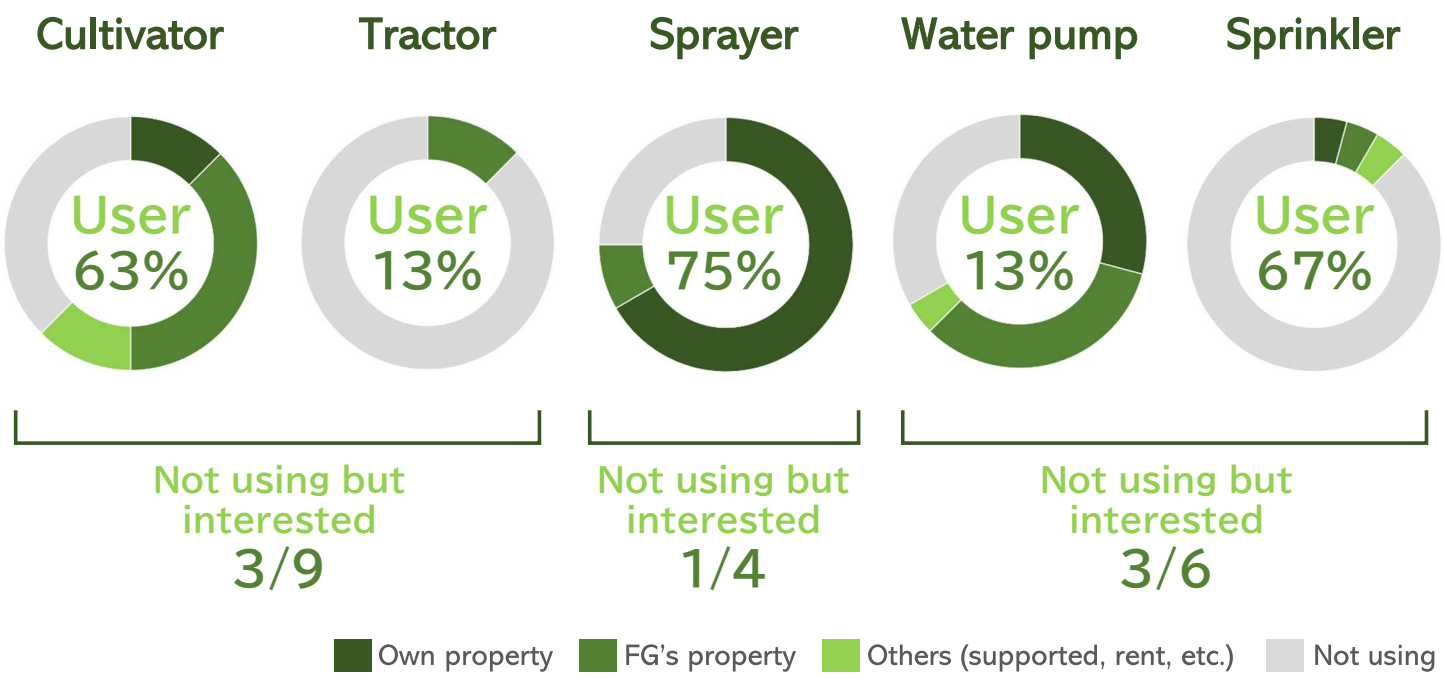
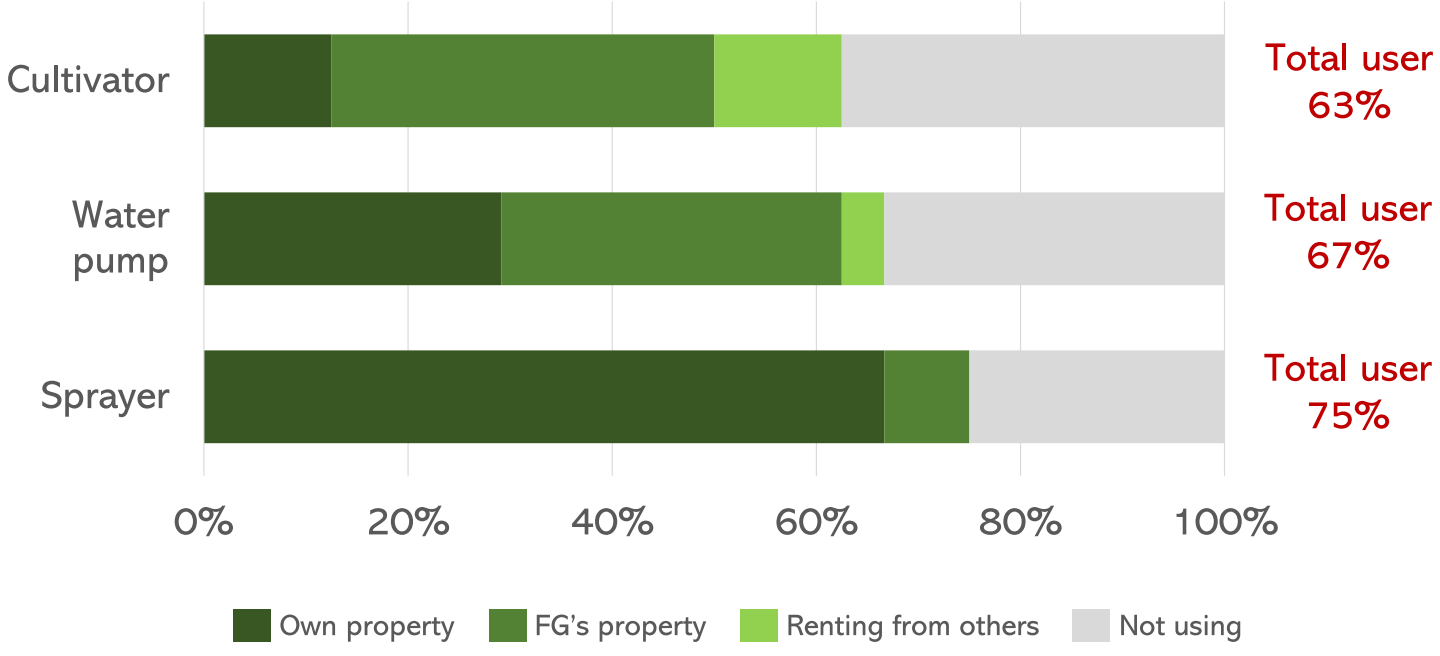


Figure 3. Social impact of farming method

Usage of machinery



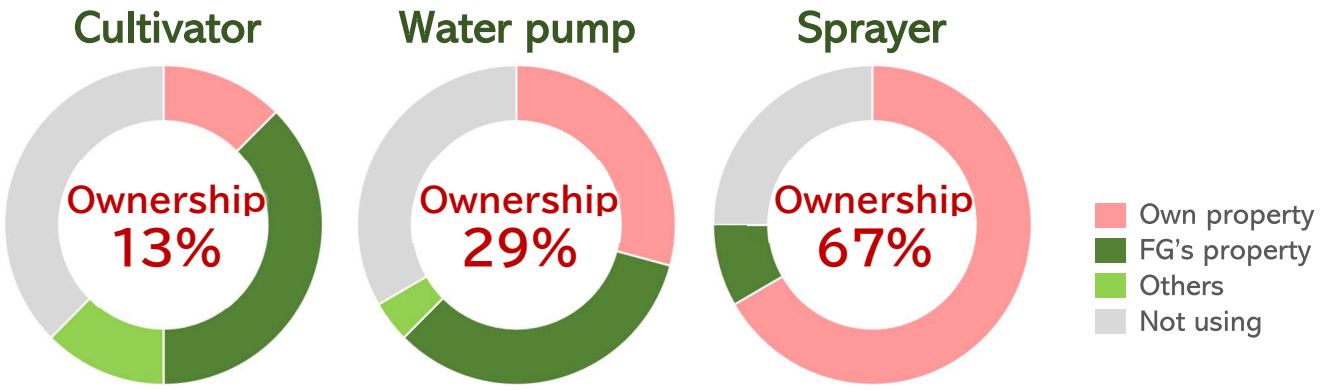
Usage of machinery



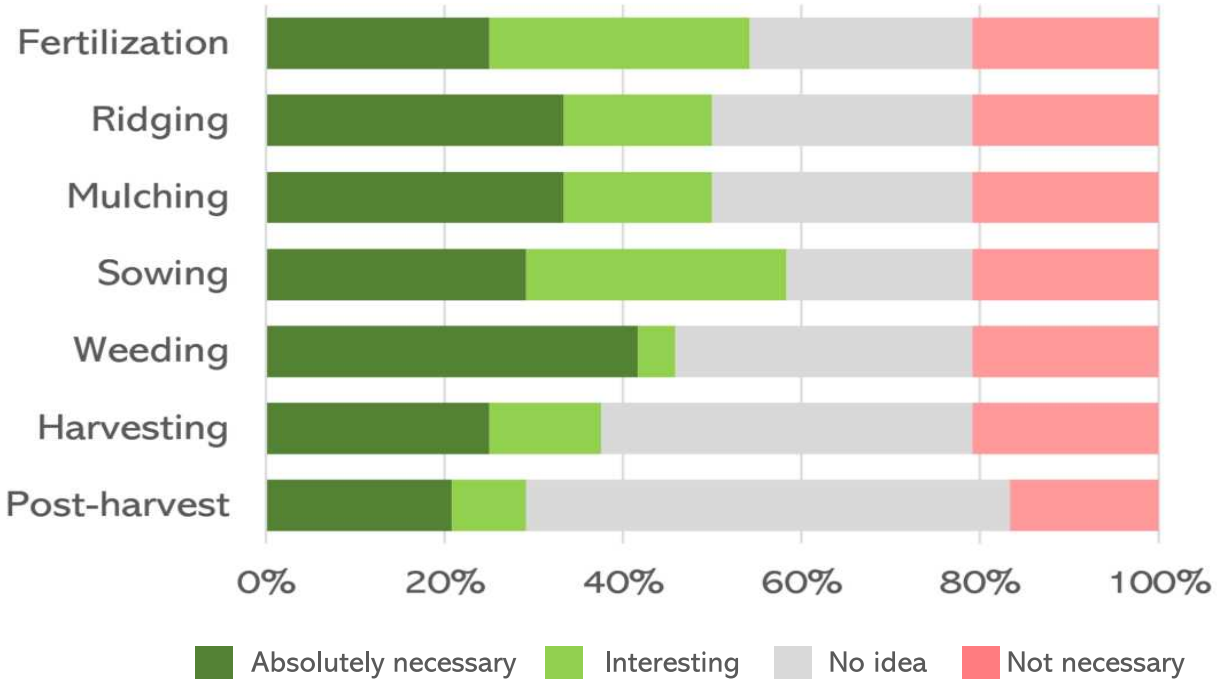
Machinery requirement and ownership

Machinery requirement

Month	1	2	3	4	5	6	7	8	9	10	11	12
Hand tractor												
Water pump												
Sprayer												

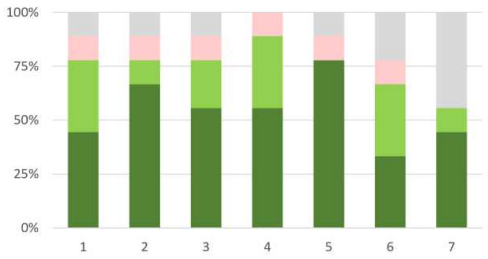


Needs of machineries



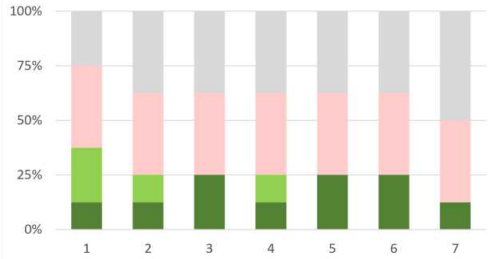
Needs of machineries (by farm size)

≧2ha n=9



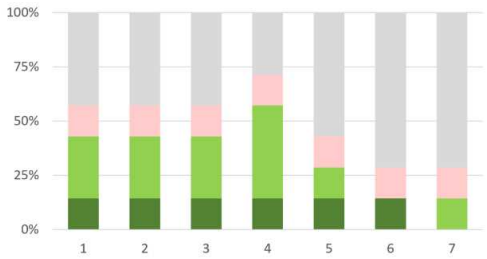
Bogor	2
Sukabumi	0
Cianjur	2
Garut	1
Bandung	3
West Bandung	1

≧1ha n=7



Bogor	1
Sukabumi	2
Cianjur	1
Garut	2
Bandung	0
West Bandung	1

<1ha n=8



Bogor	1
Sukabumi	2
Cianjur	1
Garut	1
Bandung	1
West Bandung	2

1. Fertilization 2. Ridging 3. Mulching 4. Sowing 5. Weeding 6. Harvesting 7. Post-harvest

Absolutely necessary Interesting Not necessary No idea

Annex 8.16. Farmers' Groups Database

Legend of the Farmers Group Database

	Item		Description
B	Name of Famers Groups		
C	Total number of members		
D	Total number of active members		
E	Organizational Structure	FG	Farmer Group
		AS	Association
		Coop	Cooperative
		Others	Others (specify)
F	Trial Project		Year D (Dry Season), Year R (Rainy Season), Non (not participated)
G	Field Area		Total field area of FG
H	Name of Sub-District (Kecamatan)		
I	Name of Village (Desa)		
J	Altitude (m)		Approximate altitude of farm lands of the FG
K	Land Features	F	Mostly Flat (more than 70% of group member's field)
		S	Mostly Slope
		M	Mixed with flat and slope land (almost fifty-fifty)
L	Access to Field	A	Accessible by cars to most fields
		B	Not always accessible by cars (50%/50%)
		C	Mostly not accessible by cars (access by motorbikes)
M	Irrigation Water	A	Available throughout a year
		B	Available but need a water pump in dry season
		C	Difficult to obtain water in dry season at most fields
N	Soil Condition	A	Soil-borne diseases are not identified at most of the members' fields
		B	Soil-borne diseases are partially identified at members' fields, but not sever
		C	Soil-borne diseases are common in the members' field
		D	There is sever damage by soil-borne diseases at most members' fields
O	Type of diseases		In case the answer is "C" and "D", specify what soil-borne disease is frequently found as:
		CR	Club-roots disease
		NE	Nematode
		BC	Bacteria disease such as Fusarium, Rhizoctonia, etc.
		O	Others (specify)
P	Other Features		Other Features: Specify other characteristics that might affect cultivation environment, such as "frequent fog", "high risk of flood", "frequent outbreak of specific disease or pest", etc.
Q	Facility and No.	RS	Open rain shelter made by bamboo structure
		SH	Closed screenhouse
		Others	Others (specify)
			How to fill in: Own 4 rain shelters and each size 400m2: RS (4/400)
R	Machineries owned by FG		
S	Cultivation Skill	AA	Have ability to make a planting plan according to demand by markets (+fulfill the criteria of A)
		A	Fully understand and have ability of adopt the cultivation technique introduced by the Project
		B	Partially understand the cultivation technique introduced by the Project
		C	Continues applying the traditional cultivation method. Not willing to apply a new technique introduced by the Project
T	Main Products		Specify at where cultivated as follows How to fill in: OF: tomato, chili, TR: broccoli, SH: paprika
		OF	Open field
		TR	Temporary rain shelter
		RS	Structured rain shelter
		SH	Screenhouse
U	Markets		
V	Other Information		Challenges, Need of support, Interest in collaboration with other FGs, etc.
W	Remarks		

FGs selected by DINAS as the target groups to achieve Overall Goal

Bogor City/District

No	Name	No. of Members		Organizational Structure	Trial Project	Field Area	Sub-District (Kecamatan)	Village (Desa)	Altitude (m)	Land Features	Access to Field	Irrigation Water	Soil Condition		Other Features	Facility	Farm Machines owned by Group	Cultivation Skill	Main Products	Market	Other Information (Challenges, Need of support, Interest in collaboration with other FGs, etc.)
		Total	Active										A-D	Type							
B1	Crystal Guava Mandiri	10		FG	2017D 2017R	2 Ha in total	Rancabungur	Bantar Sari	±162	F	C	C	A			Packing house		C	OF: Crystal Guava, Red Guava	Direct selling to consumers at Ministry of Agriculture office in Jakarta.	Main harvest season (Dec. Mar., Aug.~Oct.) Obstacle: damages caused by insect (fruit fly) and disease
B2	Subur Makmur	23	23	FG	2017D 2017R	8 Ha in total	Dramaga	Cikarawang	±174	F	C	C	A			Packing house, 3-wheels motorcycle	Sprayer (2 units)	B	OF: Crystal Guava Guava seedlings	Direct consumers and local trader.	Produce seedlings of crystal guava (since 2011) Obstacle: lack of containers for post-harvest management
B3	Bakti Mandiri Sukajadi	25	25	FG	2017D 2017R 2019D 2019R	1.5 Ha in total	Tamansari	Sukajadi	±636	F	C	C	B			Packing house	Cultivator, water pump machine	B	OF: Crystal Guava Chili	Kemang Bogor Wholesale Market	Owns a sorting and packing facility (built in 2016) Obstacle: damages caused by insect (fruit fly) and disease
B4	Tani Mukti	28	20	FG	2017D 2017R	13 Ha in total	Cijeruk	Tanjung Sari	±549	F	C	A	A		Frequently found helopeltis (pest) on crystal guava fruits.	3-wheels motorcycle	4-wheels tractor (from Dinas), cultivator (from dinas).	C	OF: Crystal Guava Chili, Leafy vegetables, Cucumber, Taro	Direct selling (owns a kiosk at Lawang Seketeng Market), PT. Sayuran Siap Saji (choy sum, sweet corn, spring onion, ambon banana).	Obstacles: lack of skills and knowledge on post-harvest handling (sorting and packing methods). The FG is interested to sell produce to modern market and wants to build packing house.
B5	Alam Tangkil Mandiri	27		FG	2017D 2017R	10 Ha in total	Caringin	Tangkil	±644	S	C							C	OF: Crystal Guava		Own a sorting and packing facility Ship crystal guava (Grade A) to STA Rancamaya Obstacle: damages caused by insect (fruit fly) and disease
B6	Mitra Jaya	25	25	FG	2017D 2017R	6 Ha in total	Tanah Sareal (Bogor City)	Sukaresmi	±185 ASML	F	C	C	AA				Water pump machine	B	OF: Crystal Guava, Red Guava	Direct consumers, Cengkareng Market and Cibitung Wholesale Market.	Supply crystal guava (Grade A) to STA Rancamaya Obstacle: damages caused by insect (fruit fly) and disease (only 25% of total produces are categorized as Grade A)
B7	Tunas Tani Pangrango	20	12	FG	2018D 2018R 2019D 2019R	30 Ha in total	Megamendung	Sukaresmi	±915 ASML	M	B	B	B		Fog frequently occurs, sometimes anthracnose disease infects chili.	Packing house, 3-wheels motorcycle, irrigation pipe.	Cultivator	A	OF: Chili, Bean, Cucumber	Kemang Bogor Wholesale Market, PT. Sayuran Siap Saji	Collectively ship products to local markets in Bogor and some restaurants Obstacles: 1) lack of capital to buy necessary inputs, 2) pest and disease. The FG needs a greenhouse for planting tomato. The FG made a contract with Pizza Hut in 2021 for cooperation. Hizza Hut builds 8 screenhouses for cultivation of paprika, while FG regularly ships paprika and other vegetables to Pizza Hut in Bogor.
B8	Rukun Tani	60	23	AS	2018D 2018R 2019D 2019R	25~30 Ha in total	Ciawi	Citapen	±611 ASML	F	B	B	B		Anthracnose disease sometimes infect chili fruits.	Packing house, warehouse for processing compost.	Tractor for rice field, water pump machine	B	OF: Chili (Curly Chili), Bean, tomato	Kemang Bogor Wholesale Market, catering	Consist of 7 FG. 3 FG grow vegetables Own a sorting and packing facility (members bring products to the facility) Collectively ship products to suppliers (Grade A&B), local markets, hotels, and school. Obstacle: 1) pest and disease, 2) Increase of the yield of Grade A&B products
B9	Bina Tani Sepakat	73	50	FG	2018D 2018R 2019D 2019R 2020R	15 Ha in total	Dramaga	Neglasari	±249	F	C	B	A		Helopeltis is frequently found on crystal guava fruits.	Packing house	Water pump machine, cultivator	AA	OF: Crystal Guava, Purple Eggplant	Direct selling to consumers, selling througreenhouse reseller.	Ship products to ADS/IPB (16,000 Rp/Grade A&B, 12,000 Rp/Grade C) an a local supplier (15,000 Rp/all grade) No. of trees: 500~200 trees/members The leader has started cooperation with a private investor in 2020 for cultivation of crystal guava at 1.5 Ha of new field.
B10	Pemuda Tani Naratas	22	22	FG	2018D 2018R 2019D 2019R	26 Ha in total	Megamendung	Sukamahi	±557	M	C	B	B			3-wheels motorcycle	Power sprayer	A	OF: Crystal Guava, Durian, Mangosteen, Vegetable (chili, tomato, cucumber)	Modern market, direct consumers, local market	Fruit orchard owned by an individual land owner is managed by 9 members Benefit from fruit orchard is shared with the land owner. The FG wants to receive a support for irrigation pipe and water pond for irrigation to the farmers' fields.
B11	Citra Tani Kencana	40	38	FG	2018D 2018R	5~7 Ha in total	Tanah Sareal (Bogo City)	Kencana	±157	F	B	C	B				Support from Dinas in 2019: cultivator, water pump machine	C	OF: Leafy vegetables, Red guava,	Local markets in Bogor area and Pasar Minggu.	Collectively ship/sell products to Pasar Minggu Market (group leader collects and brings to the markets)
B12	Cikatapis Maju Berkah	22	22	FG	-	9 Ha in total	Megamendung	Pasir Angin	500	M	B	C			risk for drought				OF: chili, cucumber, long bean, eggplant, etc.	wholesale market Kemang	FG has a problem with water availability in dry season so that FG has to buy water in a water tank car or use water pump with far distance with water source. This FG was newly established for a year and need a technical assistance for cultivation. FG has partnership with Sukaresmi Tani Mandiri FG for marketing the produce to wholesale market (TU Kemang)
B13	Sukaresmi Tani Mandiri	35	24	FG	-	37 Ha in total kelompok	Megamendung	Cipayung	±550	F	A	B			High risk for fog	Irrigation piping system	cultivator (1), water pump (1)		OF: curly chili, spring onion, long bean cucumber, etc, SH: beef tomato and cherry tomato	wholesale market (TU kemang), as for beef tomato and cherry tomato tp TOP Buah Cibubur and LOKA.	Has partnership with PT. Lima Sukses Usaha (LSU) for beef tomato and cherry tomato. FG is interested to have a technical assistance for cultivation and to look for new alterative for marketing which have added value and more sustainable.
B14	Subur Tani	25	25	FG	-	50 Ha in total	Caringin	Lemah Duhur	500 s/d 900	S	C	B			Medium risk for fog	Irrigation piping system (2019)			OF: chili, tomato, cucumber, long bean, etc.	Join market to Bina Mandiri FG to ship to wholesale market (TU Kemang).	FG is interested to receive new innovation of cultivation technique. FG is not interested to sell to modern market due to payment condition (limited cash flow). The challenge is in capital for cultivation.

B15	Bina Mandiri	30	30	FG	-	50 Ha in total	Caringin	Lemah Duhur	500 s/d 900	S	C	B			Medium risk for fog	Post harvest equipment: scale, container, etc. And 3-wheels motorcycle	cultivator (1)		OF: chili, tomato, cucumber, long bean, etc.	Wholesale market (TU Kemang)	FG is interested to receive new innovation of cultivation technique. FG is not interested to sell to modern market due to payment condition (limited cash flow). The challenge is in capital for cultivation.
B16	Neglasari Jaya Mandiri	40	35	FG	-	35 Ha in total	Cigombong	Tugu Jaya	800 s/d 1000	S	B	B			High risk for fog		electric sprayer (1)		OF: chili, cucumber, tomato, cabbage, etc.	Wholesale market (TU Kemang)	FG is interested to receive new innovation of cultivation technique. FG is not interested to sell to modern market due to payment condition (limited cash flow). The challenge is in capital for cultivation.
B17	Karta Raharja	20	20	FG	-	20 Ha in total	Ciampea	Cihideung Ilir	±370	F	A	B					hand tractor (1).		OF: chili, cucumber, long bean, etc.	Wholesale market (TU Kemang)	FG is interested to have new innovation for cultivation. FG is not interested to sell to modern market because they are funded by local trader for cultivation.
B18	Mekar Tani	17	17	FG	-	3 Ha in total	Cibungbulang	Ciaruteun Ilir	±230	F	C	B				Packing house, Greenhouse, Rain shelter	cultivator (1), water pump (2)		OF: spinach, kangkung, pak choi, kale, kailan etc	ATP IPB and local market (Pasar Bogor)	FG received a grant program for packing house facilities (completely built), green house (currently under construction) and rain shelter facilities for growing organic leafy vegetables. FG has an interest in expanding the market, because the ATP market is still limited in quantity.
B19	Tani Jaya	26	26	FG	-	4 Ha in total	Cibungbulang	Ciaruteun Ilir	±230	F	C	B				Greenhouse, Rain shelter	cultivator (1), water pump (3)		OF: spinach, kangkung, pak choi, kale, kailan etc	ATP IPB and local market (Pasar Bogor)	FG received a grant program for green house (currently under construction) and rain shelter facilities for growing organic leafy vegetables. FG has an interest in expanding the market, because the ATP market is still limited in quantity.
B20	Karya Mekar	42	20	FG	-	15 Ha has been cultivated out of 32 Ha in total	Pamijahan	pamijahan	±420	S	C	C			Medium risk for fog	Irrigation system: well, pump, tank in 2 locations			OF: cucumber, long bean, spring onion, shallot, etc.	local trader in Cibereum and Cibungbulang for local market in Jakarta (Pasar Senen, Pasar Jalur).	Started to switch from food crops to horticulture from a year ago. Therefore FG needs technical assistance in cultivation, marketing, etc.
B21	Bumi Cianten Endah	215	50	FG	-	46 Ha in total	Pamijahan	Purwabakti	900 s/d 1000	M	C	B				Some fields have been installed with water pipes	water pump (1), sprayer (1) and cultivator (1)		OF: chili, spring onion, long bean, etc	wholesale market (TU Kemang)	The main commodity of curly chili and big chili. FG has been convenient to sell the produce to Kemang wholesale market. Constraints in terms of capital and the introduction of how to cultivate Chile in anticipation of the plunge in the price of Chile.
B22	Manggis Raya Lestari	33	25	FG	-	49 Ha in total. around 60% field is for fruits	Leuwiliang	cikaracak	250 s/d 400	M	C	A			High risk for fog	Packing house, 3-wheels motorcycle	cultivator (1)		OF: mangosteen, durian, chili, cucumber	Eksporter of mangosteen: Elok mangosteen and Mahkota mangosteen. For vegetables to wholesale market (TU Kemang)	Marketing of produced has been coordinated by the group. Mangosteen is harvested every once in a year. Approximately 30-40% of produce is exported. For daily income farmers cultivated vegetables such as chili, cucumber, long bean, etc. The produce are sold to wholesale market. Farmer expected to get support for vegetable cultivation technique.
B23	Gapoktan Bina Warga Tani	120	120	AS	-	108 Ha in total	Leuwisadeng	Sadeng	350 s/d 400	M	C	B			Susceptible to yellow latex disease and thrips for mangosteen.	Post harvest equipment, containers	cultivator (1)		OF: mangosteen, durian, chili, cucumber	Eksporter of mangosteen: PT. Agung Mustika Selaras, PT. ADL and PT. mangosteen Mahkota Sejati. For vegetables to wholesale market (TU Kemang)	Consist of 4 FGs (Wana Lestari, Cikadu Warga Tani, Dukuh Mangu and Nutmeg Gunung Sereh). Main commodity is mangosteen and durian. They were harvested once in a year. For daily income farmers cultivated vegetables such as chili, cucumber, eggplant, and bitter melon, etc. Farmer expected the Project can help them for mangosteen post harvest, especially for storing management to extend the shelf life so farmer can maintain the availability of mangosteen every month.

Sukabumi City/District

No	Name	No. of Members		Organizational Structure	Trial Project	Field Area	Sub-District (Kecamatan)	Village (Desa)	Altitude (m)	Land Features	Access to Field	Irrigation Water	Soil Condition		Other Features	Facility	Farm Machines owned by Group	Cultivation Skill	Main Products	Market	Other Information (Challenges, Need of support, Interest in collaboration with other FGs, etc.)
		Total	Active										A-D	Type							
S1	Maju Terus 2	25		FG	2017D 2017R	6 Ha in total	Cibeureum			F	A	B	C	CR, NE, BC	High risk of flood		Tractor for rice field	B	OF: Sweet Corn, Eggplant, Choy sum, Chili, tomato, Bean	Local Trader	Obstacles: 1) unavailability of quality seeds, 2) limited access to modern markets due to low production and low quality of products
S2	Mitra Utama	57		AS	2017D 2017R	33 Ha in total	Cibeureum			F	A	B	C	CR, NE, BC	High risk of flood			B	OF: Long bean, Choy sum, Cucumber, Chili, tomato, Cabbage, Celery	Local Trader	Obstacles: 1) unstable market price of vegetables, 2) greenhouse cost of agriculture inputs (fertilizer and seeds)
S3	Adi Tani Jaya	122	2	FG	2017D 2017R	25 Ha in total	Sukabumi			M	B	B	C	CR, NE, BC	High risk for fog			B	OF: Tomato, Curly chili	Local Trader	Ship products through local traders Obstacles: 1) pest and diseases (virus), 2) low yield and quality (small size) of tomato
S4	Hikmah Tani	22	20	AS	2017D 2017R 2019D 2019R 2020R	26 Ha in total	Kadudampit	Cipetir	900	M	B	B	B		High risk for fog			B	OF: Chili, tomato, Bean, Eggplant, Cabbage, Spring onion	Local Trader Market in Cipanas (Cianjur)	Ship products to wholesale markets through traders Obstacles: 1) unavailability of quality seeds The leader is active and willing to coordinate with other FG for cooperative shipment.
S5	Bumi Mekar	20	20	FG	2017D 2017R 2019D 2019R	10 Ha in total	Kadudampit	Cipetir	900	S	C	B	B		High risk for fog		Cultivator	B	OF: Chili, tomato, Bean, Eggplant, Cabbage, Spring onion	Local Trader	Ship products to wholesale markets through traders Obstacles: 1) limited access to modern markets, 2) unstable market price, 3) lack of capital (for cash and carry system)
S6	Subur	11(23)		FG	2018D 2018R	3 Ha in total	Gunung Puyuh	Karamat		F	A	A	C	CR, NE, BC				C	OF: Cucumber, Chili, Bean	Local Trader	Collectively sell products to local traders (delivered to wholesale markets in Tangeran) Sorting: only for cucumber (straight or curved) Obstacles: pest and diseases
S7	Mucekil	25 (75)	13	FG	2018D 2018R 2019D 2019R 2020R	3~4 Ha in total	Gunung Puyuh	Karang Tengah	500	F	A	A	B			Packing house	Cultivator	B	OF: Bean (Chili, Cucumber, Leafy veg.)	Local Trader Market in Sukabumi	Land area: 1,500m2 per member Collectively sell products to local traders (delivered to local markets in Sukabumi and Bogor) Sorting: only for cucumber (straight or curved) Obstacles: disease of chili Core members are active in learning new cultivation skill.
S8	Sugih Mukti	6 (25)	6	FG	2018D 2018R 2019D	12 Ha in total	Waru Doyong	Dayeuh Luhur	400	F	A	A	B					B	OF: Chili, Bean, Cucumber (Leafy veg., spring onion)	Local Trader	Sell products to local traders (including all grades) Obstacles: low yield of products
S9	Panand Arum	25	15	FG	2018D 2018R 2019D 2019R	12 Ha in total	Caringin	Pasir Datar Indah	800-1,000	M	C	C	C	CR, NE, BC	High risk of erosion and fog	Tractor	Tractor for rice field	B	OF: Chili, tomato Bean, Cabbage, Carrot, Cucumber	Local Trader	Collectively sell products to local traders (delivered to wholesale markets in Jakarta) and local markets in Sukabumi Sorting: tomato (by size), Carrot (by length) Obstacles: 1) pest and diseases (virus), 2) low yield and quality (small size) of tomato
S10	Al Mujahidin	200	28	AS	2018D 2018R 2019D 2019R	50 Ha in total	Caringin	Cimanggu	800	S	C	C	C	CR, NE, BC	High risk for fog		Tractor for rice field	B	OF: Chili, tomato Bean, Cabbage, Carrot, Cucumber, Melon, Watermelon	Local Trader Market in Sukabumi	Individually sell products to local traders (delivered to wholesale markets in Jakarta, Bogor, and Tangrang) Sorting: tomato (by size: A 5~9 fruits/kg, B 10~12/kg), Chili (by length) Obstacles: 1) pest and diseases (virus), 2) Quality (small size) of tomato
S11	Ciloa	20 (54)	20	FG	2018D 2018R 2019D 2019R	5 Ha in total	Sukaraja	Limbangan	800	F	A	A	B		High risk for fog	Packing house	Tractor for rice field	B	OF: Tomato, Chili, Bean (eggplant, broccoli, leafy veg.)	Local Trader	Collectively sell products to local traders (delivered to wholesale markets in Cibitung/Bekasi) with all grades (not sorting) Obstacles: pest and diseases The leader shows a strong leadership and is willing to learn new cultivation techniques.
S12	Jaya Abadi	142	100	FG	-	27 Ha in total	Kadudampit	Undrus Binangun	±900	F	C	A			High risk for fog		Cultivator		Tomato, Chili, Bean, Chayotte	Local Trader	Farmers are not funded by local trader so they freely sell the produce anywhere. FG already established communication with Hikmah Tani for marketing of produce. Some fields were difficult to access. Sell products to local traders (including all grades) Obstacles: low yield of products
S13	Sumber Tani	45	15	FG	-	7 Ha in total	Kadudampit	Undrus Binangun	±900	F	C	A			High risk for fog				Tomato, Chili, Bean, Chayotte	Local Trader	Farmers are not funded by local trader so they freely sell the produce anywhere. FG already established communication with Hikmah Tani for marketing of produce. Some fields were difficult to access. Sell products to local traders (including all grades) Obstacles: low yield of products
S14	Sugih Mukti 2	46	25	FG	-	24 Ha in total	Cibeureum	Limusnunggal	±450	F	B	A					Cultivator		Tomato, Bean, Leafy Vegetables	Local Trader	30% of members focus on rice cultivation. FG received program for shallot from the mayor office. Sell products to local traders (including all grades) Obstacles: low yield of products
S15	Karang Mekar	52	25	FG	-	19 Ha in total	Cibeureum	Limusnunggal	±450	F	B	A							Tomato, Bean, Leafy Vegetables	Local Trader	30% of members focus on rice cultivation. FG received program for shallot from the mayor office. Sell products to local traders (including all grades) Obstacles: low yield of products

S16	Sejahtera	33	5	FG	-	12 Ha	Gunung Puyuh	Karang tengah		F	A	A						Rice, bean, tomato, leafy vegetables and chili	Local Trader	FG location is close to the Mucekil FG. 70% of members focus on rice cultivation. 60% of members have other jobs such as construction workers. 5 members can be easily directed to improve their skill. Total members are 33 people, 28 people are not active.
S17	Saluyu Bersatu	20	17	FG	-	2 Ha	Caringin	Pasir Datar Indah	±900 Mdpl	M	B	B			High risk for fog			Tomato, Chili, Bean and chayote	Local Trader	FG is closed to Pandan Arum FG. FG is welcomed to new knowledge. 80% of fields own by farmers. FG is familiar with the Project from Pandan Arum. Sell products to local traders (including all grades) Obstacles: low yield of products
S18	Sari Mukti	20	11	FG	-	10 Ha	Caringin	Pasir Datar Indah	±900 Mdpl	M	B	B			High risk for fog			Tomato, Chili, Bean and chayote	Local Trader	FG is closed to Pandan Arum FG. FG is welcomed to new knowledge. 80% of fields own by farmers. FG is familiar with the Project from Pandan Arum. Sell products to local traders (including all grades) Obstacles: low yield of products
S19	Seungapan	48	15	FG	-	2 Ha	Caringin	Cikembang	±900 Mdpl	M	B	A			High risk for fog			Rice, bean, tomato, leafy vegetables and chili	Local Trader	FG is closed to Almujahidin. Farmers have been collaborated with Crowde for chili production. The road can be accessed but it is in damage condition. Sell products to local traders (including all grades) Obstacles: low yield of products
S20	KWT Wanasari	30	25	FG	-	20 Ha	Sukabumi	Perbawati	±900 Mdpl	M	B	B			High risk for fog	Own Packing House		Carrot, chili, cabbage, tomato, spring onion	Personal vegetables store (Ms. Maya)	At first Dinas recommended Bina Mulya FG. It seemed like this FG is a part of Adi Tani Jaya. But when the staff visited the fields, it was found that Bina Mulya has a problem with its organization. KWT Wanasari, female FG in that area, is more potential and active. Sell products to local traders (including all grades) Obstacles: low yield of products
S21	Tangsel	40	25	FG	-	25 Ha	Sukalarang	Sukamaju	±1000 Mdpl	S	B	C			High risk for fog			Carrot, chili, cabbage, tomato, spring onion	Local Trader	Farmers are not funded by local trader so they freely sell the produce anywhere. 50% of field do not have water during the dry season. one of the member is village head and he can be dominant in the FG Sell products to local traders (including all grades) Obstacles: low yield of products
S22	Cipriangan	25	17	FG	-	5 Ha	Sukalarang	Semplak	±600 Mdpl	M	A	A						Rice, corn bean, tomato, leafy vegetables, eggplant and chili	Local Trader	The access of field location is convenient. The field has no water issue during dry season. On the opposite during rainy season sometimes fields have abundant of water so farmers can cultivate rice. Farmers are interested to improve cultivation technique for vegetables. For marketing part, members sell to their each trader (including all grades). Obstacles: low yield of products
S23	Rukun Tani 2	50	10	FG	-	15 Ha	Sukalarang	Sukamaju	±800 Mdpl	F	B	B			High risk for fog			Carrot, chili, cabbage, tomato, spring onion	Local Trader	Farmers are not funded by local trader so they freely sell the produce anywhere. Farmer is interested to join a project for marketing and improvement of cultivation technique. Farmer is very active to get the information. Sell products to local traders (including all grades) Obstacles: low yield of products

Cianjur District

No	Name	No. of Members		Organizational Structure	Trial Project	Field Area	Sub-District (Kecamatan)	Village (Desa)	Altitude (m)	Land Features	Access to Field	Irrigation Water	Soil Condition		Other Features	Facility	Farm Machines owned by Group	Cultivation Skill	Main Products	Market	Other Information (Challenges, Need of support, Interest in collaboration with other FGs, etc.)
		Total	Active										A-D	Type							
J1	Multi Tani Jaya Giri (Mujagi)	50	25	AS	2017D 2017R 2019D 2019R 2020R	95 Ha in total	Pacet	Cipendawa	1200-1600	F	A	A	B	CR, BC, NE	High risk for fog	SH (3/400 and 2/100), RS (some/100), Packing house, Greenhouse (1/1,000 with Digital Farming)	4-wheels cultivator (2), 2-wheels cultivator (5), hand sprayer	AA	OF: Various chilies, tomato, Cabbage, Broccoli, Spring Onion, Kuroda Carrot, Nasu, Kyuri, Kabocha RS/SH: Momotaro tomato, Piman, Mizuna	Papaya, Sari Ratu (restaurant), Kramat Jati Wholesale Market	Own a large rain-shelter for momotaro tomato production Have a sorting and packing facility Obstacle: 1) pest and disease (beef tomato), 2) lack of capital (for cash and carry system) Core FG in the Cipanas area, coordinating with other FGs for shipment. Currently organized cooperative named KMBM.
J2	Mandiri	100	15	AS	2017D 2017R	15 Ha in total	Pacet	Ciputri	1200	M	B	A	B	CR, BC, NE	High risk for fog	Packing house, greenhouse for nursery	2-wheels cultivator (2), hand sprayer	A	DF/TR: Spinach, Spring Onion, Broccoli, Cauliflower, Celery, Radish, other leafy vegetables	Living Organic, Simply Fresh	Consist of 11 farmers' groups (including organic farmers) Obstacles: 1) unavailability of quality seeds (broccoli, spinach), 2) lack of capital to build a greenhouse Produce both organic and non-organic vegetables.
J3	Okiagaru	33	15	FG	2017D 2017R	10 Ha in total	Pacet	Ciputri	1000	M	B	B	B	CR, BC	High risk for fog	Packing house	2-wheels cultivator (1), hand sprayer	B	OF: Japanese vegetable (Cucumber, Radish, Celery, Eggplants, etc.)	Local market, modern market	Cultivate Japanese vegetables and organic vegetables. Obstacles: 1) lack of capital (need a low-interest loan to purchase packaging equipment, a fridge and a cultivator), 2) lack of knowledge and management skill of GAP
J4	Cemerlang	17	10	FG	2017D 2017R	15 Ha in total	Pacet	Ciherang	1000	F	A	A	B	CR, BC	High risk for fog	Packing house	2-wheels cultivator (1), hand sprayer	B	OF/TR: Broccoli, Cauliflower, Cabbage, tomato, Lettuce, Chinese Cabbage,	Local market, restaurant, catering, modern market	Own a sorting and packing facility Obstacles: 1) unavailability of quality seeds, 2) lack of capital (for cash and carry system)
J5	Utama	15	10	FG	2017D 2017R 2019D 2019R	15 Ha in total	Pacet	Ciherang	1200	F	B	A	B	CR, BC, NE	High risk for fog	Simple packing house, rain shelter	2-wheels cultivator (2), water pump, hand sprayer	A	OF: Broccoli, Cabbage, Chinese Cabbage, Spring Onion, Carrot RS: Tomato	Local market, modern market	Own a sorting and packing facilities (locally built) Obstacles: 1) greenhouse rejection rate (low quality of products), 2) lack of capital (for cash and carry system) Well-organized FG. Members are active and willing to learn new cultivation techniques. The leader shows a strong leadership.
J6	Saridona 2	31	10	FG	2018D 2018R 2019D 2019R	24 Ha in total	Cugenang	Sukamulya	1200	M	C	A	B	CR, BC, NE	High risk for fog		Hand sprayer, water pump machine	B	OF: Tomato, Broccoli, Cauliflower, Cabbage, Chinese Cabbage, Spring Onion	Local market Mujagi (KMBM)	Collectively sells the products to local traders. The leader coordinate other members for collective shipment. Members are willing to learn new cultivation techniques and want to expand marketing channels.
J7	Agro Segar	11		FG	2018D 2018R	6~7 Ha in total	Pacet	Ciherang	1000	F	A	C	B	CR, BC, NE	High risk for fog	Packing house	Hand sprayer	C	OF: Horenso, Kyuri, Radish, Carrot, other leafy vegetables	Lotte Mart, modern market	Direct shipping to supermarket and Korean restaurant in Jakarta.
J8	Saluyu	38	15	FG	2018D 2018R 2019D 2019R	15 Ha in total	Cugenang	Cirumput	1200	F	B	C	B	CR, BC, NE	High risk for fog	Rain shelter	2-wheels cultivator (2), water pump machine, hand sprayer	B	OF: Tomato, Chili, Broccoli, Bean, Head Lettuce, Cabbage, Chinese Cabbage	Local market	Chili: Supply to Mujagi FG Other products: Individually sell to local traders (delivered to wholesale markets and local markets) Obstacles: 1) pest and diseases especially in rainy season, 2) low yield of products 3) difficult to get water in dry season, even using a water pump is still difficult as the water source is far.
J9	Parabon	24	10	FG	2018D 2018R	12 Ha in total	Cipanas	Ciloto	1200	M	C	A	B	CR, BC, NE	High risk for fog		2-wheels cultivator (1), water pump machine, hand sprayer	B	OF: Chili, tomato, Carrot, Spring Onion, Broccoli, Cauliflower, Cabbage	Local market	Individually sell products to local traders/collectors without sorting. The group sometimes collectively sell chili to local traders.
J10	Padajaya	43	10	FG	2018D 2018R 2019D 2019R	15 Ha in total	Cipanas	Cipanas	1200	F	C	A	B	CR, BC	High risk for fog		2-wheels cultivator (2), water pump machine, hand sprayer	A	OF: Tomato, Carrot, Broccoli, Chili, Spring Onion, Cabbage, Chinese Cabbage, Radish, leafy vegetables	Wholesale market Local market	Farm land: 3,000~4,000 m2 per member Sell products to local traders (delivered to wholesale market in Jakarta) Interested in cultivation of carrot (Kuroda) Members are active in learning new cultivation techniques.
J11	Mucekil	10		FG	2018R	1000 m	Cugenang	Nyalindung	1100	F	B	A	B	CR, BC	High risk for fog		Hand sprayer	B	OF: Broccoli, Carrot, Spring Onion, Bean, leafy vegetables	Local market	A small FGs. Individually ship produce to local traders.
J11	Makmur Tani	50	20	FG	-	50 Ha in total	Campaka Mulya	Campaka Mulya	1000	M	B	A	B	CR, BC, NE	High risk for fog		(1) 2-wheels cultivator, (1) Water pump, (1) Spraying machine, Tractor for rice field (1)		Various chilies, tomato, Bean, Legumes, Rice	Kramat Jati Wholesale Market in Jakarta	This group collects all products from each member to be shipped to Kramat Jati Wholesale Market in Jakarta
J12	Harapan	15	15	FG	-	5 Ha in total	Pacet	Ciputri	1200	M	B	A			High risk for fog	Greenhouse 160m (BPP)	(1) 2-wheels cultivator, (1) 3-wheels motorcycle (1)		Carrot, tomato, cabbage, caisim	Local market, Mujagi	BPP plans to make this group as an example group for other FG if they join the Project because the location is near BPP office.
J13	Cipendawa Lestari	20	15	FG	-	5 Ha in total	Pacet	Cipendawa	1200	M	A	A			High risk for fog		2-wheels cultivator (2), water pump (1) and power sprayer (1)		Chili, tomato, cabbage, caisim, spring onion	Local market Cipanas, KMBM, and Mujagi	The leader is interested in developing Japanese vegetables. FG is still affiliated with Mujagi and a part of the KMBM cooperative.
J14	Taruna Mekar	20	15	FG	-	5 Ha in total	Pacet	Cipendawa	1100	M	A	A			High risk for fog	Packing house	2-wheels cultivator (2), water pump (2) and Power sprayer (4)		Tomato,chili,carrot, kyuri	Local market, Horeka (50item)	FG collaborates with army (TNI) to conduct chili planting for food security program. the field planted for chili is 5 ha. FG has packing house and have shipped to horeca with 20 items.

J15	Selaawi Mukti	60	20	FG	-	Horti 15 Ha, Flori 20 Ha	Pacet	Cibodas	1200	M	B	A			High risk for fog	Packing house (in empty house)	2-wheels cultivator (1)		Chili, tomato, cabbage, caisim, pak choi, spring onion, celery, corn, crysant	Sayur Box, local market Cipanas	FG used to focus on ornamental plants, but at the beginning of the pandemic the group began to switch to horticultural plants. FG is interested in project cultivation techniques. FG is already running marketing to Sayur Box. The group is also used to have partnership with other parties. FG collaborates with marines to conduct corn planting for food security program.
J16	Gedeh Harapaan	37	17	FG	-	60 Ha in total	Gekbrong	Gekbrong	1200	M	B	A			High risk for fog	17 greenhouse	2-wheels cultivator (2), 3-wheels motorcycle (1), water pump (2) and power sprayer (2)		Paprika, chili, tomato, cabbage, caisim	Paprika (simply fresh, original hirdo, PT.Bintango, PT.Abasi, CV.Citra Sayur Organic), curly chili (Tani Hub)	The group is a CSR partner of PT. Tirta Investama (AQUA Group). The group is working with CV. Andy Young to plant melon starting from November 2020. The melon is a type of Kimochi originating from Japan, the form of cooperation is that the company provides everything from seeds to inputs such as nutrition and ZPT with a contract price of IDR 15,000 / kg.
J17	Tani Kencana	30	17	FG	-	15 Ha in total	Gekbrong	Gekbrong	1000	M	B	A			High risk for fog		2-wheels cultivator (1), water pump (1)		Chili, tomato, cabbage, caisim	Wholesale market, Gedeh Harapan	FG currently is working with Gede Harpan FG to plant curly chili
J18	Mitra Tani Parahyangan 2	15	15	FG	-	5 Ha in total	Warungkonandg	Tegal Lega	1200	M	B	A			High risk for fog		2-wheels cultivator (1)		Chili,caisim,cabbage,spring onion	Mitra Tani Parahyanga 1, Local market	Partnership with Mitra Tani Parahyangan (supplier) for shipment of produce
J19	Palm	46	24	FG	-	10 Ha in total	Pacet	Ciherang	1400	S	C	A			High risk for fog		2-wheels cultivator (1)		Cabbage, broccoli, cauliflower, caisim, Asparagus	Local market, supplier	The leader is developing marketing through E-commerce products that are already running for sale such as broccoli, asparagus, red cabbage, and shredded fish. The leader is very busy so he is not really active to manage FG. The access to the field is difficult especially in rainy season.
J20	Mekar Tani	24	14	FG	-	11 Ha in total	Cipanas	Batulawang	1100	S	C	A			High risk for fog		water pump (1)		Chili, spring onion, caisim, cabbage,pak choi,broccoli	Wholesale market Kemang, Mujagi/KMBM	FG has partnership with Mujagi and KMBM. FG is a part of KMBM. The field can only be accessed by motorbike or walking.
J21	Putra Giri Kencana	29	21	FG	-	1 Ha in total	Pacet	Ciputri	1400	F	A	A			High risk for fog		2-wheels motorcycle (1)		Bean, horenzo, Chinese cabbage, chili, pak choi, broccoli and etc	Mandiri FG	Newly registered organic farming FG. The members were from Mandiri FG, whom currently focused on organic farming but the produce is sold to Cemerlang FG.

Garut District

No	Name	No. of Members		Organizational Structure	Trial Project	Field Area	Sub-District (Kecamatan)	Village (Desa)	Altitude (m)	Land Features	Access to Field	Irrigation Water	Soil Condition		Other Features	Facility	Farm Machines owned by Group	Cultivation Skill	Main Products	Market	Other Information (Challenges, Need of support, Interest in collaboration with other FGs, etc.)
		Total	Active										A-D	Type							
G1	Mekartani 2	30		FG	2017D 2017R	40 Ha in total	Bayongbong			F	A	A						C	OF: Shallot, Chili, Ginger	Local trader	Obstacles: 1) damages caused by pest and diseases, 2) greenhouse cost of agriculture inputs
G2	Barokah Tani	25		FG	2017D 2017R	100 Ha in total	Bayongbong			M	B	B						C	OF: Tomato, Cabbage, Potato, Chili, Shallot,	Local trader	Use STA as a collection point of the products Obstacles: 1) greenhouse cost of agriculture inputs, 2) lack of capital to buy farm equipment (such as a proper container for harvest and transport of tomato)
G3	Cikanandg Agro	31	20	AS	2017D 2017R 2019D 2019R 2020R	40 Ha in total	Cikajang	Cikanandg	1200	M	B	B	C	CR, NE, BC	High risk for fog and flood	Screenhouse	Tractor	B	OF/RS: Potato, tomato, Curly Chili, Carrot, Cabbage,	Local Trader	Ship products to wholesale markets through local traders Obstacles: LImited access to modern markets Well-konow association in Cikajang area
G4	Cantigi	25		FG	2017D 2017R	6 Ha in total	Cikajang	Margamulya	1200	S	B	B				Greenhouse		B	SH: Paprika, OF: Cucumber, Cherry Tomato, Potato, Cabbage, Chili	Local trader,	Own green houses for production of tomato, cucumber and paprika Ship products to supermarkets through traders Obstacles: 1) lack of capital to rehabilitate facilities, 2) low production volume to expand markets
G5	Silih Riksa IV	25		FG	2017D 2017R		Cigedug	Cigedug	1200	S	B	B						B	OF: Potato, Chili, tomato, Cabbage	Local trader	Own a sorting and packing facility Conduct contract farming of potato with Indofood Obstacles: unavailability of seed potatoes (Atlantic)
G6	Rawit Jepang	20		FG	2017D 2017R	40 Ha in total	Cigedug	Cintanagara		S	B	B	B					A	OF: Curly Chili, Potato, tomato, Cabbage		Obstacle: unstable market price (especially chili)
G7	Agro Papandayan	20		FG	2018D 2018R	15 Ha in total	Cisurupan			M	C	B	C	CR, NE, BC	High risk for fog and flood	Own Packing House		C	OF: Tomato, Potato, Chili, Cabbage, Bean	Local Trader and Supplier	Sell products to local traders (delivered to wholesale markets) Obstacles: Pest and diseases
G8	Mekar Rahayu	10		FG	2018D 2018R	5~10 Ha in total	Cisurupan			M	C	B	C	CR, NE, BC	High risk for fog and flood			C	OF: Potato, tomato, Chili, Cabbage	Local Trader	Sell products to local traders (delivered to wholesale markets). Grade A products are sold to a supplier to modern markets after sorting. Group leader collects products from members for shipping. Obstacles: Damages (low quality) caused by pest and diseases
G9	Barokah Karunia Tani	9	9	FG	2018D 2018R 2019D 2019R	9 Ha in total	Cigedug	Barusuda	1100	F	A	B	C	CR, NE, BC				B	OF: Potato, tomato, Curly Chili, Carrot, Cabbage,	Local Trader	Individually sell products to local traders (delivered to wholesale markets). The leader produces seed potato (Median) and ship to Cikanandg Agro. Obstacles: 1) Damages (low quality) caused by pest and diseases during rainy season. 2) greenhouse input costs for application of chemicals to protect diseases.
G10	Berkah Tani	20	14	FG	2018D 2018R 2019D 2019R	25 Ha in total	Sukaresmi	Mekar jaya	1000	S	C	B	C	CR, NE, BC	High risk for fog and flood			A	OF: Potato, tomato, Curly Chili, Carrot, Cabbage,	Local Trader	Collectively ship tomato and chili to wholesale markets when the price is good. Sell products to local traders when the price is low. The leader is active in learning new skills.
G11	Jaya Mekar Mukti	20		FG	2018D 2018R	24 Ha in total	Sukaresmi			S	C	B	C	CR, NE, BC	High risk for fog and flood			C	OF: Potato, tomato, Curly Chili, Carrot, Cabbage,	Local Trader	Produce seed potatoes (Median) to be delivered to Cikanandg Agro. Collectively ship tomato and chili to wholesale markets when the price is good. Sell products to local traders when the price is low.
G12	Hitda Mandiri	25	12	FG	2018D 2018R 2019D 2019R	8 Ha in total	Cikajang	Cikanandg	1200	F	C	B	C	CR, NE, BC	High risk for fog and flood		Hand sprayer	A	OF/TR: Potato, tomato, Curly Chili, Carrot, Cabbage,	Local Trader	A part of Cikandang Agro Association.
G13	Mukti Tani Jando	20	14	FG	2019D 2019R	22 Ha in total	Cikajang	Cikanandg	1250	S	C	C	C	CR, NE, BC	High risk for fog and flood		Hand sprayer	B	OF: Potato, tomato, Curly Chili, Carrot, Cabbage,	Local Trader	A part of Cikandang Agro Association.
G14	Yosen			FG	2019D	15 Ha in total	Cikajang	Cikanandg	1250	S	C	C			High risk for fog and flood		Hand sprayer	B	OF: Potato, tomato, Curly Chili, Carrot, Cabbage,	Local Trader	A part of Cikandang Agro Association.
G15	Sinar Mandiri Coorporation	30	30	FG		100 Ha in total	Cisurupan	Selekta	1200	S	A	A			Risk of fog				Potato, tomato, Curly Chili, Carrot, Cabbage,		Newly established cooperative. FG produces variety of highland vegetables including potato, chili at relatively flat land.
G16	Bumi Asih 3	25	25	FG		50 Ha in total	Cikajang	Simpang	1200	S	C	A			Medium risk for fog		Hand sprayer		Chili, Cabbage, Carrot, Potato	Local Trader	It is a new FG and have a high willingness to learn something new. FG expects assistance for cultivation and marketing techniques. All members are active in farming and organizational activities
G17	Famili Berkah Tani	25	25	FG		50 Ha in total	Cikajang	Simpang	1200	S	C	A			Risk of fog		Hand sprayer		Carrot, Chili, Potato	Local Trader	It is a new FG and have a high willingness to learn something new. FG expects assistance for cultivation and marketing techniques. All members are active in farming and organizational activities
G18	Tunas Harapan	25	25	FG		50 Ha in total	Cikajang	Simpang	1200	S	C	A			Risk of fog		Hand sprayer		Potato	Local Trader	It is a new FG and have a high willingness to learn something new. FG expects assistance for cultivation and marketing techniques. All members are active in farming and organizational activities. Focused in potato
G19	Sahabat Berkah Tani	25	25	FG		50 Ha in total	Cikajang	Simpang	1200	S	C	A			Risk of fog		Hand sprayer		Potato, Chili, Carrot	Local Trader	It is a new FG and have a high willingness to learn something new. FG expect assistance for cultivation and marketing techniques. All members are active in farming and organizational activities. Focused in potato

G21	Ciharus	25	25	FG		5 Ha in total	Cikajang	Girijaya	1200	S	C	B			Risk of fog		Hand sprayer		Chili, Cabbage, Carrot, Potato	Local Trader	The availability of water in the dry season is a major obstacle for farmers. The total members are 25.
G22	Agromakmur	20	20	FG		3 Ha in total	Pasirwangi	Padaawas	1300	F	A	B			Risk of fog		Hand sprayer		Potato, Chili, tomato	Local Trader	The availability of water in the dry season is the main obstacle for farmers in this group. 30% of field is not planted during dry season. All members are active in farming and in group activities
G23	Garut Green Farm			Company			Bayongbong		970	F	A					Greenhouse, Packing house, Pathogen Lab	Cultivator, Water pump machine, Speyer		Lettuce, Chinese cabbage, Kale, Red spinach	Supermarket, EC	It is a private company which focused in hydroponic cultivation. The production is 3,400 of plants in the facility. At the same time, the team found a precious information that a person the team talked to is also the expert of plant microbiology. He established the foundation (plant clinic) and facility of laboratory to analyze the pathogen of plants disease and provides cure with biological agent approach. so the management (also the owner) recommended the Project team an Islamic boarding school named Situ Wangi to be a Project's candidate. This company plan to give technical assistance for running agriculture sector because most of people in that school is doing forming for a living. They cultivate 20 Ha. Currently, the school is funded by sponsor but hopefully the school can be independent from farming.

Bandung District

No	Name	No. of Members		Organizational Structure	Trial Project	Field Area	Sub-District (Kecamatan)	Village (Desa)	Altitude (m)	Land Features	Access to Field	Irrigation Water	Soil Condition		Other Features	Facility	Farm Machines owned by Group	Cultivation Skill	Main Products	Market	Other Information (Challenges, Need of support, Interest in collaboration with other FGs, etc.)
		Total	Active										A-D	Type							
D1	Lyco Farm	4	4	Others Company with partner farmers	2017D 2017R 2019D 2019R	20 Ha in total	Pasirjambu	Tenjolaya	1200	F	A	A	B	NE, BC	Water source is far from the field, the soil is red soil	SH (4, from bamboo), owns takiron for rain shelter	Hand sprayer, water pump machine (personal owning)	AA	SH: Tomato, Spinach, Lettuce,pak choi, kale and Leaf vegetables OF: Cabbage, chili, chayotte, spring onion, bean	Supermarket (Yogya and Superindo)	Direct selling to supermarket based on the specification. Lyco Farm usually buys to other farmer/local trader if any lack of supply that interested on collaborating with other FG. The products which do not fulfill the specification are sold to traditional market or sometimes just thrown away. Water is difficult in dry season, Lyco Farm buys clean water from water truck for the plants. Lyco Farm needs different market to sell the products which do not fulfill the specification by supermarket.
D2	Al-Ittifaq	270	270	Co-operative	2017D 2017R 2019D 2019R	130 Ha in total	Rancabali	Alamendah	1500	F	B	A	B	NE, BC	high risk for fog	SH (3, with internet of things system), owns takiron for rain shelter	Cultivator, water pump and spraying machine, hand spryer	A	SH: Tomato, Spring onion, Beans, and others leaf vegetables OF: Carrot, cabbage, chili, chayotte, dekopon orange, strawberry	Retail, e-commerce (blibli.com), restaurant, catering, modern market and traditional market	Owns packing house, direct shipping to retail and modern market, owns an online store named "Alifmart.id". Owns screenhouse
D3	Barokah Tani	250		AS	2017D 2017R	160 Ha in total	Pasirjambu	Sugihmukti	1300	M	B	B	B					C	OF: Strawberry	Local market	FG has the difficulty to find good and healthy seedlings. The plantings were always contiminated by diseases
D4	Katata	100			2017D 2017R	70 Ha in total	Pangalengan	Margamekar	1200	M	B	B				Packing house, washing machine, transportation	Cultivator	B	RS: Beef tomato, Cherry tomato, Paprika OF: Carrot, Bean, Radish, Potato,	Modern market, Retailers	marketing of the members were organized by
D5	Saribhakti	n/a		Others (Company)	2017D 2017R	25 Ha in total	Cicalengka	Tanjungwangi	1000	M	B	B	B		Red soil	SH (from bamboo)	Cultivator, small excavator, water pump and sprayer machine, hand spryer	B	SH: tomato (Momotaro), Spinach, Eggplant, Cherry tomato, Chili, other vegetables	Modern market, retail	More focuses on exclusive commodities.
D6	Mekar Tani	50	30	FG	2018D 2018R 2019D 2019R	15 Ha in total	Kertasari	Cibeureum	1700	S	B	B	B	NE, BC	Black soil (mountain soil), risk for land slide	Owns takiron for rain shelter	Cultivator, hand sprayer, water pump machine, sprayer	B	OF: Potato, Cabbage, Carrot, Spring Onion	Wholesale and local market	Implementing the trial project on potato with PT. Calbee Wings Sell products to local traders (delivered to wholesale markets)
D7	Hikmah Farm	30~40	35	Co-operative	2018D 2018R 2019D 2019R 2020D	30-50 Ha in total	Pangalengan	Margamukti	1500	F	B	B	B	NE, BC	high risk for fog	SH, solar dryer dome, cold storage, takiron for rain shelter	4-wheels tractor, cultivator, sorting machine for potato, water pump, sprayer, hand spryer	AA	SH: Seed Potato OF: Potato, Carrot, Broccoli, Cabbage, Corn	Retail and wholesale market	The main business of Hikmah Farm is production of seed potatoes Hikmah Farm woks with 7 partner FGs Want to collect and sell other vegetables (not only potato) to market. FG conducted contract farming of Median potato with Calbee Wings.
D8	Bakti Tanjung Wangi Lestari	15			2018D 2018R	15 Ha in total	Cicalengka	Tanjungwangi	1000	M	B	B	A		Red soil	Owns takiron for rain shelter	Cultivator, water pump machine, sprayer, hand spryer	C	OF: tomato, Cabbage, Chili, Broccoli	Wholesale and local market	Individually sell products to local traders All members work at the farm of Saribhakti
D9	Jaya Alam Lestari	22			2018D 2018R	15 Ha in total	Pasirjambu	Cisondari	1500	M	B	B	B		Red soil	Owns takiron for rain shelter	Cultivator, hand sprayer, cold storage, packing house	C	OF: Organic vegetables (carrot, broccoli, tomato, leafy vegetables)	Supplier	Organic vegetables: Sell products to suppliers of organic vegetables (Living Organic and others) Members produce non-organic vegetables (such as carrot)
D10	Hataki	84	35	FG	2018D 2018R 2019D 2019R	25 Ha in total	Pasirjambu	Cibodas	1200	F	B	B	B	NE, BC	Some red soil and some black soil	Owns takiron for rain shelter, solar dryer dome	Cultivator, water pump machine, sprayer, hand sprayer	B	OF: Tomato, Chili Chayote, Cabbage, Chinese cabbage, eggplant, corn, cucumber	Online shop (by WhatsApp and Facebook), wholesale and local market	Group leader receives products from members and ship to suppliers to wholesale/local markets. Obstacles: 1) damages (low quality) caused by pest and diseases, 2) unstable size of produce (tomato)
D11	Hidayah Alam	56	56	FG		17 Ha in total	Ciwidey	Lebakmuncang	1200	S	A	C			medium risk for fog	Packinghouse	Cultivator, water pump machine, hand sprayer		Bean, Corn, Egg plants, tomato, Cabbage, Chinese cabbage	Supplier, wholesale markets	The field is rainfed land. FG plant 2 out of 3 season in a year. All members are active. 56 active
D12	Al - Istiqomah	749	100	FG		14 Ha in total	Ciwidey	Lebakmuncang	1200	F	A	A			medium risk for fog		Cultivator, water pump machine, hand sprayer		Chili, Bean, tomato, cabbage, Broccoli, Horenzo, Spring onion, Celery, Chinese cabbage	Local Trader	Some field cannot be planted in the dry season. There are 70-100 members who are active in farming vegetables. From 2 villages
D13	Biomedia	21	21	FG		20 Ha in total	Pangalengan	Margamekar	1500	F	A	A			medium risk for fog	Packinghouse	Cultivator, water pump machine, hand sprayer		Kenya bean, Potato, tomato, Chili, Chinese cabbage, Carrot	Supplier, wholesale markets	Actively ship the produce to some supplier and interested to explore new cultivation technique. All members are active
D14	Bernard Tani	150	150	FG		30 Ha in total	Pangalengan	Warnasari	1500	S	A	A			medium risk for fog	Packinghouse	Cultivator, water pump machine, hand sprayer		Chili (all item), Potato, Cabbage, Chinese cabbage, Broccoli, Ginger	Supplier, wholesale markets	The members are mostly young people, focused in chili cultivation, interested to learn new cultivation technique.

D15	Alam Lestari	25	20	FG		35 Ha in total	Pangalengan	Tribakti Mulya	1500	S	C	B			medium risk for fog		Water pump machine, hand sprayer		Bean, egg plants, Carrot, Shallot, Chili, Lettuce	Local Trader	FG is willing to learn something new. Water is a problem for some members in dry season.
D16	Katenzo	15	15	FG		42 Ha in total	Pangalengan	Margamukti	1500	F	A	A			medium risk for fog	Temporary rain shelter, Packinghouse	Water pump machine, hand sprayer		Pagoda, Horenzo, stem lettuce, coriander leaves, Bean, Radish	Wholesale and supplier In Lembang	Expect the support for better marketing and cultivation technique, focused in exclusive vegetables (mustard pagoda, horenzo, baby Kenya). All members are active
D17	Seghara Agri	10	10	FG		100 Ha in total	Pangalengan	Margamulya	1500	F	A	A			medium risk for fog	Greenhouse	Cultivator, water pump machine, hand sprayer		Potato	Factory and Local Trader	Interested in potato cultivation for industry.
D18	Cipta Rasa (Paguyuban Petani Horti Arjasari)	50	30	FG		100 Ha in total	Arjasari	Arjasari	900	F	A	B			low risk of fog	Packinghouse	Cultivator, water pump machine, hand sprayer		Chili, tomato, Egg plants, Long bean, Cucumber, Sweet corn	Wholesale market	Formed community named "Paguyuban Petani Horti Arjasari" with the aim of centralizing the distribution of horticulture products in Arjasari area. The community consists of several FG. the leader recommended other FG under the community: Sari Wangi, Rawat Jagat, Pusaka Karuhun, and Himat Raharja.
D19	Ana Berkah	15	8	FG		21 Ha in total	Kertasari	Sukapura	1700	F	A	A			low risk of fog		Hand sprayer		Carrot, Spring onion, tomato, Chili, Potato	Local Trader	FG is willing to learn new technology and marketing.
D20	Mutiara Tani	48	48	FG		24 Ha in total	Kertasari	Tarumajaya	1500	F	A	B			medium risk for fog	Warehouse	Cultivator, water pump machine, hand sprayer		Potato, Carrot, Spring onion, Cabbage, Chinese cabbage	Wholesale market, Local Trader, Supplier	Most of the produce are sold through FG. The group is very open with the introduction of new technology and market.

West Bandung District

No	Name	No. of Members		Organizational Structure	Trial Project	Field Area	Sub-District (Kecamatan)	Village (Desa)	Altitude (m)	Land Features	Access to Field	Irrigation Water	Soil Condition		Other Features	Facility	Farm Machines owned by Group	Cultivation Skill	Main Products	Market	Other Information (Challenges, Need of support, Interest in collaboration with other FGs, etc.)
		Total	Active										A-D	Type							
W1	Dewa Famili	10	10	FG	2017D 2017R	6 Ha in total	Cisarua	Pasirlangu	1100	F	A	A	A			Greenhouse (Paprika)	Chiller car	C	SH: Paprika	Hoka-Hoka Bento & Hero	Own a sorting and packing facility equipped with a fridge Export paprika (20% of total production) to Singapore through an exporter Ship paprika to supermarkets and food service industries Obstacles: 1) damages (deterioration of quality) caused by incest (thrips) and disease, 2) lack of capital (for cash and carry system)
W2	Lembang Agri	150	150	FG	2017D 2017R	80 Ha in total	Lembang	Cikiandg	1500	F	A	B	A			Greenhouse (Paprika)	Cultivator	B	OF: Lettuce, Kenya Bean, Green Bean, Potato, Zucchini, Kyuri, Chili, Cauliflower, Broccoli	Modern and local market	Own a sorting and packing facility Ship to modern markets through traders Obstacles: 1) lack of capital (due to delay in payment from markets) for purchase of necessary inputs
W3	Wargi Panggupay	15	15	AS	2017D 2017R	4 Ha in total	Lembang	Sunten Jaya	1400	F	B	B	A		Risk of fog		Cultivator & Tractor	C	OF: Lettuce, Kenya Beans, Cauliflower, Chili, Cabbage, Chinese cabbage, Broccoli, Paprika	Toko Tani Indonesia (TTI)	Own a sorting and packing facility Export beans to Singapore through an exporter Obstacles: 1) lack of capital (for cash and carry system), 2) unstable market price (especially lettuce) Prefer to conduct contract farming with a trader/markets
W4	Gerbang Emas	43		Koperasi	2017D 2017R	4 Ha in total	Lembang	Cibodas	1400	F	A	A	B			Greenhouse (Paprika, Beef tomato, Horenzo)	Cultivator	A	SH: Paprika, Beef tomato OF: Totato, Lettuce, Bean, Broccoli	Pizza Hut Supplier (Yans Fruits)	Ship products directly to Pizza Hut every day (21 shops in Bandung, 20 shops in Jakarta) Ship other products to modern markets through traders Obstacles: transport costs to deliver vegetables to Pizza Hat
	Yan's Fruit & Vegetable Supplier			Others Supplier with partner farmers	-	-	Lembang	Cibodas	-	-	-	-	-	-	-	-	-	-	Broccoli, tomato, Beans, Cauliflower, Chinese cabbage, Lettuce, Chili, Cabbage	Supermarkets	Ship quality vegetables to modern markets in Jakarta Own a sorting and packing facility and trucks Provide technical instruction to member farmers Obstacles: 1) lack of cultivation technique of partner farmers, 2) difficulty in production and shipment during the rainy season
W5	Mitra Sukamaju	25	25	Koperasi	2017D 2017R	11 Ha in total (100 greenhouses)	Cisarua	Pasirlangu	1100	F	A	A	A			Greenhouse (Paprika)		AA	SH: Paprika	Lotte Mart, Hypermart	Directly ship paprika to supermarkets in Jakarta Obstacles: damages (deterioration of quality) caused by incest (thrips) and disease
W6	Sinar Mukti	24	24	FG	2018D 2018R 2019D 2019R 2020R	16 Ha in total	Cisarua	Tugu Mukti	1300	M	B	B	A				Cultivator and water pump	AA	OF/TR: Bean, tomato, Broccoli, Lettuce, Celery	Online market Supplier Direct selling to retailers	Own a sorting and packing facility (Members bring products to this facility) Beans are delivered to Amazing Farm for export Grade A tomato is delivered to Amazing Farm Obstacles: 1) Unstable size of tomato (optimal size: 120 g per tomato) The leader is active in supporting and coordinating with other FG for cooperative shipping and wants to explore new markets. FG has a own brand name "Rumah Sayur".
W7	Panen Lestari	26	26	FG	2018D 2018R 2019D 2019R 2020R	5 Ha in total	Lembang	Langensari	1200	S	A	B	B	CR, BC	Medium risk of fog		Cultivator and water pump	AA	OF/TR: Chili, tomato, Broccoli	Supermarket (Yogya),, Supplier, Sayurbox	Own sorting and packing facility Directly ship Grade A products to supermarkets (Yogya, Total Buah). Products with low grade are sold at local markets. Obstacles: 1) unstable size (smaller size) of tomato, 2) lack of capital to buy inputs
W8	Sukarasa Tani	9	9	FG	2018D 2018R	2 Ha in total	Lembang	Cibodas	1300	F	A	A	A			Greenhouse (Beef tomato, Horenzo)		B	OF: Lettuce, Broccoli, tomato, Kyuri	Yan's Fruits and Vegetables	Group leader collects products from members for shipping to suppliers. Obstacles: 1) damages caused by disease and insect, 2) quality of kyuri (not straight)
W9	Family Rezeki Tani (FRT)	10	10	FG	2018D 2018R 2019D 2019R	1 Ha in total	Cisarua	Pasirlangu	1100	F	A	A	A			Greenhouse (Paprika)		AA	SH: Paprika	Supplier in Cianjur	Own 15 green houses for paprika production. Ship to suppliers based in Cipanas in Cianjur (700~800 kg per day) Obstacles: Damage caused by thrips
W10	Saluyu	33	33	FG	Non	500m2/ member	Lembang	Cikhuripan	1600	F	B	B							OF: tomato, Broccoli, Potato	Local market through local traders	1) Members sell products to local traders individually; no coordination by the group for marketing. 2) Challenges: i) control of pest and diseases, ii) lack of capital to procure inputs when needed 3) Willing to cooperate with other FGs in development of supply chain of vegetables if cash and carry system is applied
W11	Rahayu Ningrat	30	30	FG	Non		Lembang	Wangun Harja	1500	F	B	B					Cultivator		OF: Broccoli, Cabbage, Chili, tomato, Lettuce, Chinese lettuce, etc.	Local market through local traders (not sell to suppliers for modern markets)	1) Members gather once per month to exchange information. However, FG has not conducted joint activities in marketing and shipment as a group. 2) Challenges: i) Marketing (prefer to sell products to better markets), ii) fluctuation of selling prices (want to find stable markets), iii) lack of proper knowledge on soil management (soil conditions of members' fields have been worsen as members use unmatured composts) 3) Interested in selling products to suppliers for modern markets if cash and carry system is applied. 4) Willing to cooperate with other FGs in development of supply chain of vegetables if i) cash and carry system is applied and ii) conditions (price and other arrangements) are preferable.

W12	Abadi I	20	20	FG	Non		Lembang	Sunten Jaya	1400	M	B	B					Cultivator		OF: Broccoli, Cabbage, Cauliflower, tomato, Chinese cabbage, Lettuce	Local trader (70%) Suppliers (30%)	1) For shipment to suppliers, the leader collects products from members. 2) The leader pays to members when received products (cash & carry), while the leader gets payment from suppliers after 2 weeks. 3) The group meeting is held once per month. 4) Challenges: i) Fluctuation of local market price 5) Willing to cooperate with other FGs in development of supply chain of vegetables if conditions, such as a price, payment condition, and shipping arrangement, is preferable. 6) The group accepts delayed payment for maximum 2 weeks. 7) The group has an experience in cultivation of specific commodity (broccoli) according to the planting plan for shipment to suppliers. 8) Access to finance: members get a loan from traders as they do not want to borrow money formal banks (as farmers are afraid in case of delay in repayment due to crop failure)
W13	Mitra Makmur	11	10	FG	Non	3.2 in total	Lembang	Cibodas	1400	F	A	A				Greenhouse (Beef tomato, Cherry tomato)	Cultivator		OF: Herb, Broccoli, Lettuce, other vegetables	8 major hotels in Jakarta (including Sheraton) Supplier	1) The group was established in 2018 (one member participated in the trial project as a member of Gerbang Emas) 2) The group targets to major (5 star) hotels for marketing of products. 3) Regarding capacity of cultivation, currently 50 % of total products shipped to customers are produced by members, while half of products are brought from partner farmers. The optimum rate is 80 % (member) and 20% (partner farmers). 4) Challenges: i) cash flow (finance) as the payment term by hotels is 2 months after delivery, ii) availability of seeds since hotels demand European vegetables (not registered variety of vegetables), iii) cultivation techniques as members need to improve cultivation skills to meet specification by customers 5) The group plans to obtain an official entity such as cooperative or CV (private company) in order to expand business. 6) The organizational management system has been well established as a full-time management staff is assigned to deal with business transaction.
W14	Cipeusing Maju	35	35	FG	Non	15 Ha in total	Cisarua	Kertawangi	1200	S	C	A					Water pump		OF: Tomato, bean, broccoli, cauliflower, lettuce	Local trader, Rumah Sayur	1) The challenge is the limited market; local trader and Rumah Sayur 2) Some of members have participated in trial project with JICA project through Sinar Mukti. They implemented technical cultivation method of the Project. 3) Prefer to focus in improving supply the produce to Sinar Mukti in which the produce has been packed. 4) The regular meeting of FG is conducted once in a month. 5) FG does not have the packing house for supplying to Rumah Sayur
W15	Mekar Mandiri	20	20	FG	Non	16 Ha in total	Cisarua	Pasirhalang	1100	F	B	B							OF: Pakchoi, lettuce, broccoli, cauliflower, tomato	Local trader	1) The challenge is the limited market; local trader 2) FG is interested to learn Project's cultivation technic which has been applied in Sinar Mukti 3) FG is interested to join supplying the produce to Sinar Mukti 4) The regular meeting of FG is conducted once in a month. 5) Marketing is conducted individually by each member.
W16	Harapan	12	12	FG	Non	3 Ha in total	Cisarua	Tugu Mukti	1200	M	B	B							OF: Broccoli, bean, tomato, lettuce	Rumah Sayur, local trader	1) The challenge is the limited market; local trader and capital for farming 2) FG is interested to learn Project's cultivation technic which has been applied in Sinar Mukti 3) FG is interested to join supplying the produce to Sinar Mukti 4) The regular meeting of FG is conducted once in a month. 5) Another challenge in dry season is availability of water. The water source is available but it should be pumped by water pump
W17	Tani Jaya	31	31	FG		7 Ha in total	Cililin	Karanganyar	700	F	C	B			Risk of fog		Water pump machine, Hand sprayer		OF: Rice, Corn, Curly chili, Cucumber, Bean, Water spinach, Local basil	Local Trader	Most of members are young people. FG expected to have a support for technical assistance and marketing. All members are active and easy to coordinate.
W18	Padaringan	30	30	FG		5 Ha in total	Cililin	Budiharja	700	F	A	B			Risk of fog		Water pump machine, Hand sprayer		OF: Rice, Bird eye chili, Curly chili, tomato, Bean, Cucumber, Long bean	Local Trader	The fields which are located near to each other have the same source of water from pipe installed independently by farmers. FG expected to have a support for technical assistance and marketing.
W19	Giri Wangi	35	35	FG		7 Ha in total	Batujajar	Selacau	700	M	A	A			Risk of fog		Water pump machine, Hand sprayer		OF: Rice, Bird eye chili, Curly chili, Chinese cabbage, Cabbage	Local Trader	Expected the support for technical cultivation assistance and marketing.
W20	Tunas Mekar	35	35	FG		7 Ha in total	Batujajar	Pangauban	700	F	A	A			Risk of fog		Water pump machine, Hand sprayer		OF: Rice, Chili, Chinese cabbage, Cabbage, Lettuce, Chaisim, Bean	Local Trader	Expected the support for technical cultivation assistance and marketing.

W21	Mekar Jaya	85	85	FG		45 Ha in total	Sindangkerta	Rancasenggang	700	M	A	A			Medium risk of fog		Water pump machine, Hand sprayer		OF: Bird eye chili, Curly chili, tomato, Bean, Cucumber, Egg plant, Cabbage	Local Trader	The main commodity are chili and tomato. This FG produce good quality of chili; the chili has more weight and less water contain (good self life). And because of that chili from this FG can get a better price in wholesale market compared with others. The leader himself is a trader for all members from 2 villages. He organizes the marketing to wholesale market and provides capital for most of members. The field work in this FG is organized together by members. Leader expect this FG can support them for marketing to modern market, as leader is confident he can organize it.
W22	Famili	25	25	FG		13 Ha in total	Sindangkerta	Mekar Wangi	1200	M	A	A			Medium risk of fog		Water pump machine, Hand sprayer		OF: Potato, Bird eye chili, Curly chili, tomato, Bean, Beet root	Local Trader	The main commodities in this FG are potato, chili, tomato. This FG is located near Ciwidey and even nearer to other FG candidates of Bandung. This area has a good quality of tomato. Sometimes Al-Ittifaq sourced the produce to this area. FG has a problem with marketing because they have to sell to local trader since they get a fund from local trader. Therefore they need another source of capital. This area has cooperative for vegetable farmers but the amount of loan is very limited
W23	Masyarakat Sejahtera	15	12	FG		3 Ha in total	Sindangkerta	Cintakarya	900	F	A	A			Risk of fog	Packinghouse, Food processing facility	Water pump machine, Hand sprayer		OF: Rice, Edamame, Orange	Supplier	This FG has convenient location to access and has no problem with water availability. The main commodity of this FG is edamame. This area produced the best quality of edamame. It has been one season they stopped to produce edamame because there is no seed available. Farmers usually obtain the seeds from edamame big trader from Cisarua. FG wants to improve seed availability and marketing issue because edamame is one of potential commodity to be developed in Indonesia and also has a good price in the market. This FG has packing house and food processing facility.
W24	Jaya Mandiri	17	17	FG		2 Ha in total	Cisarua	Jambudipa	1200	F	A	C			Risk of fog		Cultivator, Water pump machine, Hand sprayer		OF: Cauliflower, Broccoli, tomato, Lettuce, Carrot	Local Trader	The leader takes role as a trader who provides capital to farmers. The selling activities are organized by leader.
W25	Mulya Tani	18	18	FG		3 Ha in total	Cisarua	Saandg Mekar	1200	S	C	B			Medium risk of fog		Cultivator, Water pump machine, Hand sprayer		OF: Cauliflower, Broccoli, tomato, Lettuce, Bean	Local Trader	FG activates are going well. But for marketing they are still being carried out individually.
W26	Tani Saluyu	10	10	FG		1 Ha in total	Cisarua	Pasirlangu	1200	F	A	B			Medium risk of fog		Cultivator, Water pump machine, Hand sprayer		OF: Lemon, Broccoli, Lettuce	Local Trader	The commodity is only lemon. FG needs an improvement for pesticide management and marketing. The total members are 10 but 5 members are focused in lemon. only lemon farmers are active as an organization.
W27	Giri Hurip	33	15	FG		70 Ha in total	Cililin	Karya Mukti	800	S	A	B			Medium risk of fog		Water pump machine, Hand sprayer		OF: Rice, Chili, tomato, Cabbage, Sweet corn, Bean, Cucumber	Local Trader	15 members are horticulture farmers while other 20 members are rice farmers. FG is interested to have a support for technical assistance and marketing.
W28	Tumaritis	35	35	FG		6 Ha in total	Cililin	Nanggerang	800	S	A	B			Medium risk of fog		Water pump machine, Hand sprayer		OF: Rice, Curly chili, tomato, Cabbage, Sweet corn, Long bean, Bean	Local Trader	All members are active. Most of farmers get funded by trader. FG expected to have a support for technical assistance and financing so that the farmers can be independent.
W29	Mekar Harapan	34	34	FG		6 Ha in total	Cililin	Nanggerang	800	S	A	B			Medium risk of fog		Water pump machine, Hand sprayer		OF: Rice, Curly chili, tomato, Cabbage, Sweet corn, Long bean, Bean	Local Trader	Most of field are riverbanks of Saguling Lake. The fields cannot be used when the water volume goes up.

Annex 8.17. Survey Report on the Covid-19's Impacts on the Horticultural Value Chain

Survey Report on the Covid-19's Impacts on the Horticultural Value Chain

1. Background

1.1. Social Restrictions after the Covid-19 Outbreak

A value chain survey was conducted between October and December 2020 to investigate the impacts of the Covid-19 outbreak and to identify a bottleneck brought about in the horticultural value chain in the target areas. Economic activities with horticultural products were largely affected by social restrictions introduced by governments. Having the rapidly increasing number of Covid-19 cases, the Jakarta Government put in place the first large-scale social restrictions (Pembatasan Sosial Berskala Besar: PSBB) from the 10th of April to the 3rd of June, which were followed by surrounding cities (Bogor, Depok, and Bekasi), Bandung City/District and West Bandung. Other target districts also locally applied social restrictions in May.

Table 1 Schedule of Social Restrictions in the Target Areas

Social Restrictions	Time
Jakarta (by Jakarta Government)	
First PSBB	10 April to 3 June
Transitional PSBB	4 June to 13 September
Second PSBB	14 September to 9 October
Transitional PSBB	23 November to 6 December
Bogor, Depok, Bekasi (by West Java Provincial Government)	
PSBB	15 April to 2 July
Transitional PSBB	3 July to 23 December
Bandung City/District, West Bandung (by West Java Provincial Government)	
PSBB	22 April to 26 June
Garut (by the local government)	
Local social restrictions	6 to 19 May
Cianjur, Sukabumi (by the local governments)	
Local social restrictions	20 May to 2 June

During the PSBB, many social activities including religious activities and the gathering of more than five people were prohibited. Schools, offices, local markets, restaurants, hotels, etc, were temporally closed or had limited working days or hours. The restrictions in the transitional PSBB were loosened; some of those places were allowed to start operating with health protocols. In Garut, Cianjur, and Sukabumi, social activities were similarly restricted by the local governments. As a result of these restrictions, demand from hotels, restaurants and catering (Horeca), which were one of the main customers of local as well as wholesale markets, sharply decreased. Consumers avoided crowded places like local markets, which also led to a decrease in demand in local markets.

1.2. DG of Horticulture's Support to Farmers

Directorate General of Horticulture (DGH) designed three measures to support farmers affected by Covid-19 in marketing: i) Pasar Tani (farmers' market), ii) Horti Trade Room (online marketplace), and iii) distribution funding. Pasar Tani is a farmers' market regularly held by DGH, where farmers can directly sell products to consumers without being affected by local market price fluctuation. Farmers are provided with mobile tents,

loudspeakers, packaging facilities, etc. In addition to the regular markets, Pasar Tani at shopping malls (Pasar Tani from Mall to Mall) was held twice after the outbreak.

DGH also opened Horti Trade Room, an online marketplace for horticultural products, to provide a new marketing channel to farmers. Farmers as sellers display their contacts and product information on the Horti Trade Room website so that buyers can find and contact them. Horti Trade Room is still in preparation with a limited number of products available, being planned to be officially launched in January or February 2021 after involving more farmers,

Furthermore, DGH is to provide funds for the distribution of horticultural products to farmers/farmers' groups (FGs), local traders, and other buyers who will purchase products at reasonable prices. DGH is going to subsidize transportation costs of selected commodities shipped from a region with overproduction of the product to another region with a high demand for it. This distribution funding is also in preparation, which will be officially launched in January or February 2021.

Despite the efforts being made by DGH, most farmers interviewed in the survey were not even familiar with any of the three measures. Further promotion of the measures is needed for more farmers to know and benefit from them.

2. Survey Results of the Covid-19's Impacts on the Horticultural Value Chain

In an attempt to identify a bottleneck in the entire horticultural value chain, the survey covered different actors. The number of interviewees amounted to 86: 24 FGs, 13 agro-input dealers, 12 local traders, 10 suppliers, 10 local markets, four wholesale markets, four supermarkets, seven EC companies, and two fintech companies.

Table 2 Interviewees of the Survey

	Bogor	Cianjur	Sukabumi	Garut	Bandung	West Bandung	Jakarta Bekasi Tangerang	Bandung City	Total
FG	4	4	4	4	4	4			24
Agro-input dealer	2	2	2	2	2	2		1	13
Local trader	2	2	2	2	2	2			12
Supplier	2	1	2		2	2		1	10
Local market	1	2	2	2	1	1		1	10
Wholesale market	1						2	1	4
Supermarket							4		4
EC company							7		7
Fintech company							2		2
Total	12	11	12	10	11	11	15	4	86

In the survey, information on changes that took place during the 1st PSBB in Jakarta from April to June and changes afterward were separately collected; the former was answered with scales as shown in many graphs in the following sections while the latter was also described by the interviewees.

Figure 1 is a map of the horticultural value chain, where actors and transactions between them are shown in different colors. In red are those negatively affected by Covid-19, in green are those with both positive and negative changes, and in blue are those positively influenced. It became clear that no parts of the horticultural value chain were cut or became bottlenecks. The biggest change was rather found in the end markets; a sharp decrease in demand and prices in local as well as wholesale markets resulted in a drop in sales of local traders and farmers selling to these markets. Some of the farmers had to reduce the production in the subsequent cultivation due to a shortage of cash. In contrast, since supermarkets and online markets enjoyed a higher demand from customers, a handful of farmers and some suppliers shipping to these markets also increased their sales. The details of each actor's situation are described in the following sections, starting with the market side.

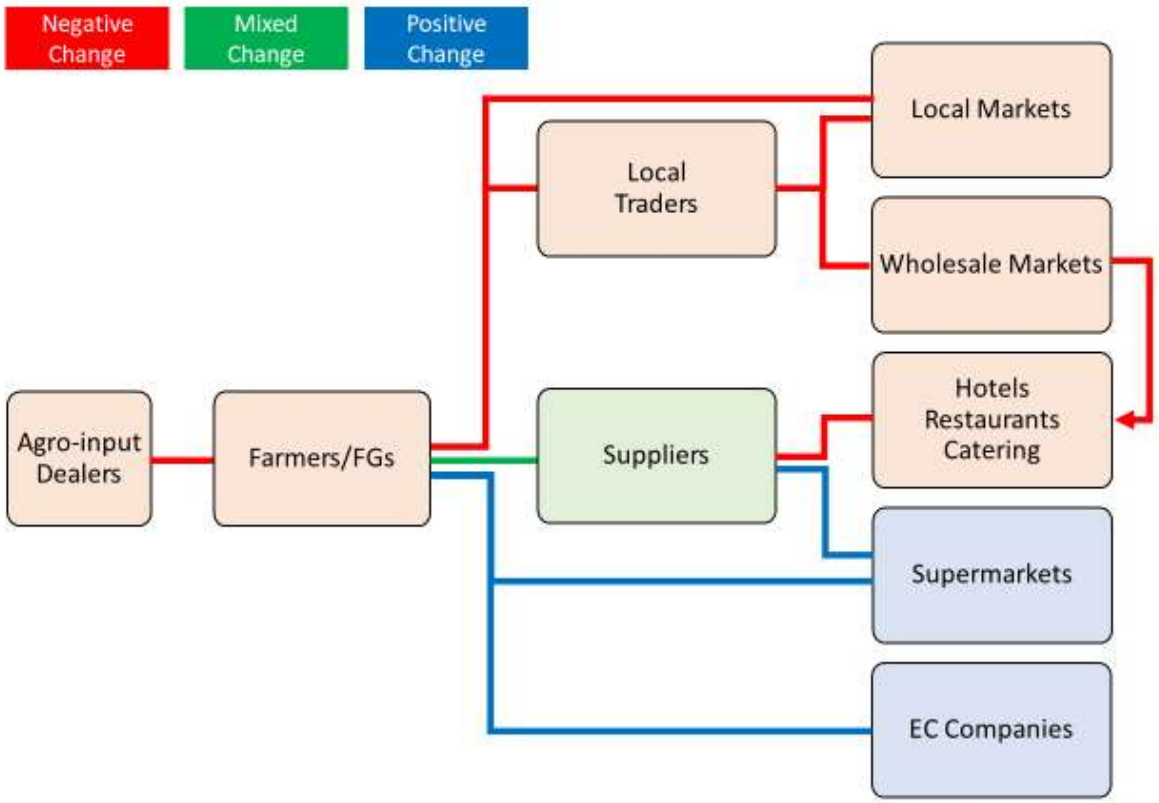


Figure 1 Value Chain Map of Horticultural Products

2.1. Local/wholesale markets

Local/wholesale markets were negatively affected by Covid-19. As illustrated in Figure 2, sales of all 14 interviewed stalls in the local or wholesale markets decreased because of low demand and prices. Some markets were temporally closed or had to reduce open hours due to the social restrictions. To avoid crowded places, consumers shifted from local markets to supermarkets, etc. Most Horeca, which are the main customers of wholesale markets, were closed during the social restrictions so that the demand for wholesale markets sharply decreased. While the demand fell, the supply of vegetables from farmers or local traders did not decrease, which led to an oversupply of produce and a consequent plummet in their selling prices.

This situation also reduced the local/wholesale markets' purchasing amounts and prices. Figure 3 shows that the markets' purchasing amounts of 60% of commodities decreased, though some stalls still absorbed all the amount offered by their traders or farmers to sell them all at low prices. Likewise, purchasing prices of 82% of commodities decreased. Lower purchasing prices as well as purchasing amounts were observed in most commodities from any sources, either from farmers, local traders or other wholesale markets. This situation has been partially or completely reverting since the completion of the 1st PSBB in Jakarta.

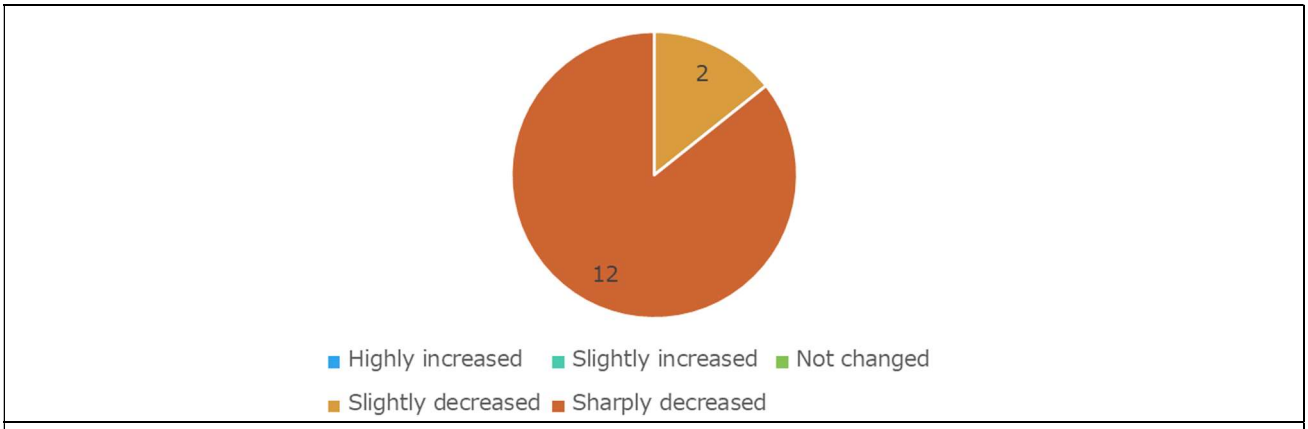


Figure 2 Local/wholesale Markets' Sales

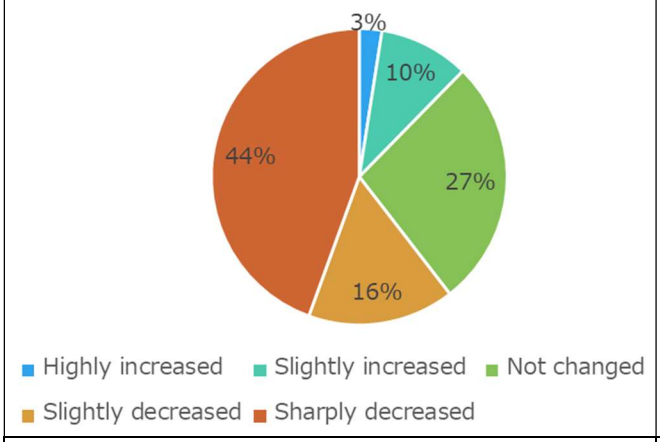


Figure 3 Local/wholesale Markets' Purchasing Amounts

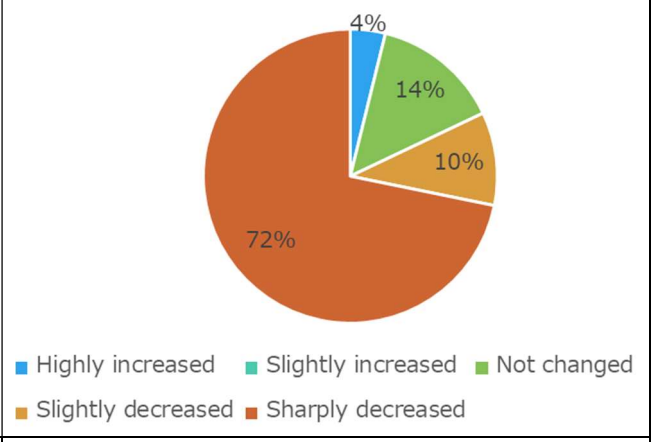


Figure 4 Local/wholesale Markets' Purchasing Prices

2.2. Supermarkets

In great contrast to the local/wholesale markets, all 4 interviewed supermarkets increased the sales of horticultural products in the 1st PSBB. Many consumers shifted from local markets to supermarkets, some of whom bought in bulk to reduce the frequency of visits to supermarkets. In response to the increased demand from customers, the supermarkets highly increased purchasing amounts of 80% of commodities. Changes in their purchasing prices differed among supermarkets. One supermarket targeting low to mid-class consumers sharply decreased purchasing prices by following local market prices. Other supermarkets for mid to high-class consumers minimized the decrease or did not change the purchasing prices at all.[1]

[1] Interviews with suppliers to supermarkets showed a slightly different view. Suppliers' answer suggested that supermarkets' purchasing prices of most commodities (83%) did not change from the pre-agreed prices.

Although this preferable situation for supermarkets was most apparent during the 1st PSBB, the demand from consumers started reverting to the pre-Covid situation afterward. Consumers discontinued bulk purchase, some of whom returned to local markets. One supermarket also mentioned that the competition with expanding online markets was getting severer.

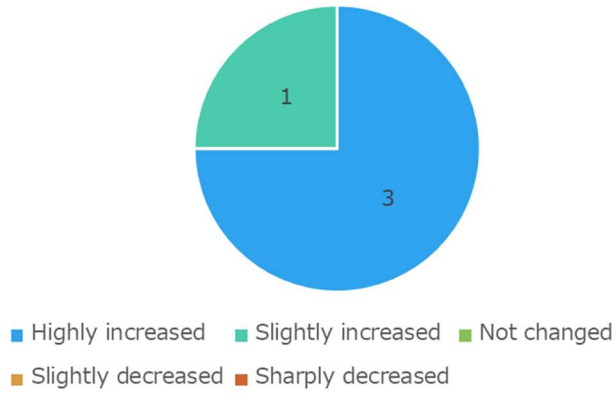


Figure 5 Supermarkets' Sales

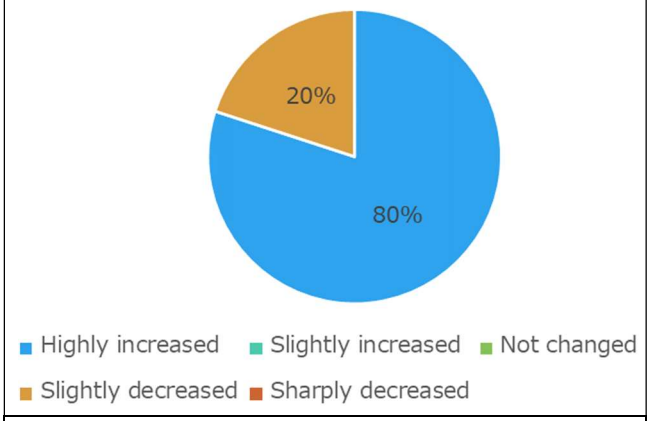


Figure 6 Supermarkets' Purchasing Amounts

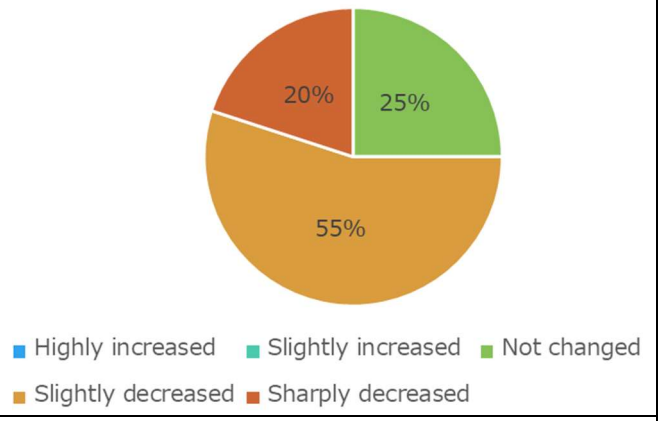


Figure 7 Supermarkets' Purchasing Prices

2.3. EC Companies

Seven EC companies were interviewed in the survey, of which three companies focused on online B2C (business to consumers) markets while the other four had both B2B (business to business) and B2C markets. In general, all the companies' online B2C markets' sales highly increased since more consumers started using them during the 1st PSBB. On the other hand, online B2B markets' sales sharply decreased due to the closure of most Horeca. Thus, all three EC companies only for B2C markets increased sales while all other companies, except for one, had an increase in sales from B2C markets, which was offset by a decrease in sales from B2B markets. As an exception, one company's great increase in sales in the B2C market outweighed a decrease in the B2B market.

The EC companies mostly procure vegetables directly from farmers. Figure 9 shows that the purchasing amounts of 60% of commodities did not change. The same explanation can be applied here; the purchasing amounts of products for B2C markets increased while those for B2B markets decreased. Most EC companies' purchasing prices followed the downward trend of local market prices. As exceptions, one company specializing in organic vegetables maintained purchasing prices thanks to their high value while another company employs crowdfunding, in which purchasing prices are set in advance.

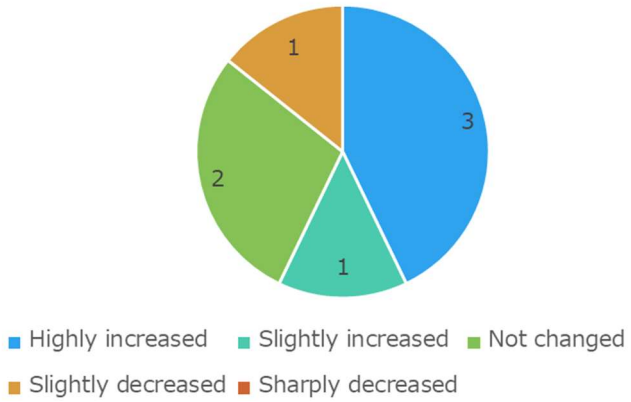


Figure 8 EC Companies' Sales

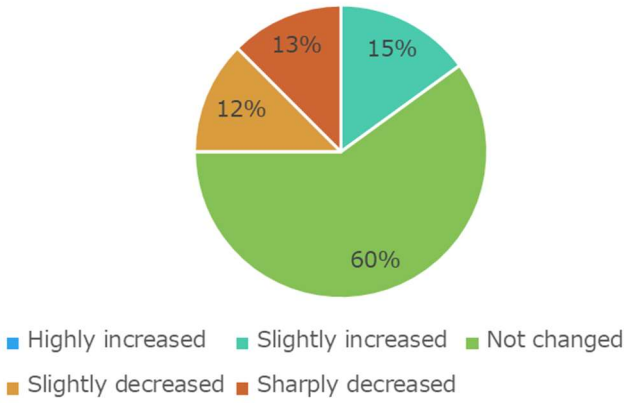


Figure 9 EC Companies' Purchasing Amounts

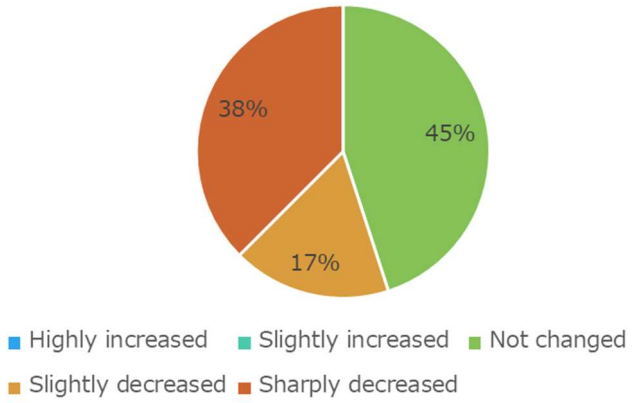


Figure 10 EC Companies' Purchasing Prices

2.4. Local Traders and Suppliers

Impacts on local traders and suppliers differed according to their main markets. Most local traders, who sold to local/wholesale markets, and suppliers to Horeca faced a sharp decrease in sales. Although some suppliers to supermarkets increased sales, other suppliers to supermarkets received smaller orders since the competition among them became harder.

Local traders and suppliers' procurement amounts and prices changed, depending on their customers. Many local traders for local/wholesale markets decreased purchasing amounts and prices while some traders still absorbed all the amounts offered by farmers to sell them all at low prices. Suppliers to Horeca decreased purchasing amounts due to the closure of most customers while purchasing prices of most commodities did not change since the pre-agreed prices with Horeca were maintained. Without changing purchasing prices, a few suppliers to supermarkets increased purchasing amounts of most commodities to meet the higher demand from their customers.

Although these local traders and suppliers procured horticultural products from several actors including farmers, other traders, and sometimes wholesale markets, changes in the purchasing amounts and prices were not significantly different between different sources. Purchasing amounts and prices mostly depended on to which markets the local traders or suppliers sold products.

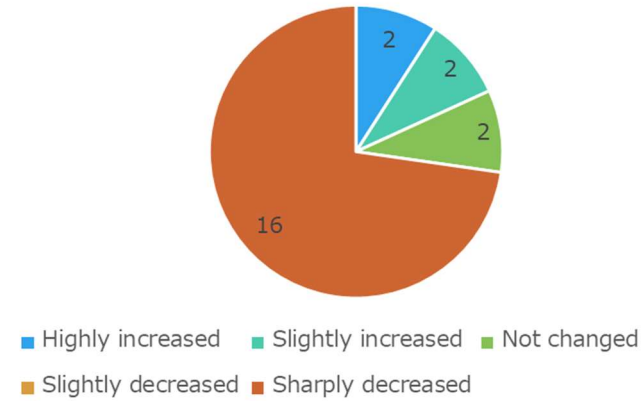


Figure 11 Local Traders and Suppliers' Sales

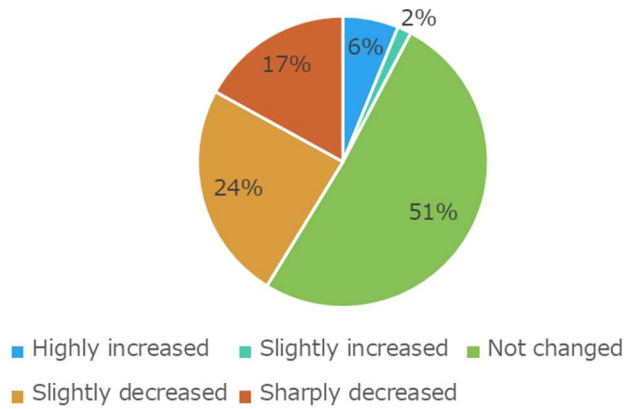


Figure 12 Local Traders and Suppliers' Purchasing Amounts

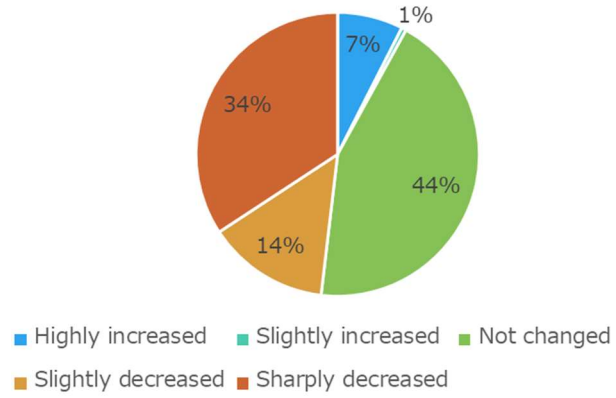


Figure 13 Local Traders and Suppliers' Purchasing Prices

2.5. Farmers

Most of the interviewed farmers (21 out of 24 farmers) faced a decrease in sales due to the low market prices and demand since their main customers were local traders or local markets. Only a few farmers shipping to supermarkets or online markets increased or maintained sales during the 1st PSBB. On the other hand, Figure 15 shows that the production amounts of 87% of commodities did not change in that period. Since farmers had started planting a few months before the 1st PSBB, they were not able to adjust the production when the market prices were very low. With limited cash income from the harvests then, some farmers needed to reduce production scale in the subsequent cultivation by narrowing the field size or minimizing the use of inputs or labor. As a result, when the market prices started recovering from August or so, the farmers did not have many products to sell, being trapped in a vicious circle.

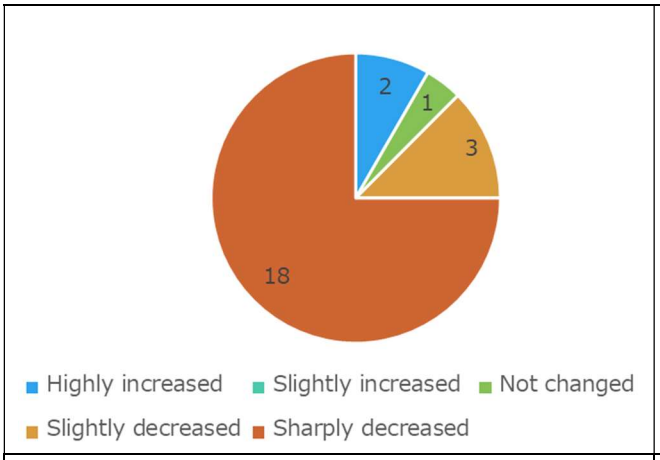


Figure 14 Farmers' Sales

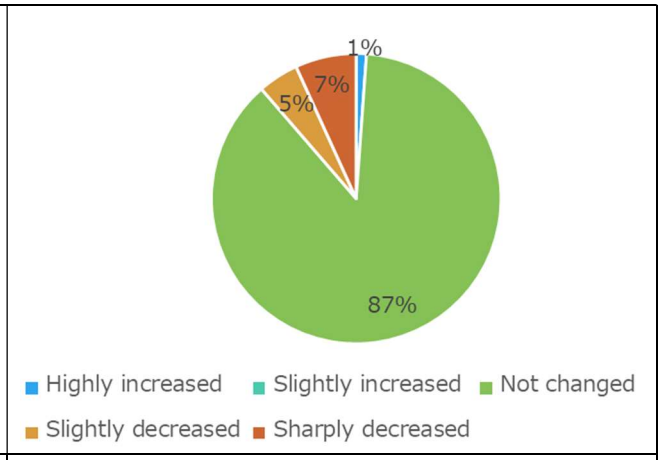


Figure 15 Farmers' Production

In the survey, farmers were asked to answer all the problems caused by Covid-19 and to select one as the biggest problem. Except for one farmer, all the farmers considered the low demand for and prices of products as the biggest problem (each farmer's biggest problem was counted two points in Figure 16). Other issues in production, procurement of input, etc. were minimal.

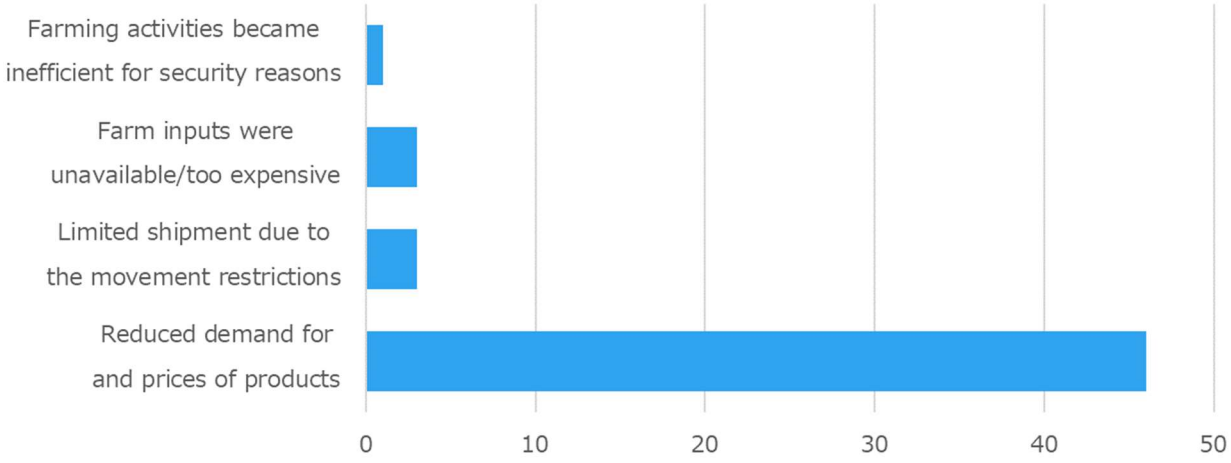


Figure 16 Problems Brought by Covid-19

To tackle the difficulty in marketing, many farmers adjusted the harvest schedule according to the buying capacity of their customers. Several farmers tried to sell their products to the neighborhood through SNS such as WhatsApp, Facebook, and Instagram. Other examples of measures taken by farmers are summarized in the table below.

Table 3 Examples of Measures Taken by Farmers/FGs

District	FG	Measures
Marketing side		
Cianjur	Utama	• Diversified markets to two Islamic boarding schools
Bandung	Mekar Tani	• Diversified markets of potato to a university and DINAS
West Bandung	Panen Lestari	• Diversified markets to a local small food processing enterprise.
Bogor	Tunas Tani Pangrango	• Adjusted the delivery time to arrive at wholesale markets earlier so that they were able to sell all the products at less low prices. • Diversified markets to a local market and restaurant.

Production side		
Cianjur	Saridona 2	• Stopped growing leafy vegetables, of which prices were expected to continue decreasing. • Instead, expanded the field of spring onion from 3,000 to 5,000 m^2 for its relatively stable demand and price.
Sukabumi	Mucekil	• Increased varieties to grow in order to minimize the risk of a price decrease.

Whereas the EC market has been expanding, the number of farmers who enjoyed the opportunity was still limited; only five out of 24 farmers had ever shipped to EC companies. Among 20 farmers currently not shipping to EC companies, 14 showed their interests while some farmers mentioned difficulties doing business with EC companies: i) the volume of one order was small; ii) high quality requirements might lead to many rejections even though selling prices to the EC companies were not as high as to supermarkets; iii) payment was not made in cash on delivery; and iv) EC companies collection points were too far for some farmers to ship products.

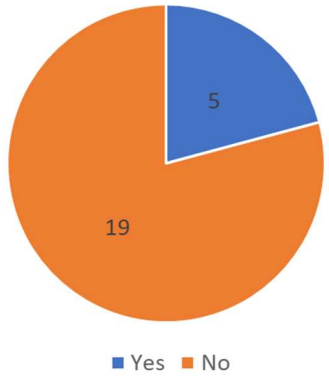


Figure 17 Farmers' Experience in Selling to EC Companies

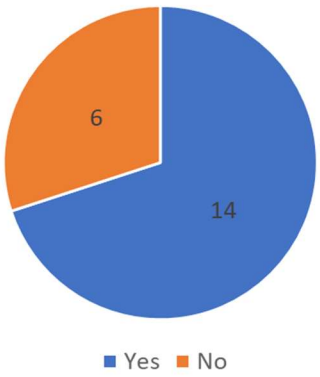


Figure 18 Farmers' Willingness to Sell to EC Companies

2.6. Agro-input Dealers

Agro-input dealers were no less influenced by Covid-19. While they had almost no problems in procurement except for only a few inputs such as imported seed, 12 out of 13 interviewed dealers faced a decrease in sales that resulted from low demand from their main customers: farmers. Fewer farmers came to input shops due to the social restrictions. Besides, farmers' low income from the low local market prices did not allow them to purchase as many inputs as before. No significant difference in demand was observed among different types of inputs including seed, fertilizers, agro-chemicals, etc. With stable procurement prices of most inputs, no dealers reduced selling prices for promotion during the 1st PSBB.

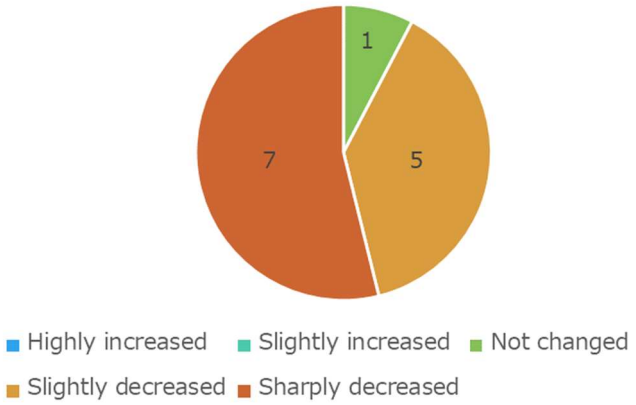


Figure 19 Agro-input Dealers' Sales

3. Potential for Cooperation with E-Commerce (EC) in Sales Promotion of Horticulture Products

3.1. EC market in Indonesia

1) General trend of the Indonesian EC market

The Indonesian EC market has been dramatically growing in recent years. Its total sales of all goods and services grew from USD 9.5 billion in 2018 to 18.7 billion in 2019,[2] and are expected to reach USD 26 billion in 2020.[3] According to the sales data of the EC market by categories, sales of food and personal care increased from USD 1.45 billion in 2018 to 3.17 billion in 2019.[4] In Indonesia, the pandemic of Covid-19 and the large-scale social restrictions (called PSBB in Indonesian) boosted this trend, as a result of which, the EC sales amount increased by 320% in May and 480 % in April from January 2020.[5]

2) Covid-19's impacts on EC companies dealing with horticultural products.

As described in Section 2.3., the outbreak of Covid-19 and subsequent introduction of the PSBB differently impacted online B2B and B2C markets. While sales in most online B2B markets plummeted because of a sharp decrease in demand from Horeca, online B2C markets highly increased their sales since many consumers started purchasing vegetables and fruits online. Among seven EC companies interviewed, three companies focusing solely on B2C markets benefitted from the increased demand while the other four with both B2B and B2C markets received both positive and negative impacts.

3.2. Business models of the interviewed EC companies

The following two tables summarize business models of each EC company; the first table is for the companies specializing in B2C markets and the second table is for those operating both B2B and B2C markets.

[2] DATAREPORTAL "DIGITAL 2019 SPOTLIGHT" (https://datareportal.com/reports/digital-2019-ecommerce-in-indonesia) and "DIGITAL 2020 SPOTLIGHT" (https://datareportal.com/reports/digital-2020-indonesia) Accessed on 29 December 2020
[3] Facebook and Bain & Company (2020) "Digital Consumers of Tomorrow, Here Today"
[4] DATAREPORTAL "DIGITAL 2019 SPOTLIGHT" (https://datareportal.com/reports/digital-2019-ecommerce-in-indonesia) and "DIGITAL 2020 SPOTLIGHT" (https://datareportal.com/reports/digital-2020-indonesia) Accessed on 29 December 2020
[5] Digima news "Indonesia: Expansion of the EC market accelerated by Covid-19, 170 million users, major Chinese companies also particiapating" (https://www.digima-news.com/20200701_59118) Accessed on 29 December 2020

Table 4 Summary of Business Operation

(1) Business Operation 1: <u>Business to Consumer (B to C)</u>

	Sayur Box	Kecipir	AGRetail
Operational Area	• Jabodetabek[6] Area • Started business in 2016	• Jabodetabek Area • Started business in 2015	• Operated in 40 cities and districts in Indonesia • Started business on April 2020
Business Model	• Operate an online market focused mainly on fresh foods including vegetables, fruits, cereals, meats, fishes and others.	• Operate an online market specialized in organic vegetables (dealing with around 200 items).	• Operate both an online market (B2C/B2B) and conventional trading business supplying products to SME (such as food processing and Horeca[7]) and re-sellers (AGRetail's partners).
Procurement and Logistics	<Procurement of products> • Vegetables: Mainly from individual farmers or farmers' groups • Fruits: Farmers (60%) and suppliers (40%) <Setting of purchasing prices> • Adjusted based on local market prices • Set a minimum purchasing price in case a local market price is too low <Payment terms> • Once or twice a week <Logistics> • Location of a warehouse and collection points ✧ Main warehouse: Sentul (Bogor) ✧ Collection points: Lembang (West Bandung), Cipanas (Cianjur), Megamendung (to be operational, Bogor) • Shipping specification ✧ Required to pack/wrap products according to specification set for each item • Delivery of items to customers ✧ By own delivery system: 80% ✧ Outsourced to service providers: 20%	<Procurement of products> • Procure all products from contract farmers in Bogor, Cianjur, and Sukabumi. <Setting of purchasing prices> • Set a contract price of each item referring to selling prices to supermarkets. • Review contract prices every 6 months <Payment terms> • Two weeks after shipment <Logistics> • Location of a warehouse: Nanggewer (Bogor) • Distribution of products to the warehouse: ✧ i) Contract farmers directly deliver products to the warehouse. ✧ ii) Kecipir's field staff pick up products at collection points located nearby contract farmer's fields. • Packing of products ✧ Use a reusable plastic container for delivery to customers • Delivery of items to customers ✧ Outsourced to service providers	<Procurement of products> • Procure products from farmers at each operational area. <Setting of purchasing prices> • Adjusted based on local market prices <Payment terms> • Cash on delivery <Logistics> • Location of the distribution centers (DC): 1) Bandung, 2) Surabaya, 3) Jember (East Java), 4) Tulungagung (East Java) • Distribution of products to DC: ✧ AGRetail's staff pick up products at farmer's fields and bring them to DC. • Delivery of items to customers ✧ Outsourced to service providers ✧ Delivered by partners themselves.
Other Information	• Sayurbox has started discussion with Fintech to explore a credit scoring mechanism for	• Organic vegetables sold by Kecipir are categorized into 3 types.	• AGRetail has registered local partners at each operational area for conducting business.

[6] Jakarta, Bekasi, Bogor, Depok, and Tangerang
[7] Hotels, restaurants, and catering service companies

	agriculture finance by referring to Sayurbox's transaction records. • Sayurbox has facilitated contract farming of high demand vegetables, such as broccoli, with farmers in Lembang.	✧ "Certified": Obtained the official certificate from the registered certifier. ✧ "Non-Certified": Not yet obtained the certificate, but follow the required cultivation method set by the registered certifier. ✧ "Zero Pesticide": Not use any chemical pesticide and fungicide.	• Local partners can use AGRetail's name and its web site for business transaction once registered. • AGRetail facilitates cross-border trading of surplus products, through which farmers can sell them to other areas where a market price is higher.

(2) Business Operation 2: <u>Both Business to Business (B to B) and Business to Consumer (B to C)</u>

	Paskomnas (B2B) Cari Sayur (B2C)	**RegoPantes (8villages)**	**Kios Agro (B2B) Kios Sayur (B2C)**	**TaniHub (B2B, B2C)**
Operational Area	• Jabodetabek Area and Surabaya • Started business in 2017	• Jabodetabek Area • Started business in 2018 (RegoPantes)	• Bandung City, Bandung and West Bandung District • Started business in 2019	• Jabodetabek Area, Bandung, Sumedang, Central Java, East Java, Bali
Business Model	• Paskomnas operates three large wholesale markets: Pasar Tanah Tinggi in Tangerang, Pasar Osowilangun in Surabaya (East Java) and Pasar Jakabaring in Palembang (South Sumatra). • Utilizing products available in the wholesale markets, Paskomnas sells horticultural products to businesses and consumers through the two online markets.	• 8villages operates an agricultural ecosystem with different platforms: ✧ RegoPantes (online B2B and B2C markets); ✧ Vlogs (a system to manage orders from RegoPantes to farmers); ✧ Datahub.id (a system to collect farmers' field data); and ✧ Lisa (an online platform for farmers to share information).	• Operate both online B2B and B2C markets, and a transport company called Agro Express • Though the company's main business is B2B (operated by Kios Agro), the company started B2C business (Kios Sayur) in April 2020 due to a sharp decrease in sales of the B2B component resulted from PSBB.	• TaniHub Group provides 3 different services that are linked to each other: ✧ TaniHub (online B2B and B2C markets); ✧ TaniFund (a peer-to-peer lending platform for farmers' cultivation programs); and ✧ TaniSupply (quality control, warehousing, and delivery).
Procurement and Logistics	<Procurement of products> • Paskomnas (B2B): From the 3 wholesale markets. • Cari Sayur (B2C): Mainly from farmers. In West Java, they are mostly in Garut and Bandng. <Setting of purchasing prices> • Adjusted based on the wholesale market prices. <Payment terms>	<Procurement of products> • Vegetables: Mainly from farmers in Cianjur • Fruits: Mainly from farmers in East Java, Central Java and Lembang (West Bandung). <Setting of purchasing prices> • Calculated in consideration of local as well as modern market prices, production costs, etc. for a	<Procurement of products> • Procure products mainly from farmers in West Bandung and Bandung <Setting of purchasing prices> • Set a fixed price of each item <Payment terms> • Cash on delivery <Logistics> • Location of a DC: Bandung City	<Procurement of products> • Procure products from 1) farmers funded by TaniFund (contract farmers), and 2) non contract farmers. <Setting of purchasing prices> • Contract farmers: contract prices • Non contract farmers: based on local market prices <Payment terms>

	• 6 days after shipment <Logistics> • Location of warehouses: 1) Tangerang, 2) Surabaya, and 3) Palembang (inside the wholesale markets). • Delivery of products to the warehouses ✧ Farmers need to ship products themselves • Delivery of items to customers ✧ Outsourced to service providers	better profit for farmers. <Payment terms> • Once a week <Logistics> • Location of a DC: Bekasi • Delivery of products to the DC ✧ The staff pick up products at farms and bring them to the DC • Shipping specification ✧ Required to pack/wrap products according to specification set for each item • Delivery of items to customers ✧ Outsourced to service providers	• Delivery of products to the DC ✧ The staff pick up products at farms and bring them to the DC • Delivery of items to customers ✧ Agro Express delivers products to customers by motorbike	• 1-7 days after shipment <Logistics> • Location of a DC: One DC in each operational area • Delivery of products to the DCs ✧ i) Some farmers directly deliver products to the DCs. ✧ ii) The staff pick up products at farms and bring them to the DCs for other farmers. • Delivery of items to customers ✧ TaniSupply delivers products to customers
Other Information	• Paskomnas has been collaborating with IPB[8] for famers' capacity building.	• Due to high operational costs, the B2C market has been temporarily closed since July 2020.	• Kios Sayur sells vegetable packs (with 6~7 items) to consumers at a stable price (20,000 Rp), which contributes to the stable purchasing prices. • They are currently trying to collaborate with an Islamic fintech company, Syarfi.id, to finance farmers for agro-inputs	• TaniHub Group provides training twice a year for the capacity building of farmers (on financial management, quality control, etc.)

[8] Institut Pertanian Bogor, an agricultural university in Bogor.

3.3. Summary of the Survey Results

1) Farmers' Experience in Selling Online

Five out of 24 interviewed FGs had experience in either doing business with EC companies or selling through online marketplaces. Al Ittifaq in Bandung and Panen Lestari in West Bandung are shipping products to Sayurbox. Sinar Mukti in West Bandung established their own brand, named Rumah Sayur, and opened its own EC site as well as shops in online marketplaces such as Shopee and Tokopedia. Cipeusing Maju in West Bandung is shipping products to Rumah Sayur while Bina Tani Sepakat in Bogor had once opened a shop in Tokopedia, which was closed due to low sales.

The major advantage they mentioned of working with EC companies is frequent payment. Sayurbox, especially, makes payment once or twice a week without delay. FGs that are capable of maintaining stable supply can also enjoy stable orders.

On the other hand, farmers' effort to make their own online shops has not been fruitful. Although Sinar Mukti's Rumah Sayur greatly increased its sales during the first PSBB, they sharply decreased after the second PSBB due to the severe competition with other EC companies that conducted intensive promotion including discounts. Online shops of farmers with limited financial resources, either EC sites or stores in marketplaces, have difficulty competing with many new EC companies being established. For this reason, Al Ittifaq as well as Bina Tani Sepakat closed their shops in the online marketplaces. Sinar Mukti also closed Rumah Sayur's EC site and shops on the marketplaces, focusing on selling to existing customers through Instagram.

2) Farmers' Views on EC Companies

Given the increasing demand from EC companies, many farmers, who were not shipping to EC companies, showed their interest in business with EC companies as long as the business terms (prices, payment terms, etc.) are lucrative. Some farmers, however, were unwilling because of the following problems.

Firstly, the volume of one order from EC companies is small. Secondly, their quality requirements are high, which can result in a high rejection rate, despite the purchasing prices being not so high. Unlike most local markets, EC companies usually have quality standards to be met, similar ones as those of supermarkets. However, most EC companies' purchasing prices are adjusted based on the local market prices, which are not as high as those of supermarkets. Thirdly, payment is not made in cash on delivery. Although frequent payment was appreciated by several FGs as mentioned above, FGs with limited financial capacity still prefer cash on delivery since the FG leaders have to pay to member farmers when they receive products. Lastly, EC companies' collection hubs are too far for some FGs; shipping products to the hubs is costly and makes it difficult to maintain the quality of products. At least some of these hurdles should be cleared for more farmers to benefit from the increasing demand from EC companies.

3) EC Companies' Challenges of Working with Farmers

On the other side of the business, EC companies also face challenges when they work with farmers. The biggest challenge all the seven interviewed EC companies mentioned is to keep products' quality as well as quantity. They expressed the need for technical support to improve farmers' production skills.

In collaboration with universities and manufacturers of inputs such as seed and fertilizer, Paskomnas (Cari Sayur) teach farmers how to make a planting pattern, how to effectively use fertilizer, etc. Sayurbox and Kecipir clearly showed their willingness to have a partner that can provide this kind of technical supports to farmers.

3.4. Ideas on Collaboration among Farmers, EC companies and Other Actors

Given the tough competition among EC companies, it may not be recommendable for farmers to run their own online shops, either EC sites or shops in marketplaces. Instead of competing with EC companies, farmers should take the advantage of the increasing demand from EC companies by working with them. The following are ideas to tackle the problems raised by farmers as well as EC companies for more farmers to be involved.

1) Attractive Product Development

Most EC companies currently sell single kinds of products. For more attractive and high-value products, farmers can offer vegetable boxes, or meal kits (vegetables with seasonings and a recipe for a meal), based on their product availability. Being distinctive, they can be less affected by local market price fluctuation.

2) Collaboration with Fintech Companies

Collaboration with fintech companies can be a solution to the problem of deferred payment. A loan to FGs from fintech companies for payment to member farmers improves FG's cash flow. The loan also improves farmers' access to inputs, which can lead to higher volume and quality of harvests as demanded by EC companies. Sayurbox actually discussed with a bank potential loan to farmers by using Sayurbox's data on farmers as credit information,

3) Collaboration with Agritech Companies

There are many agritech companies offering different services in Indonesia such as water management, tractor sharing services, and traceability ensuring service. Introducing these service providers can meet EC companies' needs for improvement in farmers' production.

3.5. Use of Digital Technologies in the Agriculture Sector

1) Current Status of the Use of Digital Technologies in the Agricultural Sector

The increasing Internet and mobile phone penetration rate in Indonesia has been providing opportunities to utilize digital technologies. Given the emergence of agritech services especially over the last five years, Indonesia's agricultural sector is ripe for digital transformation.[9]

[9] GSMA (2019) "AgTech Innovation Unlocks Economic Identities for Smallholder Farmers in Indonesia"

Based on publicly available data, the investment in Indonesian agritech startups amounts to about $33.15 million in total from seed to Series B funding rounds since 2013, though the actual figure may be higher than that because the amount of money raised is undisclosed in many funding rounds. The largest agritech startup investments in Indonesia between 2018 and March 2020 are made in Chilibeli (EC site), TaniGroup (crowdfunding and EC site), Kedai Sayur (EC site), and eFisher (automated fish and shrimp feeding system).

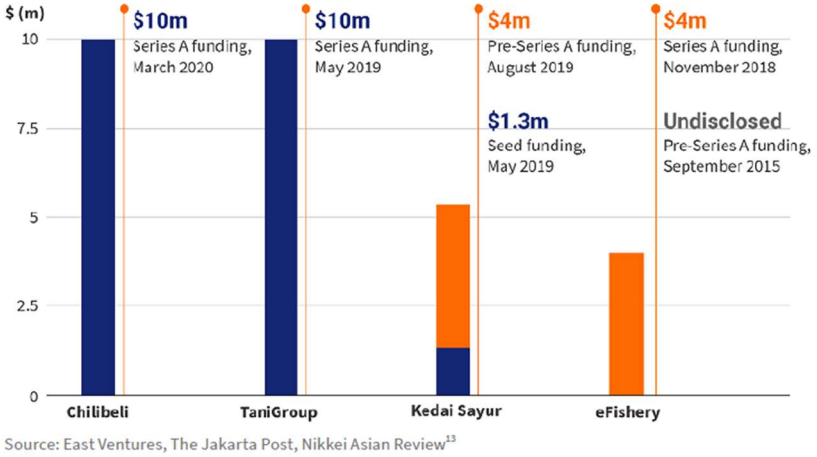


Figure 20 Largest Investments in Agritech Startups in Indonesia[10]

Figure 21 divides the horticultural value chain into four phases: procurement, production, distribution and consumption, in each of which there are several agritech services provided in Indonesia. For the procurement of inputs, crowdfunding provides farmers with necessary inputs without upfront payment. In the production phase, several technologies such as IoT (Internet of Things) devices (weather sensors, water level meters, etc.), AI (Artificial Intelligence), satellite images, and drones are utilized to provide Smart Farming solutions: weather forecasting, yield forecasting, water management, tractor sharing services, etc. In the Distribution and Consumption phases, there are online platforms that match farmers with local traders and suppliers, EC sites, ICT-enabled efficient collection and delivery services, and traceability ensuring service using blockchain. "Indonesia's top 20 agritech companies" by a startup aggregator Tracxn are shown under each phase in Figure 21 (companies providing services for fishery are excluded from the mapping).

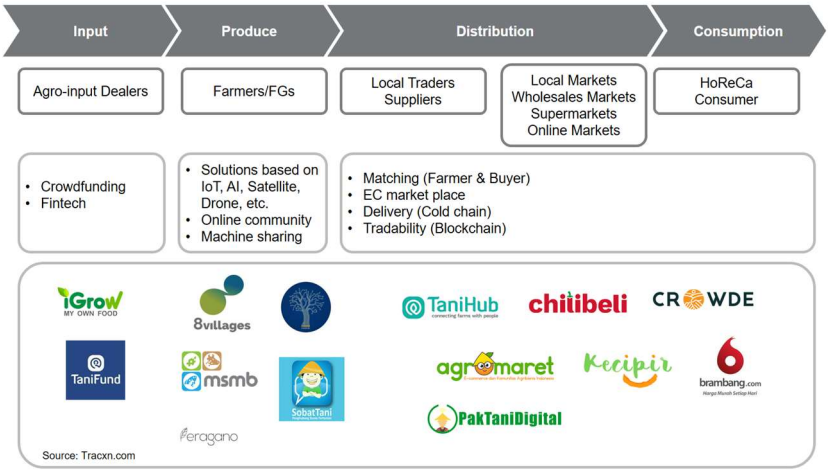


Figure 21 Different Agritechs in the Agricultural Sector

[10] Source: A Compass List Research Publication Indonesia Agritech Report 2020

2) Improve Farmers' Resilience to a Temporary Decrease in Income

While the decrease in demand, the biggest problem caused by Covid-19, was a temporary phenomenon, its impact on farmers can be long-lasting; limited use of inputs/labor due to low income from the cultivation during the first PSBB will reduce potential yields in the subsequent cultivations. Farmers can be trapped in this kind of vicious circle not only by Covid-19 but also by other shocks such as bad weather, and pests and disease outbreaks.

To lift farmers out of the vicious circle, coordinating different agritech companies to create an ecosystem where farmers can be more resilient to a temporal decrease in income is more effective than separately introducing individual solutions. Figure 22 Model of Ecosystem with Fintech and EC Companies

illustrates an idea of the ecosystem involving fintech and EC companies (such as TaniFund and TaniHub). On behalf of farmers, fintech companies pay for inputs, with which farmers grow and sell products to EC companies. Selling the products to its customers, EC companies repay to fintech companies for the inputs, the amount of which can be deducted from the procurement price of vegetables from farmers. With inputs paid for by fintech companies, the farmers can maintain the production level even after a temporary decrease in their incomes.

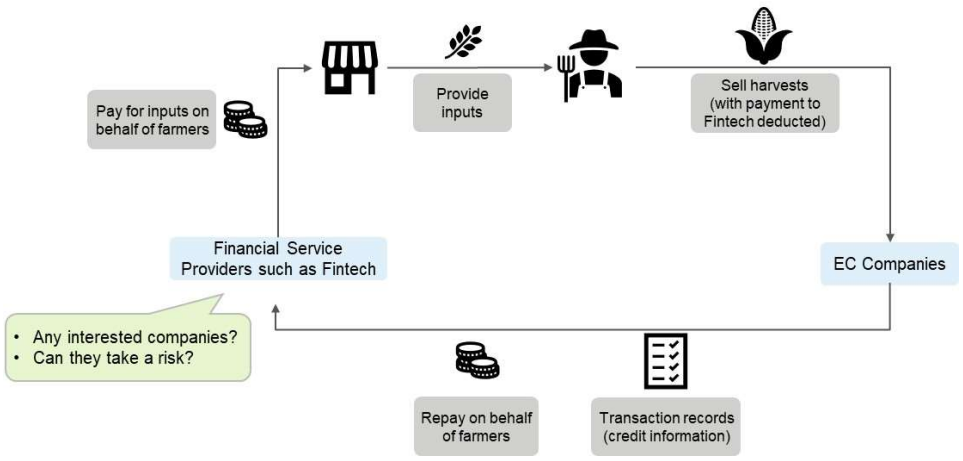


Figure 22 Model of Ecosystem with Fintech and EC Companies

Bearing the risk of farmers' default, fintech companies require detailed information on farmers' capacity for proper assessment of farmers' creditworthiness. EC companies, therefore, should be involved in the model because they can properly collect farmers' records of transactions, which will be provided to the fintech company as credit information. Besides the sales records, EC companies usually possess their contract farmers' detail information including their production capacity, quality of products, materials they own, etc. Merits of the collaboration for fintech and EC companies are summarized below.

Table 5 Merits of the Collaboration for Fintech and EC Companies

Companies	Merits
Fintech	• Credit assessment of farmers can be more reliable with the information from EC companies. • A pre-agreed market (EC company) minimizes the risk in farmers' marketing of products.
EC	• Secure farmers' stable supply of products. • Farmers' production capacity can be enhanced.

That being said, taking the risk may still not be easy for fintech companies. For attracting potential partner fintech as well as EC companies, therefore, emphasis should be placed on advantages of trying the model under the JICA project: i) JICA experts' technical support to be provided to farmers, and ii) the publicity effect of cooperation with JICA.

3) Broader Ecosystem

In a long term, the ecosystem can be further developed by involving more actors besides fintech and EC companies as shown in Figure 23 Advanced Model of Ecosystem with Different Service Providers

. Four new actors are added: agricultural machine lease companies and farming solution providers (with IoT devices, AI, satellite images, drones, etc.) can provide farmers with their services to improve farmers' production; venture capitals (VC) can invest in fintech companies to boost the expansion of the fintech services; and Japanese companies can work as a market by procuring Indonesian horticultural products from EC companies. Collaboration among these different actors in one ecosystem can improve farmers' i) resilience to a temporal shock, ii) production and marketing of horticultural products, and hence iii) income from agricultural activities. The broader ecosystem will not only lift farmers from the vicious circle but also put them in a virtuous circle.

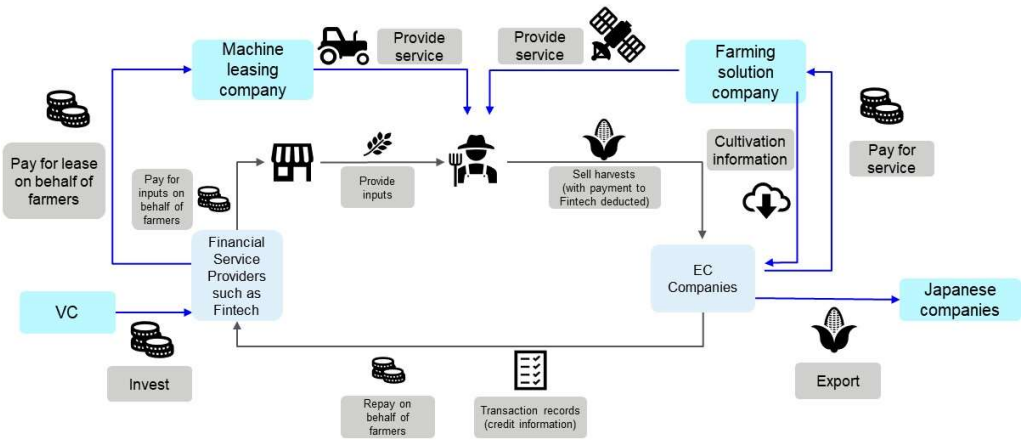


Figure 23 Advanced Model of Ecosystem with Different Service Providers

Annex: Pilot Activity Plan for Supply Chain Development of Horticulture Products at the Project Sites

List of Proposed Pilot Activities

1. Establishment of an ecosystem including different actors of horticulture value chain such as financial institutes including Fintech, E-Commerce business operators, and distributors, in which farmers can obtain resilience to temporal decrease in income.

   1.1 Establishment of a comprehensive value chain though creating a partnership with multiple actors.

   1.2 Development of value-added products for online and offline markets in cooperation with EC, Agri-tech companies, supermarkets, and other market actors.

2. Establishment of collective production and cooperative shipping system at the areas, in which EC companies do not have collection hubs. (Target: Garut, Bandung, and Sukabumi Districts).

   2.1 Large-scale contract farming with a large food industry for production of potatoes for processing.

   2.2 Establishment of a strategic supply chain of selected products, targeting customers in Bandung City through capacity building of core FGs in Garut District.

   2.3 Strengthening of a cooperative mechanism among FGs in Sukabumi District/City for shipment of products to Jakarta, expecting improved accessibility to Jakarta and Bogor City by highway in near future.

   2.4 Promotion of high-value products such as melon and watermelon shipped to high end supermarkets as well as for export.

3. Establishment of collective production and cooperative shipping system at the major production areas by selected core FGs, through organizational capacity building for the selected core FGs.

   3.1 Establishment of a transit point/center for horticulture products brought from outside West Java Province for forming an extended supply chain of horticulture products.

   3.2 Effective use of the modernized collection/post-harvest facility in Lembang, built by assistance of Taiwan, for shipment of high value/quality products in collaboration with private operators.

   3.3 Organizational capacity building of core FGs to strengthen a cooperative shipping mechanism with other partner FGs, targeting customers in Bandung City and surroundings as well as in Jakarta.
   (1) West Bandung District
   (2) Bogor District
   (3) Cianjur District
   (4) Cross-District Collaboration

   3.4 Expansion of the production area for crystal guava at Bogor District in collaboration with private companies/investors.

   3.5 Capacity building of organic farmers for improving yield and quality of produce in order to meet increased demands of organic vegetables from modern markets.

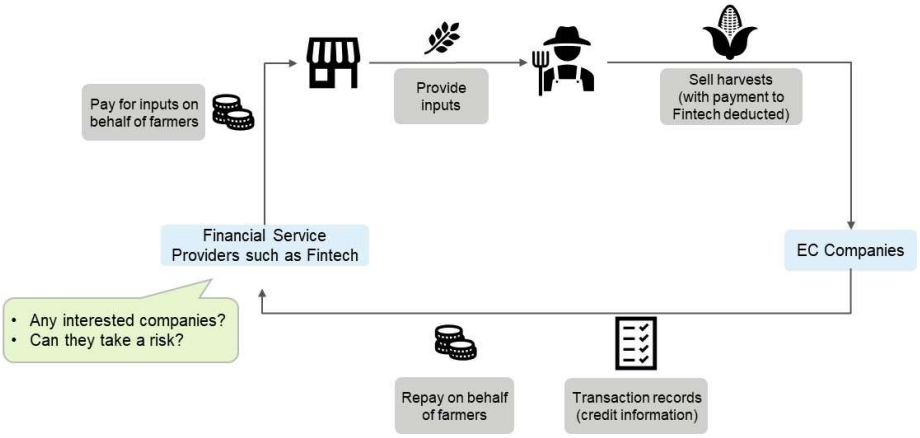
4. Development of attractive local markets, Pasar Tani (managed by representatives of local FGs), to create a better marketing channel for FGs at the district level.

1. Establishment of an ecosystem including different actors of horticulture value chain such as financial institutes including Fintech, E-Commerce business operators, and distributors, in which farmers can obtain resilience to temporal decrease in income.

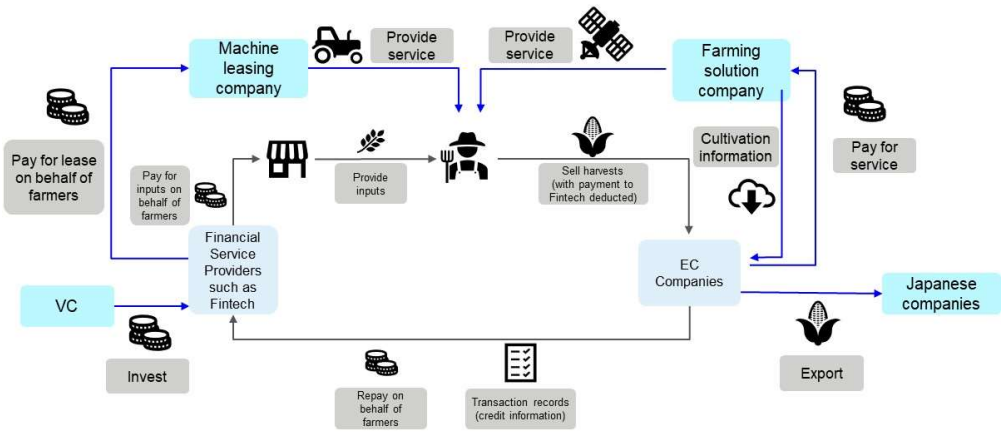
1.1 Establishment of a comprehensive value chain though creating a partnership with multiple actors.

Item	Description
Target Crops	• Depending on demand from customers
Target Area	• Districts where EC/buyers have a collection hub: West Bandung, Cianjur, Bogor
Core Farmer Groups	• West Bandung: Sinar Mukti, Panen Lestari • Cianjur: Mujagi, KMBM (including member FGs of KMBM) • Bogor: Tuna Tani Pangrango, Bina Tani Sepakat
Output	• Create a partnership with multiple actors such as EC, financial institutes including Fintech, and Agri-tech companies, by which farmers can obtain resilience to temporal decrease in income.
Potential Partners	• EC: Sayurbox, Kios Sayur, Cari Sayur, Tani Hub • Financial Institute: Fintech (such as Crowde, Tani Fund, Tani Joy), formal banks including Islamic finance (sharia-compliant finance), micro finance institution • Agri-tech: MSBM, companies that have smart farming solutions
Arrangement	• With involvement of financial service providers, farmers can start cultivation without upfront payment for inputs.

1) Basic Model: Collaboration with FGs, EC, and Fintech companies



2) Advanced Model: Involvement of other service providers and Agri-tech companies



1.2 Development of value-added products for online and offline markets in cooperation with EC, Agri-tech companies, supermarkets, and other market actors

Item	Description
Target Crops	• Depending on demand from customers
Target Area	• Districts where EC/buyers have a collection hub: West Bandung, Cianjur, Bogor
Core Farmer Groups	• West Bandung: Sinar Mukti, Panen Lestari • Cianjur: Mujagi, KMBM (including member FGs of KMBM) • Bogor: Tuna Tani Pangrango, Bina Tani Sepakat
Output	• Develop attractive value-added horticulture products to be sold through EC or other potential markets, such as "a seasonal fresh vegetable box", and "a series of meal boxes with fresh vegetables". • Make a branding strategy for the new products, and conduct sales promotion together with market actors. • Introduce usable IT tools or smart farming solutions, such as "application to ensure traceability of products (by showing profile of producers)", and "application to indicate deliciousness or freshness of produce, in cooperation with Agri-tech companies.
Arrangements	• Roles of the Project: Coordination and capacity building of FGs (such as cultivation technique, post-harvest management, organizational ability) according to ideas/activities proposed by companies. • Roles of EC, Agri-tech companies, and other selected market actors: Service and product development, marketing, sales promotion, trial sale.
Others	• The Project asks private companies (EC/Fintech/other interested parties) for proposals on ideas of pilot activities jointly implemented with FGs. • The Project provides a fund to elected proposals for implementing proposed activities.

2 Establishment of collective production and cooperative shipping system at the areas, in which EC companies do not have collection hubs. (Target: Garut, Bandung, and Sukabumi Districts)

2.1 Large-scale contract farming with a large food industry for production of potatoes for processing.

Item	Description
Target Crops	• Industrial potato (Variety: Median (local variety) and imported varieties)
Target Area	• Bandung: Pangalengan, Kertasari • Garut: Cikajang, Cisrupan, other suitable areas for potato production • Cianjur: Highland area
Core Farmer Groups (Potential facilitators for contract farming)	• Pangalengan in Bandung: Hikmah Cooperative • Kertasari in Bandung: Mekar Tani • Garut: Sinar Mandiri Cooperative/Cikandang Agro Association • Cianjur: KMBM
Partner company	• PT. Calbee Wings Food (CWF)
Output	• Establish a sustainable contract farming mechanism in producing potatoes for processing through nurturing of capable local coordinators at each target area. • Develop a stable supply system of local seed potato (variety: Median), which is propagated and gown at the target area by a local seed producer.
Cultivation	• In consultation with CWF, a cost-effective cultivation technique (an efficient

technique	agrochemical and fertilizer application method, etc.) is introduced in order to reduce cultivation costs for maximizing farmer's profit.
Others	• Agriculture finance: ✧ If contract farmers need a fund for procurement of inputs, the Project facilitates acquiring a short-term finance from banks or fintech companies. • Trial of advanced technologies: ✧ As a trial, the Project explores introducing new agricultural technologies or smart farming solutions in collaboration with Agri-tech companies.

2.2 Establishment of a strategic supply chain of selected products, targeting customers in Bandung City through capacity building of core FGs in <u>Garut District.</u>

Item	Description
Target Crops	• Tomato, other demanded vegetables
Target Area	• Kecamatan (Sub-District): Sukaresmi, Cigedug, Cikajang, Pasirwangi
Core Farmer Groups	• Cikajang: Cikandang Agro Association • Cisrupan: Sinar Mandiri Cooperative • Sukaresmi, Cigedug : Mekar Tani together with Barokah Karunia Tani
Target Farmer Groups	• FGs participated in Phase 1 • Members of Sinar Mandiri Cooperative (547 farmers in 10 partner FGs) • Potential FGs in Pasirwangi (capable new FGs)
Output	• Strengthen capacity and function of Cikandang Agro Association and Sinar Mandiri Cooperative to become a core farmer-supplier of horticulture products. • Establish a stable production and cooperative shipping system among partner FGs to deal with different buyers, such as suppliers and retailers in Bandung City.
Marketing	• Target Market: Suppliers to modern markets based in Bandung City or surrounding areas (such as Yan's Fruits and Vegetables, Sentra Panen Raya, Sayuran Siap Saji, etc.)
Implementation Arrangement	• Cikandang Agro and Sinar Mandiri Cooperative form management teams for effectively conducting horticulture business. The Project provides a series of capacity building training for staff members based on their needs. ✧ Marketing and management team: In charge of marketing, business transaction, and accounting ✧ Technical team: In charge of i) preparation of a planting schedule based on demand from markets, ii) instruction of proper cultivation technique to partner farmers, and iii) monitoring of members' fields. ✧ Field facilitators: In charge of operation of a central demo plot established at each partner FG. • Mekar Tani establishes a partnership with Barokah Karunia Tani for cooperative shipping of products to Sayuran Siap Saji and other potential markets as well as to Cikandang Agro or Sinar Mandiri Cooperative. • The Project provides capacity building training for core FGs on coordination and negotiation skills for business management. • The Project collaborates with financial institutions, such as fintech companies, banks, and microfinance, for introducing agriculture finance to farmers.

2.3 Strengthening of a cooperative mechanism among FGs in Sukabumi District/City for shipment of products to Jakarta, expecting improved accessibility to Jakarta and Bogor City by highway in near future.

Item	Description
Target Crops	• Chili, tomato, leaf vegetables, depending on demand from customers
Target Area	• Kadudampid, Caringin, Sukaraja, other potential sub-districts
Core Farmer Groups	• Kadudampit: Bumi Mekar and Hikmah Tani, • Caringin: Al Mujahidin, • Sukaraja: Ciloa
Output	• Establish a cooperative shipping mechanism among relatively small-scale vegetable producers in Sukabumi District/City, targeting to deliver produce to modern markets in Jakarta and Bogor.
Marketing	• Since accessibility to Jakarta and Bogor shall be greatly improved within a few years once Jakarta-Sukabumi highway is open, one of the potential markets is EC companies that have a distribution center in Bogor.
Others	• The Project collaborates with financial institutions, such as fintech companies, banks, and microfinance, for introducing agriculture finance to farmers.

2.4 Promotion of high-value products such as melon and watermelon shipped to high end supermarkets as well as for export.

Item	Description
Target Crops	• Melon, Watermelon
Target Area	• Sukabumi, Bogor, Cianjur
Target Farmer Groups	• FGs interested in production and marketing of high-quality melon and watermelon.
Output	• Establish a stable supply chain of high-quality melon and watermelon to modern markets in Jakarta and for export in collaboration with a capable supplier.
Post-Harvest	• Introduction of quality check standard such as measurement of the brix level
Others	• Marketable varieties shall be selected based on demand from markets/buyers. • Since availability of quality seed is the critical issue especially for cultivating high-quality melon and watermelon, the Project tries to establish a partnership with seed companies/suppliers (such as Takii and Tokita Seed in Japan).

3 Establishment of collective production and cooperative shipping system at the major production areas by selected core FGs, through organizational capacity building for the selected core FGs.

3.1 Establishment of a transit point/center for horticulture products brought from outside West Java Province for forming an extended supply chain of horticulture products.

Item	Description
Target Crops	• Potato and other imperishable commodities
Place	• **Cianjur STA**, Cipanas, Cianjur District
Core Farmer Group	• Cianjur STA Cooperative
Output	• Establish a transit center for selected horticulture products at Cianjur STA through

	creating a business partnership with producers in other provinces.
Post-Harvest	• If need arises, STA cooperative conducts primary processing (such as cutting and frozen of vegetables) at Cianjur STA.
Others	• STA Cooperative had an experience in receiving potato from producers in Lombok Island and sold them to modern markets in Jakarta.

3.2 Effective use of the modernized collection/post-harvest facility in Lembang, built by assistance of Taiwan, for shipment of high value/quality products in collaboration with private operators.

Item	Description
Target Crops	• High value/quality products for high-end markets or export
Place	• The facility locates in the compound of the Research Center of Ministry of Agriculture in Lembang, West Bandung District.
User of the Facility	• Capable FGs/cooperative or a supplier who has a capacity to effectively utilize the modernized host-harvest facility.
Output	• Establish a stable supply chain of high-value horticulture products, produced by partner farmers in West Bandung and Bandung Districts, by effectively utilizing the modernized post-harvest facility in Lembang for shipment to modern markets.
Marketing	• In order to ensure a high usage rate of the facility, a user should find stable buyers of products with a long-term contract arrangement.
Others	• The Project coordinates with Directorate General of Horticulture to ensure that a long-term usufruct shall be provide to a user of the facility. • The Project widely accepts a business proposal from public for selecting a capable user of the facility.

3.3 Organizational capacity building of core FGs to strengthen a cooperative shipping mechanism with other partner FGs, targeting customers in Bandung City and surroundings as well as in Jakarta.

(1) West Bandung District

Item	Description
Target Crops	• A variety of vegetables depending on demand from markets
Target Area	• Cisarua, Lembang, and surrounding areas
Core Farmer Groups	• Cisarua: Sinar Mukti • Lembang: Panen Lestari or newly joined capable FGs
Output	• Establish a stable cooperative shipping mechanism, coordinated by the core FGs, of a variety of vegetables throughout a year according to demand from customers.
Post-Harvest	• Cisarua: Capacity of the collection and packing facility owned by Sinar Mukti shall be further strengthened according to requirements by markets. • Lembang: The Project examines capacity of post-harvest facilities of selected core FGs and provides them necessary support in order to fulfill requirements by markets.
Marketing	• Target markets: Supermarkets, EC, re-sellers, retailers, and individual customers in Bandung City and surrounding areas. Modern markets in Jakarta
Others	• In case core FGs want to register as a cooperative or agribusiness firm, the Project provides necessary support in cooperation with concerned government offices, such as DINAS Cooperative.

(2) Bogor District

Item	Description
Target Crops	• A variety of vegetables (such as chili, tomato, broccoli, bean, and leaf vegetables), depending on demand from markets
Target Area	• Megamendung and its vicinity
Core Farmer Group	• Tunas Tani Pangrango • Pemuda Tani Naratas (acts as a supplier of products to supermarkets)
Output	• Establish a stable marketing channel of demanded vegetables to modern markets in Jakarta in collaboration with capable producers in the area. • Effectively use the group's (Tunas Tani Pangrango) collection and packing facility newly built by West Java Provincial DINAS in 2020.
Post-Harvest	• The Project provides farmers instruction of a proper sorting and packaging method according to specification given by customers/markets. • The Project or DINAS explores provision of necessary equipment for improving post-harvest activities, if the need arises.
Marketing	• Potential markets are 1) modern markets in Jakarta (supermarket chains and HoReCa[11]), 2) wholesale market in Bogor, 3) PT. Sayuran Siap Saji (a supplier for restaurant chains) for contract farming, and 4) EC companies. • Tunas Tani Pangrango and Pemuda Tani Naratas shall cooperate for shipment of products to modern markets by using the marketing channels that Penuda Tani Naratas has already established.
Others	• Tunas Tani Pangrango first forms a marketing and operational team for starting business as a group. • The group selects 2~3 strategic commodities for sales promotion to target markets and conducts cooperative shipping by effectively using the group's post-harvest facility. • In case the FG wants to register as a cooperative, the Project provides necessary support in cooperation with concerned government offices. • The Project collaborates with financial institutions, such as fintech companies, banks, and microfinance, for introducing agriculture finance to farmers.

(3) Cianjur District

Item	Description
Target Crops	• Japanese vegetables: Momotaro tomato, Nasu, Piman, Mizuna, Kyuri, Kabocha, and Kuroda carrot • Other marketable vegetables (broccoli, chili, local tomato, etc.)
Target Area	• Cipanas and surrounding areas
Core Farmer Groups	• Koperasi Maju Berkah Mandiri (KMBM), Mujagi
Output	• Establish a stable cooperative shipping system of Japanese vegetables and other marketable vegetables through KMBM (Cooperative) in collaboration with partner FGs in Cipanas and surrounding areas.

[11] Hotels, restaurants, and catering services

	• Develop new marketing channels of Japanese vegetables in addition to the current customer (Papaya)
Marketing	• Potential markets are Papaya, AEON, other high-end supermarkets, EC, major restaurant chains, and suppliers to modern markets.
Others	• KMBM acts as a supplier for the shipment of produce, cultivated by partner FGs, to customers. • The Project provides capacity building training for KMBM and partner FGs: ✧ Skills on preparing a planting calendar of multi-products. ✧ Business and management skills to work with different customers/markets. • The Project seeks for partnership with Agri-tech companies to introduce useful IT tools or smart farming solutions such as a comprehensive farm management application (including accounting and business management).

(4) Cross-District Collaboration

Item	Description
Target Crops	• Kuroda carrot
Target Area	• Cianjur, Bandung, and Garut Districts
Main Coordinator	• Hikmah Cooperative in Bandung
Core Farmer Groups in Each Area	• Cianjur: Mujagi, Utama (Sub-District: Pacet) • Bandung: Hikmah Farm (Pangalengan), Mekar Tani (Kertasari) • Garut: Cikandang Agro (Cikajang), Sinar Mandiri Cooperative (Cisrupan)
Output	• Establish a stable supply chain of Kuroda carrot throughout a year by cross- district collaboration among capable FGs. • Develop new market channels of Kuroda carrot.
Post-Harvest	• Washing machines installed at 3 FGs (Al Ittifaq, Mujagi, Cikandang Agro) in each district by the support of Phase 1 are effectively utilized in order to strengthen capacity of post-harvest management. • If need arises as a result of newly established value chain of Kuroda carrot, the Project considers installing an additional washing machine at an appropriate distribution point. • The Project explores introduction of proper packing materials such as a quality plastic bag (anti-fog bag) and labels based on market's need.
Marketing	• Potential markets include Super Indo, AEON, other high-end supermarkets, food industries such as catering companies.
Others	• An efficient shipping arrangement from production sites in different districts to end markets should be in place so as to meet demand from several customers. • Taking account of improving quality of products especially in rainy season, a variety that is resistant to diseases shall be introduced in cooperation with a seed supplier (private company).

3.4 Expansion of the production area for crystal guava at Bogor District in collaboration with private companies/investors.

Item	Description
Target Crops	• Crystal guava
Target Area	• Bogor District
Core Farmer Group	• Bina Tani Sepakat
Output	• Establish a stable marketing channel of crystal guava to modern markets in Jakarta in collaboration with capable producers (FGs and partner farmers). • Strengthen capacity of the core farmer group (Bina Tani Sepakat) on business operation (preparation of a proper accounting record, skill of coordination with other FGs, marketing promotion, etc.)
Marketing	• Target market is supermarket chains in Jakarta shipped directly by the group or indirectly through a capable supplier.
Others	• The Project facilitates creating a partnership between FGs and a private company/investor, who covers cultivation costs, to further expand a cultivation area of crystal guava. • Bina Tani Sepakat made a contract with a private investor in November 2020 for newly planting crystal guava at 1.5 Ha of the rented field.

3.5 Capacity building of organic farmers for improving yield and quality of produce in order to meet increased demands of organic vegetables from modern markets.

Item	Description
Target Crops	• Organic vegetables
Target Area	• Bogor and Cianjur District (organic farmers are located)
Target Farmer Group	• Farmers groups or individual farmers who are engaged in organic farming.
Output	• Strengthen capacity of organic farmers on cultivation techniques and skill of post-harvest management so as to i) stably cultivate organic vegetables with a required quality level to meet increased demands, ii) ensure traceability of products, and iii) increase farmer's income as a result of improved yield and quality of products. • Establish a stable marketing channel of organic vegetables in collaboration with capable suppliers.
Marketing	• Target market includes high-end supermarket chains (such as AEON) in Jakarta, EC (such as Kecipir that specially focuses on selling organic products through its online market), and restaurants that regularly order organic vegetables. • Suppliers who deal with organic vegetables (potential collaborators): Simply Fresh Organic, Living Organic, Agribusiness and Technology Park (ATP) of Bogor Agriculture University (ITB)
Others	• The Project cooperates with a registered certifier for organic vegetables in providing necessary information and technical training to interested farmers. • The Project facilitates introducing agricultural inputs and materials necessary for organic farming, such as organic fertilizer and pesticide, in collaboration with producers (private companies as well as research institutes).

4 Development of attractive local markets, Pasar Tani (managed by representatives of local FGs), to create a better marketing channel for FGs at the district level.

Item	Description
Target Crops	• Vegetables, fruits, and processed food made of horticulture products
Target Area	• All target districts
Core Farmer Groups	• DINAS develops criteria for selection of proper and capable farmer groups or individual farmers who coordinate operation of Pasar Tani at the district level.
Target Farmer Groups	• All FGs registered to DINAS are eligible to sell products at Pasar Tani.
Output	• Create a better marketing channel for local farmers at the district level with strengthened organizational capacity of coordinators for Pasar Tani.
Others	• In collaboration with DINAS, the Project supports Pasar Tani to be an attractive marketplace by conducting a series of sales promotion activities and developing branding strategies of local products.

Annex 8.18. Good Practices of Sales Promotion and Collaboration with Different Actors Initiated by the Farmers Groups during the 2020 Rainy Season

Good Practices Initiated by the Target Farmers Groups

FG	Activity	Photo
Mujagi (Cianjur)	• Bank of Indonesia (BI) constructed a greenhouse (1,000 m^2) equipped with digital farming equipment, such as automatic drip irrigation system, since Mujagi was selected by BI as a model FG for establishing a cluster of high-quality vegetable production in Cianjur. • Mujagi uses the greenhouse for cultivation of Momotaro tomato and other Japanese vegetables shipped to Papaya Fresh Gallery in Jakarta.	 Modern Greenhouse
Mujagi (Cianjur)	• Mujagi has developed a new market, PT. Delifood (a subsidiary of Mayora Group, one of the largest food industries in Indonesia) for shipment of lemongrass and spring onion. The shipment was started on 15 March. • The leader of Mujagi has been assigned by the Government as a "millennial farmer", and he obtained the information on PT. Delifood through a network of the millennial farmers.	 Preparation of Shipment
Hikmah Tani (Sukabumi)	• A farmer of Hikmah Tani FG actively worked on finding better markets for tomatoes by use of his networks with local traders and relatives. • With the good quality of fruits, the farmer further marketed his produce directly to a buyer of the Cipanas market in Cianjur, who offered a higher price than that of local markets in Sukabumi. The farmer also made a shipping arrangement by himself, which resulted in a lower transaction cost.	
Wanasari (Sukabumi)	• Ms. Maya of Wanasari FG, who participated in the trial project in 2017, has started agrotourism activities at her farm, targeting tourists and students from Sukabumi City as well as the Jabodetabek area. Visitors can harvest vegetables grown at her field by themselves, buy fresh vegetables at the farm shop, have a rest under a gazebo set, and do recreational activities such as archery shooting. • She wants to explore an additional income source from farming in addition to selling produce to local market. • With maximized utilization of a KUR loan that she received in 2018 with support from the Project, she made several attempts to improve her farming business, one of which was this promotion of agrotourism.	  Agrotourism field and its vegetable stall

Mucekil (Sukabumi City)	• With experiences gained though participating in the trial projects several times, Mucekil FG has explored another means to improve farm income in consideration of a limited size of their farmland. • Therefore, to learn how to start and manage agrotourism business, farmers of Muekil FG had a visit to Ms. Maya's farm on 4 March. • After the field visit, Mucekil consulted with Sukabumi City DINAS to ask for financial and technical support in initiating agrotourism activities at their field.	 Field Visit by Mucekil members
Tunas Tani Pangrango (Bogor)	• Tunas Tani Pangrango FG, involving 8 members, has started collaboration with Pizza Hut for production of paprika to be shipped to Pizza Hut outlets in Bogor. • Pizza Hut has been constructing 8 greenhouses (200 m^2 per greenhouse), which will be completed in early April 2021, while farmers shall cover all necessary costs for production as well as have responsibility to deliver paprika to Pizza Hut's 16 outlets in Bogor once starting harvest. • Purchase prices offered by Pizza Hut are 30,000 Rp/kg for green paprika and 37,000 Rp/kg for red paprika. • In addition, with material support (UV plastic for roofing) from Pizza Hut, the leader of the group constructed a rain shelter, in which tomato and other vegetables for Pizza Hut will be cultivated.	 Greenhouse (under construction)  Rain shelter for tomato
Tunas Tani Pangrango (Bogor)	• Three members of Tunas Tani Pangrango FG received, from a fintech company CROWDE, inputs and marketing support for curly chili being cultivated at 2,500m^2 of each member's field. Planting of seedlings completed in mid-March 2021. • CROWDE will procure produce at IDR 17,000/kg.	
Hataki (Bandung)	• Hataki FG, which participated in the trial project 2019~2020, currently prepares seedlings of a variety of vegetables, raised in polybags, for sale to urban dwellers. • A boom in "urban farming" has increased the demand for vegetable seedlings. By seizing this opportunity, Hataki aims to make up the decreased income from selling vegetables after the outbreak of Covid-19.	
Mekar Tani (Garut)	• Prior to his first bean production, a farmer of Mekar Tani FG initiatively visited a local market nearby to research the market information on bean such as prices, demand, and popular varieties, based on which the farmer decided which variety to plant. • Thanks to the market research, he enjoyed good and stable selling price (Rp. 4,000 – 5,500) to the local market.