

Schedule

3/22(Wed)	22:55 arrive@KHH New Long hotel	Xiaogang, Kaohsiung Fengshan, Kaohsiung
3/23(Thu)	9:00-12:00 Briefing of TARI, Fengshan Tropical Horticultural Experiment Branch	Fengshan, Kaohsiung
	14:00-15:00 Sponge gourd farm	Wanluan, Pingtung
	15:30-17:00 Bitter gourd/cucumber farm	Dashu, Kaohsiung
3/24(Fri)	9:00-12:00 Vegetable and Tropical fruit cultivation in TARI, Fengshan Tropical Horticultural Experiment Branch	Fengshan, Kaohsiung
	14:00-17:00 Meinong Farmers' Association (Green agricultural materials, plant doctor) Green bean farm 17:00 Welcome Dinner	Meinong, Kaohsiung
3/25(Sat)	10:00-12:00 Dr. Margit Olle Talk -Innovative methods to improve growth, yield and quality of vegetables	Fengshan, Kaohsiung
	14:00-15:00 Seedling / transplant market	
3/26(Sun)	Kaohsiung	
3/27(Mon)	10:00-12:00 AVRDC	Shanhua, Tainan
	14:00-16:00 Taiwan lettuce village	Mailiao, Yunlin
3/28(Tue)	9:00-10:00 Asparagus farm	Madou, Tainan
	10:30-12:00 Loga solar (Plant factory)	Xinshi, Tainan
	14:00-16:00 Shi-Sheng organic farm	Kuantien, Tainan
3/29(Wed)	10:00-10:50 TARI-briefing 11:00-12:00 Agricultural engineering division-Plant factory 13:00-15:00 Crop Division-Discussion (vegetable cultivation) 15:00-17:00 Biotechnology Division-Discussion (plant phenotyping) Stay@Taichung	Wufeng, Taichung

3/30(Thu)	9:00-10:00 Liao's Organic farm (leafy vegetable) 10:30-12:00 Xiluo agricultural products market	Xilou, Yunlin
	13:00-15:00 Lin's organic farm (water convolvulus & leafy vegetable)	Cihtong, Yunlin
3/31(Fri)	8:00-12:00 Onion farm Kenting stay@Hengchun	Henchun, Pingtung
4/1(Sat)		Pingtung-Kaohsiung
4/2(Sun)	Flight 14:55@KHH	Fengshang-Xiaogang

23.03.23

9:00-12:00 Briefing of TARI, Fengshan Tropical Horticultural Experiment Branch



Welcome by director Wen-Li Lee



Taiwan climate:

Lee, W.L., Huang, C.C., Kuan, C.S., Jiang, S.W. and Hsieh, H.Y., 2015, April. Development of GA3 tropical fruit varieties and cultivation techniques in Taiwan. In *International Symposium on GA3 Tropical Fruit (Guava, Wax Apple, Pineapple and Sugar Apple)* 1166 (pp. 47-54).

The authors said:

“CLIMATE OF TAIWAN

Taiwan enjoys warm weather all year round. Weather conditions fluctuate during spring and winter, while in summer and autumn the weather is relatively stable. Taiwan is extremely suitable for traveling, as the annual average temperature is a comfortable 22°C with the lowest temperatures on the lowlands generally ranging from 12 to 17°C (54-63°F). Average temperature: 23.6-30°C in the summer and 15-20°C in the winter time. Therefore, with the exception of a few mountain areas where some traces of snow can be found during winter, no snow can be seen in Taiwan. During the raining season (April to September), continuously drizzling rain will sometimes fall on Taiwan. During the summer time (June to August), typhoons sometimes approach or hit the country and bring heavy rain in that time, the average precipitation 2,150 mm per year”.

The authors said:

“OVERVIEW OF AGRICULTURE IN TAIWAN

The farmer of Taiwan has an average of about 1.5 ha of land, belonging to smallholder farming delicate way, with some large countries, farming land in different ways. Recently, low agricultural output makes the community ignore the importance of agriculture cause in Taiwanese agriculture it is not easy to recruit young people to join. In 2013, fruit and vegetable production are most important, and paddy rice was reduced caused by reduced consumer consumption, tight water supply and policy encouraging those farmers to fallow. And one important part of ornamental plants are orchids, especially Phalaenopsis orchid. From the five passed years to now, Taiwan imported a lot of agricultural products from other countries especially from the USA, although we export some agri-product to other countries, like mango to Japan, mainland China. But we still import a lot from oversea”.

Video presentation of TARI.

The overview of Department of vegetables (PPT presentation)

Most important vegetables produced in Taiwan: cabbage, bamboo shoot, watermelon, non-heading Chinese cabbage, Welsh onion, tomato and radish.

Breeding for yield, insect and disease resistance, lower production costs, nutrition, quality (eat, appearance, storage quality), eco adaption, heat tolerance.

Their cultivars:

Cauliflower ‘Fengshan No. 2’

Cauliflower New hybrid ‘22-107’

Chinese Kale ‘Fengshan No. 1’

Cauliflower ‘Tainung No. 1’

‘Tainong-AVRDC No. 3’ broccoli

Bitter melon Fengshi-2405

‘Tainong No. 7’ bitter melon

‘Tainong No. 2’ Chinese mustard- resistance to anthracnose

‘Tainong No. 3’ Chinese mustard- tolerant to TuMV

Projects:

1. Evaluation of rooftop photoelectric greenhouse with 40% shading rate: Yield of Pak choi, non-heading Chinese cabbage and Mustard can reach more than 70% of open field cultivation.
2. Cultivation test of column photoelectric facilities with 30% shading rate:
5 kinds of head lettuce, 7 kinds of half-head lettuce, 16 kinds of semi-heading lettuce, 5 kinds of Japanese green, 5 kinds of commercial varieties of hot pepper, 6 kinds of amaranth, 2 kinds of basil, 3 kinds of Egyptian king vegetable and equatorial primrose, etc., the output can reach more than 70% of open field cultivation
3. Project: Welsh onion breeding

New: Tainung Sel No.1

-Early mature

-Heat-tolerant

-Suitable for cultivation in the west of Taiwan

New: line-Su12

- Early mature

- Good quality

- Tender and sweet

Onion breeding

-Short-day type

-High yield

-Good storability

Selection of tomato varieties for export

-Good quality

-Good storability

Solanaceous vegetables grafting lines in FTHES

Eggplant rootstock- FTHES No. 3 (F1) – grafting tomato seedlings

Tomato rootstock line - 2035(F1) – grafting beef tomatoes

Pepper rootstock line – 1202(F1) – grafting pepper

Challenges to solve: white fly in greenhouse, aphid in greenhouse, virus in tomato, tipburn in heading Chinese cabbage

14:00-15:00 Sponge melon farm

40 years old

Luffa, cucumber, bitter gourd production. Bees for pollination.

Luffa – 20 t/ha, 1 luffa 60-70 NT\$ on the market

1 bitter gourd 80 NT\$ on the market

Fertilizer 15% N, 15% P, 15% K, 4% Mg

Nethouse, little aphids in the nethouse

EM addition to the soil, Conventional cultivation



Mr. Lin (breeder), me and farmer Bee pollination

15:30-17:00 Bitter gourd/cucumber farm

10 years farm

Bitter gourd 20 t/ha

Breeder Jaw-Neng Li - Variety PST 2405

Bees for pollination

Blue & Yellow Sticky Card Traps | Pest Insect Monitoring

Irrigation underground water, pipe spray 4 times per week

Fertilization 30% N, 3% P, 30% K

Planted in November, yielding in January – May

High yielding

Powdery mildew disease – low temperature, high humidity, Photosynthesis is lower

White net to cover the fruit to avoid injuries during harvesting and transport.

Selling with the white net, transport to Taipei, higher price than local market.

CUCUMBER

10 years

Fertilization 30% N, 3% P, 30% K

Irrigation underground water

November to January when plant small then Blue & Yellow Sticky Card Traps | Pest Insect Monitoring

Grown up – no need for pest control

Downey mildew – disease

Temperature over 30 °C then cucumber is small, dwarfed.



Farmer, me and breeder Mr Lin



Cucumbers

24.03.23

9:00-12:00

Vegetable and Tropical fruit cultivation in TARI, Fengshan Tropical Horticultural Experiment Branch

Fruit garden

Established in 1937. Tropical Industry research. Soil and climatic conditions tropical.

Red mountain, soil red. Tropical rainforest.

Right hand side garden – Tropical American, Asian, African crops

Left hand side garden - collection star fruit, 1 tree 1 variety

Right hand side garden - Lougen plant, tea plant, honey plant, good smell and taste

Tamarin, Mangosten,

Plant protection, traps for insect control - Oriental fruit fly, Black sabbotay

Chebotak, jackfruit relative, season May

Macademia nat, May – June

Pomelo

One of citrus, little lemon, new variety

Wild mangosten

Cashiu nat

Fig collection under net house

Roof plastic, sides net
1 tree 1 variety, 50 varieties
Drip irrigation



Mr. Chen, Ms. Lillia and Ms Luo



Insect collection on fruit trees



Citrus fruit tree



Fig tree in greenhouse



Me and Mr. Chen

VEGETABLE GARDEN, GREENHOUSE

Grafted pepper, non-grafted pepper

Onion breeding

They are looking for onion pest tolerance for seed propagation.

Propagate plants if they get a new variety

Bacteria to protect soil borne disease

Planting to greenhouse

Fertilizer – (USA) minerals also control nematode

Diatomaceous Earth - Spray plants body – insects cut dead

The main advantage of diatomaceous earth (DE) over many other forms of pest control is that it is an entirely natural, easy-to-use product. It has no impact on the environment and is harmless to most

higher life forms.

In the second place greenhouse:

pepper

Grafting (first), non-grafted (second)

Grafted – more branches, more fruits

Thrips, virus problem

Tomato – variety – East Western company – In Asia no. 1 seed company

High yield, very tolerant, drip irrigation, - Thailand variety

Radish 60 varieties - Heat tolerant radish varieties



Mr. Wang



Onion propagation



Grafted plant

OPEN LAND – SOLAR PANEL

Under solar panel 70% of production

Iceberg lettuce

Rice husk to increase soil aeration – increase of carbon, carbon in soil longer

10-20 t per month, 1 kg per m² iceberg lettuce

Organic fertilizer, includes microorganisms. Heat tolerant cultivar, shading (4 m high)

Japanese type of Chinese cabbage Pomace type

Shading, non-shading

White plastic with holes decreases temperature 4 °C

Shading – more yield than non-shading

Lower than 1000 ppm N

Vitamin C content increases in non-shading

N content decreases in non-shading

Green net, pink net – less light

Organic fertilizer + microorganisms – *Bacillus thuringiensis*

Bacillus thuringiensis (or Bt) is a gram-positive, soil-dwelling bacterium, the most commonly used biological pesticide worldwide.



Shading



Tipburn on cabbage



White plastic to reduce soil temperature



Iceberg lettuce experiment

14:00-17:00 Meinong Farmers' Association (Green agricultural materials, plant doctor)

Farmer Market place

Market (Brands) many products- good quality

Farmers market + restaurant – promotion place

Dried radish – great product – price increase every year

Aim: in 10 years reduce 50% chemicals and fertilizers



Meinong Farmers Association Market place



Meinong Farmers Association Market place and the director of it.

Plant doctor

Disorders are not easy to distinct

Analyses also soil conditions

Alternaria on pepper, inserted to computer – farmer will get solution

Less pesticides to control the disease

First organic option, then chemicals

Biocontrol, microorganisms (Bacillus, Trichoderma; Biocontrol bacteria)

Biocontrol fertilizer, Organic fertilizer, Green material

Selling package has many information, including the farmer and the date and time.



On the left Plant Doctor workers, on the right director (FTHEB) dr. Wen-Li Lee and Mr. Wang



Plant Doctor products

GREEN BEAN FARM

Green bean group leader, deals also with Education, goals

Fertilization products and other materials cheaper if joined to farmers association

Harvest 300 kg every day

Mature beans to ice water to reduce the heat, In winter time not necessary

Cucumber, asparagus summer time, green bean winter time

Organic fertilizer- manure + chemical 200 kg / ha

Before harvest another fertilizer



Green bean farm

17:00 Welcome Dinner



20:00 Night Market

25.06.23

10:00-12:00 Dr. Margit Olle Talk

-Innovative methods to improve growth, yield and quality of vegetables

14:00-15:00 Seedling / transplant market

Grafted plant – luffa rootstock, bitter gourd up



16.00 Buddha temple

19.00 Hot pot dinner

26.06.23

10:00-14:00 Kaohsiung center

14.50 – 16.00 Cruise

16.00 – 16.20 vegetable shop

16.20 – 17.30 Temple

17.30 – 19.00 Tea shop – fruit tea

27.03.23

10:00-12:00 AVRDC

Green Revolution in Asia - Veggies growing increases.

Variety accepted by stakeholders (farmers first)

Tomato bacterial wilt, eggplant resistant to this disease: Grafting tomato on eggplant

Waterlogging and soilborne diseases – eggplant is resistant to them

0 energy cooling chamber

Healthy seedling treatment – against root rot and damping off – Trichoderma

Demo Garden

Established 2001, 100 species

Garden models – No chemicals, pesticides



Staff member from AVRDC, me and Mr. Wang

14:00-16:00 Taiwan lettuce village

Colder winter suitable for lettuce. North East wind - in middle of Taiwan

Suitable for growing all vegetables

Family company

40 years ago, nobody eats iceberg lettuce

Iceberg lettuce export to Singapore

In Japan winter cold, they import from Taiwan

Agreements with companies - Fresh food McDonald's

Some years are not able to supply, Produce iceberg according to order

Produce too much price drops

Winter will send Japan Korea, summer Taiwan

Growing lettuce 30 years, Company established 2010

Yield 30 t/ha, cabbage 70 t/ha, here 50 t/ha

Packing machine from Netherlands 11 years old

850 iceberg lettuces packaged per hour, 4 machines, - 4 x 850 per hour

2 °C in storage

Precooling of veggies: Temp down as quickly as possible: 40 min to 4 °C



Me and farmers from Taiwan Lettuce village



Packaging machine and packed iceberg lettuce



Storage of packed products

16.00 – 17.00 Nursery – Grafting farm

Grafting seedling company

Seedling:

1. Professional grafting
2. Just seedling

Crops gets much diseases

Rootstock eggplant – grafting tomato on it

Resistant to fusarium and nematode

Cowpea as rootstock against Fusarium problem

Sweet pepper seedling

Cucumber watermelon seedling

Muskmelon grafting

23 years

Grafting increases BRIX, against cracking in cherry tomatoes

Wanted thin skin, then flavor will reduce

Maxifort F1 rootstock tomato

Pumpkin rootstock for bitter gourd plant



Three types of grafting plants

28.03.23

9:00-10:00 Asparagus farm

12 years growing Asparagus

Crop rotation

Soil solarization is a hydrothermal procedure of disinfesting soil of soilborne diseases and pests.

Solarization can be combined with many other chemical or non-chemical alternatives to afford integrated pest and diseases management or improve plant yield. Calcium cyanamide (CaCN_2) is a fertilizer used in agriculture sector and is also effective in suppressing soilborne pathogens.

Soil sterilization – Ca cyanamide into the soil, then water will be added and covered with plastic for 2 months, during this period fumigation will go on.

November to January growing, harvesting when comes out, harvesting 1 month - February month.

After harvest 1 month in March, plants big. In April harvest small ones again, until June. Off July.

Harvesting again in august September. Perennial.

Water on the ground. Yield 3rd year 10 – 22 t/ha

Pests: thrips, flies, moth

Greenhouse: Netting sides, plastic on the top

Male female yields different

Winter 1 week 1 shoot, summer 3 days 1 shoot

Open field production

Yielding in greenhouse 1,5 times more than in field.

Insects on open field similar to greenhouse.

Bee pollination, fruit on the stem on open land cultivation, because of cross pollination.

Spray NEEM oil against the insects

Disease problem, chemical to spray

Mancozeb reduce disease, high humidity – Benomyl chemical

Stem blight problem – Thiabendazole



Me and farmer



Asparagus in greenhouse



Yellow trap for insects



Sold Asparagus



Asparagus on open land

10:30-12:00 Loga solar (Plant factory)

Established in 2012

3 parts: sales and equipment; production, research

68 crops, many varieties

1st company – ginseng growing here

1 year old seedling cultivates 1 month in plant factory

Ginseng seedling without leaves import from Korea

Leaf has more nutrients than in root.

Producing Drink Kombucha, processing

Soilless medium mixture

4 plant factories

1200 ppm CO₂ leafy veggies

100 t per year lettuce domestic use / 10 years lettuce growing

Tea aeroponic system, harvesting 10 times per year – 24 h lighting

Tea used like veggies, and eating

Metabolic products, less fiber, less reduced strong flavor

Problem in organic – insects

If high humidity insects do not damage plants

Not use chemicals to control insects

Washabi:

Peoples have low K problem: Kidney problem, cannot uptake many K

Therefore, K lowered 15%, High Ca, Fe, vitamin B, low K

6 lighter sources, CO₂, temp RH control

Independent nutrient supply to test



Ginseng cultivated at Plant Factory



Plant Factory



Plant Factory

14:00-16:00 Shi-Sheng organic farm started 1996

Net greenhouse just established

Temp higher increase aeration

Temp higher net cover (4 m above the plants) to reduce temperature

Temp higher fan

Mist system

Water refrigerator to 8 °C

To reduce root temperature

120 cm wide, 10, 20, 10 cm plants distance

In 10 between plants drip irrigation tube

30 cm from the ground, bed also 30 cm

Semi heading type of lettuce – heat tolerance, high yield

14.02 planted, on 28.03 big

Substrate from mushroom growing + egg shell (Ca)

Steam sterilization. 70 – 80 °C will reduce disease problem

Ca, Mn fertilizer

Farm organic farm – ecofriendly, environment important

Local schools pupils get to eat, selling

Automatic water system, exact amount of harvest,

Processing of vegetables to other products

Mechanical cultivation

Automatic water systems

Replace the labor with machinery if can

Expand to other farmers

Invite other organizations to visit the farm, visitors, students, officials,

Stable amount to sell, good quality, quantity,

TRUST - Responsibility towards the consumers

Convince consumer to buy

Weeds in greenhouse – let them be and harvest veggies, Labor cost high

In the beginning lots of veggies were tried out, while now less veggies growing, because only most suitable will be grown

7,6 ha (greenhouse 3,5 ha)

Underground water irrigation system

Export only Hongkong

Planting seedlings, sowing then harvesting, in the meantime non going to the greenhouse.

Irrigation sprinkles



Shi Sheng organic farm



young plants

plants ready to harvest



Ahi-Sheng organic farm farmer presenting the farm

29.03.23

10:00-10:50 TARI-briefing

From website:

TARI was established in 1895 by the Office of the Governor-General of Taiwan at the time of Japanese rule, and was named "Agricultural Experiment Station of the Office of the Governor General of Taiwan." After World War II in 1945, the institute was re-named as the "Taiwan Agricultural Research Institute" and came under the direct supervision of the Taiwan Provincial Administrative Executive Office.

TARI has ten R&D divisions, i.e., Crop Science, Biotechnology, Agricultural Chemistry, Plant Pathology, Applied Zoology, Agricultural Engineering, Agricultural Economics, Plant Germplasm, Technical Services and Farm Management; two affiliated units, i.e., Floriculture Research Center and Guansi Experiment Station; four administrative offices, i.e., Secretariat, Personnel, Accounting and Statistics Office, and Civil Service Ethics; two branches, i.e., Chiayi Agricultural Experiment Branch and Fengshan Tropical Horticultural Experiment Branch.

What TARI does:

Genetic resources :

TARI conserves, studies, uses, and shares the collections of genetic resources of diverse agronomic and horticultural crops.

Improved varieties :

At the heart of TARI's work and accomplishments, TARI develops crop varieties for the benefit of farmers and consumers. We conduct genetic and physiological research to improve crops for better quality and higher yield, resistance to diseases and insect pests, and tolerance of environmental stresses. In this endeavor, we employ both conventional breeding and new tools such as tissue culture, marker-assisted selection, genomics and genetic modification.

Value adding :

TARI develops ways to add economic value to crops products by preserving freshness, extending shelf life, processing, and improving value-chain linkages.

Crop health :

Other than genetic resistance to diseases and insect pests, we focus on measures such as non-chemical control, holistic crop-health care, and new quarantine techniques.

Farm management :

We develop technologies and systems on soil and nutrient management, and integrated crop and resource management that adapt to increasing risk of floods and droughts induced by climate change, and to reduce greenhouse gas emissions.

Socio-economic study :

We conduct research to identify key research issues, and to assess TARI's impacts.

Technology transfer :

We transfer acquired innovations to the agri-food industry, and strengthen capacity building in the extension system to increase technology adoption, expand industrial capabilities and enhance competitiveness.

For better understanding please watch the video on TARI website:

<https://www.tari.gov.tw/english/form/index-1.asp?Parser=2,15,1085,78,,,8279>

Farmers Academy teaches farmers, including breeding.

11:00-12:00 Agricultural engineering division-Plant factory
Edible flowers, Mini Garden – leafy veggies at home
White light grow, blue before harvest, UV more red in lettuce
Fully automated system, developed 10 years ago
Cutting machine



At the Plant factory



Small garden



Cutting machine

12.00 – 12.30 the control of spraying drones (video)

13.00 – 14.00 Mushroom Museum

Waste from tree for substrate

Medicinal use Maithake, cosmetics

Drying for preservation



In mushrooms museum

14:00-15:00 Crop Division-Discussion (vegetable cultivation), Mr. KANG

Cucumber and tomato breeding double haploid

Chinese cabbage, cauliflower, radish

... 10 years tomato cultivation for greenhouse systems

Cherry tomato, beef tomato, - heat tolerance, marker selection (MS)

Resistant gene plant selection (plant still young), a sample is taken in the cotyledon phase

3 leaf stage planted in to greenhouse

10% plants selected

2nd generation selection, sequencing – need to know for markers; selected plants grow and they will be evaluated what is the performance.

Tomato breeders use MS

Few brassica breeders use also MS

Cucumber breeder from TARI:

Molecular skills to help breeders' efficiency

TYLCV – tomato yellow leaf curl virus, whitefly, double net house

Holes bigger in net usually

Farmers get transplants from TARI

Tomato high mountain – in summer high temperature – heat selection

3 stage tomatoes picture, farmer need different stages transplants

Disease resistance, protected greenhouse, net density, double net house

100 cucumber lines

Density between plants 45 cm

Describes the traits from seedling stage – leaf, stem, root, disease and pest resistance

Database in GenBank

If seed is clean from Phytophthora, then not important cucumber fungicides to spray to seeds.

Cauliflower breeding

1-year pure line, self-cross this line

Cultivation know-how to farmers

Dark room to enter greenhouse against insects, that fly in direction of light – out of dark room

Soil: tomato crop model

Aim; predict yield according to weather conditions

Growth model, RH, light sensors, predict harvesting

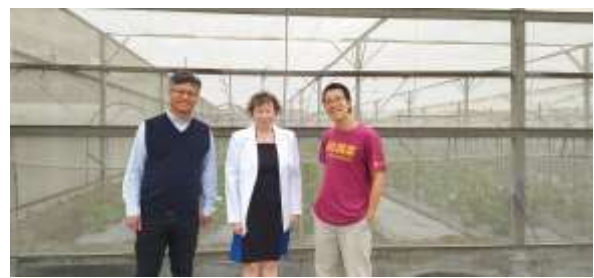
Slow growth when price low

Ventilation, plastic cover, grafting plants in tomatoes

Tomato collection



Ms. Luo, Mr. Kang, Ms. Lillian



Cucumber breeder, me and Mr. Kang



Tomatoes in different growth stages for farmers



Tomato experiment



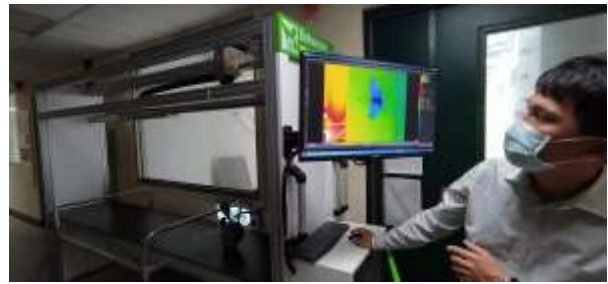
Tomato collection - minitomatoes

15:00-17:00 Biotechnology Division-Discussion (plant phenotyping)

Phenotyping machine + software was displayed



Me and Plant Biotechnology laboratory researchers



Entoscan machine

30.03.23

9:00-10:00 Liao's Organic farm (leafy vegetable)

Traditional organic fertilization

Wanted to experience veggies cultivation

1996 established, 2006 got greenhouse

Many different veggies

Weeds are controlled by fire machine.

Variety – resistant to dis pests

Traditional yield quality – market demand

Use microorganisms against dis insects

Cooperation - with schools

Soil sterilization

Small machine – rotates

Organic fertilizer – manure substrate from mushrooms

Area 0,3 ha, was 1 ha

Irrigation

Kangkong

LED lamp usage: N decreases, yield increases

Pink / red, yellow LED

2 m distance between lamps

Mouth catching machine



Liao organic farm



Fire to kill weeds



Insect trap



LED lamps for leafy greens

10:30-12:00 Xiluo agricultural products market

2nd largest in Taiwan

6.00 comes agricultural farmers here

8.00 starts selection of the products, negotiating the price

Buyers will see all products and will see best quality and best price for that

Mostly for local use

If farmers will not sell all products, they rent refrigerator or if price not good through away.

Products transported here, net plastic barrels for storage products on the market, reused

Area- bigger price area, every aisle price different. Bigger product bigger price

Field harvest, wash packaging --- selling place 10 kg packages

Smaller farmers with their products in another place.

He sells also other products, not only farmer



Market for big farmers

Market for small farmers

13:00-15:00 Lin's organic farm (water convolvulus & leafy vegetable)

Established 2010

0,55 ha, many like this. 3 ha total area

10 different leafy vegetables

Every crop 0,5 ha, 400 kg of fertilizers

Flooding, shading

Blue & Yellow Sticky Card Traps | Pest Insect Monitoring

Yield 200kg – 0,5 ha

Storage 2-4 °C

Packaging

Harvest next week

Bigger – bigger price, catering

The striped flea beetle (*Phyllotreta striolata*) insect

4 week 1 crop, 10 - 12 crops in one year

Temp lower, growth longer

Rotation: lettuce – cabbage – kangkong – amaranths

After harvest 1 week no crops

No sterilization

Rotation with different crops

Microorganisms: use high amount of org. fertilizer

Microorganisms diversity keeps away insects and pests

WEED: fire kills weed

Portulaca oleracea – hard to control

Transplant, seedling

As short period as possible

Summer weed grows quickly, reduces weed possibility to grow over plants

Seedlings 14 days old, buys from others and does planting

Farmer does: planting – irrigation – fertigation – harvesting

Irrigation: 1 times per 3 weeks, floating 2 hours

Downey mildew – early winter no problem, high temperature summer higher problem

OPEN LAND

High rainfall summer – problem

Water – high amount of Ca here

Cultivar: very heat tolerant Italic type

Sowing machine: Amaranthus, Kangkong, spinach

From China, from Italy originally

Insect catcher Taiwan made lighted at night - catches moths

Steam for soil sterilization – in the winter season is using, renting to other farmers.



Greenhouse cultivation



Open land cultivation



Packaging machine



Sowing machine



Insect trap



Steam machine

31.03

8:00-12:00 Onion farm Kenting

Established 30 – 40 years ago

Area 4,5 ha

Yield down, no rainfall, 0,1 ha 4 t

Yield can be up to 7 t

Cultivar 708

Before new year come rain, no diseases

In the morning humid, disease

Mechanical planting – seedlings (grow themselves seedlings)

Machine to cut the roots first, then hand harvest, then field drying 3 days (sunshine + wind), then to selling point.

6 rows of onions per one bed

Weeds – herbicide in the beginning – hand weeding high cost, after 1 time herbicide no work anymore.

Largest 300 – 400 g

4 classes

Org. fert 100 kg 0,1 ha

Flooding

Underground water coming out from tubes

Fusarium – main disease – no rain – no disease

Open air seedling nursery

Rotation with rice

Red type onions:

Thrips on bushes, comes to onions – Hand planting mistakes, longer distance – yield decreases

Most important key to grow onions:

Water control, cultivar, planting, chemicals here similar

Field sterilization

Cyanide, Metalaxyl-M – into soil – wait for 5 days – transplant seedlings

Flooding few days later

Spray on the surface on the soil

Red onion – yield lower

Grow a little for restaurant

Sells to wholesale – sells further



Onions



Watering tube



Ms. Lillian, me and farmer



Onion field



Red onions drying on the field



Onion big bags