FFTC-KU-PPRI

"DEVELOPMENT OF GOOD AGRICULTURAL PRACTICES (GAPs) MODLES FOR TEA, RICE AND VEGETABLES IN VIETNAM"

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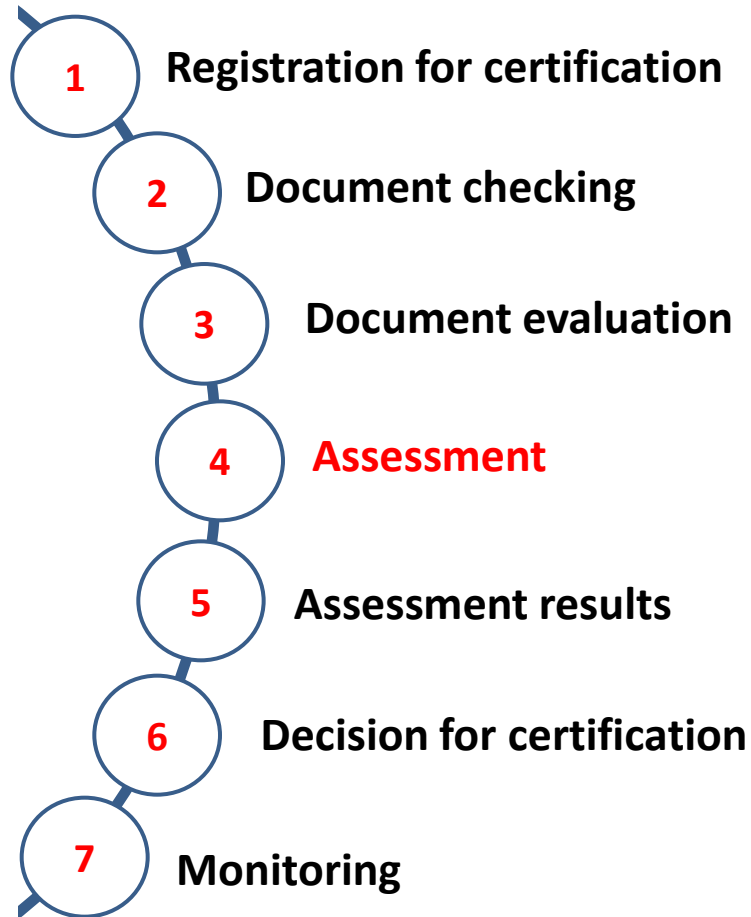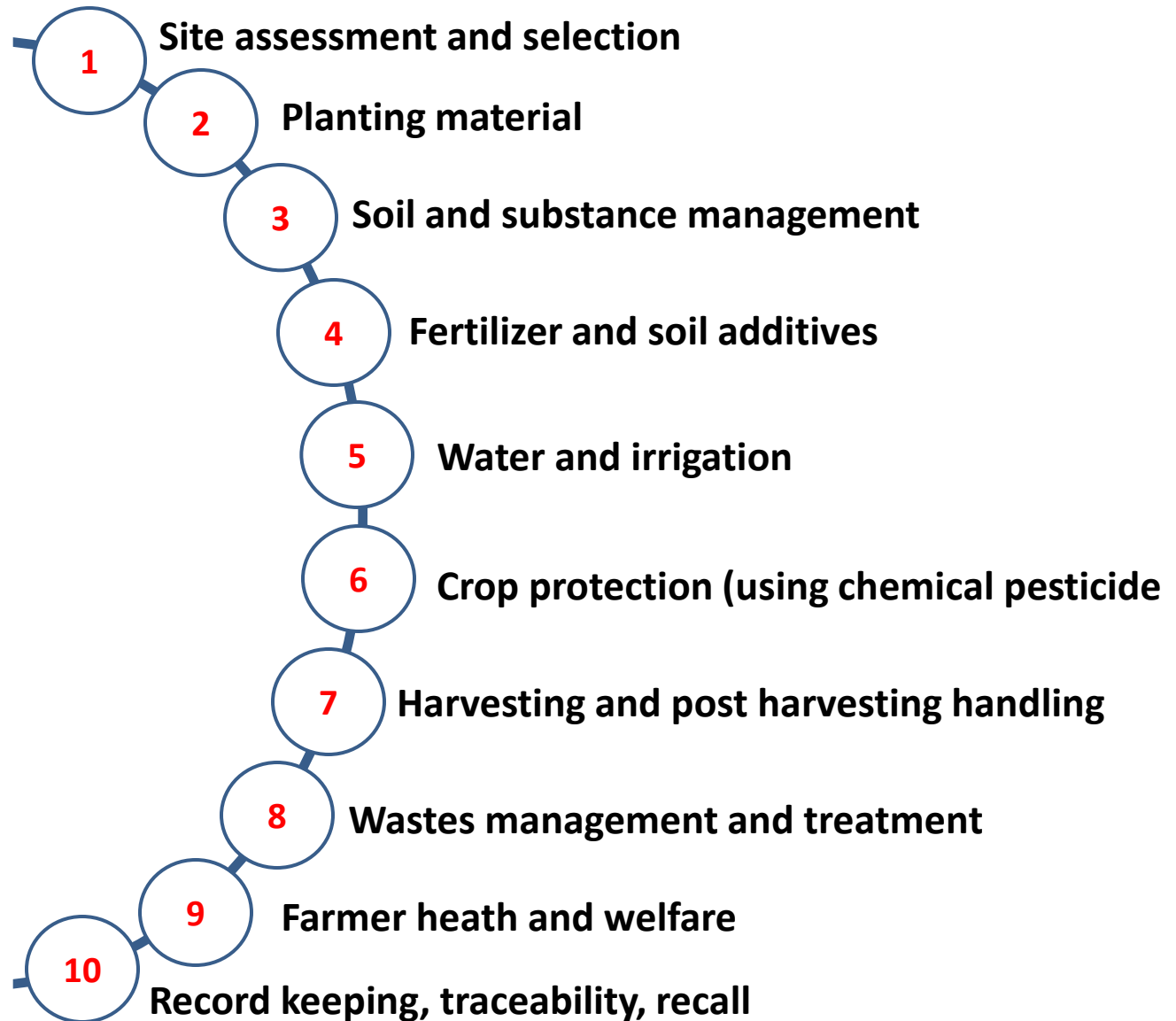**Department of Pesticide, Weed and Environment**

INTRODUCTION.

- **Agriculture is plays important role in national economy of Vietnam.**

- **Food production has markedly changed in area, yields, types and production.**

- **Using of agrochemical products have also increasing quickly.**

- **Food safety have been a major concern for Vietnamese because of increasing food poisoning and chemical hazard.**

- **Government have issued many policies to control agrochemical and harmful microbiology.**

- **Finally, Good Agricultural Practices (GAPs) is most suitable for agricultural production in Vietnam.**

- **VietGAPs was established by MARD on 2008.**

- **Aim of VietGAPs is prevent and minimize of hazard risks.**

- **VietGAPs was developed base on GlobalGAPs**

PROCESS FOR VIETGAPS CERTIFICATION

1 — **Registration for certification**

2 — **Document checking**

3 — **Document evaluation**

4 — **Assessment**

5 — **Assessment results**

6 — **Decision for certification**

7 — **Monitoring**

IMPLEMENTATION FOR VIETGAPS

1. Site assessment and selection
2. Planting material
3. Soil and substance management
4. Fertilizer and soil additives
5. Water and irrigation
6. Crop protection (using chemical pesticide
7. Harvesting and post harvesting handling
8. Wastes management and treatment
9. Farmer heath and welfare
10. Record keeping, traceability, recall

VIETGAPS MODEL FOR RICE, VEGETABLES AND TEA

Methodology:

- **Three local locations in Northern of Vietnam for VietGAP models**

Tea model

Rice model

Vegetable model
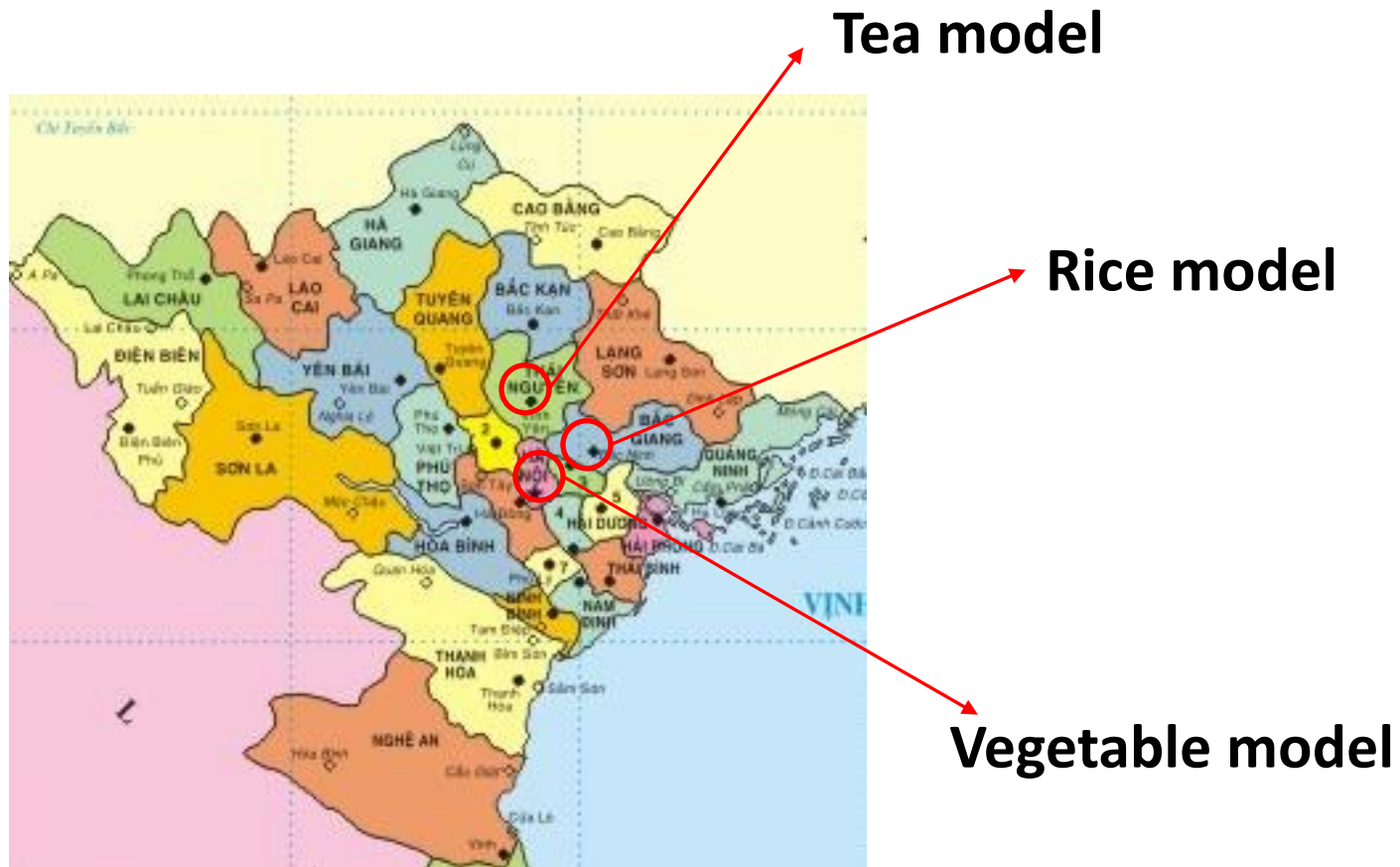
Methodology:

- *Site selection:*
  + **Rice: 50 ha**
  + **Vegetable: 15 ha**
  + **Tea: 25 ha**
- *Survey condition for VietGAPs implementation.*
  - **30 farmers, local officer, extentionists**
  - **Frastructure**
  + **Local transportation**
  + **Electric power system**
  + **Water and irrigation**
  + **Storage**
  - **Techniques:**
  + **Cultivation (seedling to storage)**
  + **Plant protection (Pests and Pesticides)**
  + **Nutrition (Fertilizers)**

Methodology:

- **Testing chemical residue (pesticide residue, heavy metal)**
- **Harmful microbiology (E.coli, Sanmonella, etc)**

Results:

Natural Condition for VietGAP implementation:

Rice

- **50 ha of rice, in total area 290 ha, was selected for VietGAP implementation.**
- **Two season per year, water and irrigation, local transportation and waste storage (fertilizer container, vv).**
- **Most of requirement is suitable with VietGaps standard.**

Results:

Natural Condition for VietGAP implementation:
Vegetable

- 10 ha of vegetable, in total area 100 ha, was slected for VietGAP implementation.
- Water and irrigation, local transportation, storage (fresh products, waste, etc)
- There are several kind of vegetable have grown
- Farmers have high experience for growing veg.

Results:

Natural Condition for VietGAP implementation:

Tea

- **25 ha of tea, in total area 15.700 ha, was slected for VietGAP implementation.**
- **Local transportation, storage (fresh products, waste, etc)**

Results:

Survey and testing condition before VietGAPs starting

Table 1. Results for analysis of heavy metal in water samples in Yen Phu - Yen Phong - Bac Ninh

No	Samples	As	Cd	Pb	Hg
1	MN1	0,005	0,003	0,003	0,0007
2	MN2	0,004	0,004	0,005	0,0005
3	MN3	0,004	0,004	0,003	0,0007

Unit mg/kg (mg heavy metal per litter of waterl)

Table 2. Results for analysis of heavy metal in soil samples in Yen Phu - Yen Phong - Bac Ninh

No	Samples	As	Cd	Pb	Hg
1	MN1	1,68	0,35	27,43	25,30
2	MN2	2,22	0,43	22,18	34,78
3	MN3	2,11	0,40	30,53	17,20

Unit mg/kg (mg heavy metal per kilogram dried soil)

Table 3. Results for analysis of heavy metal in water samples in Linh Nam - Hoang Mai – Hanoi

No	Samples	As	Cd	Pb	Hg
1	MN1	0,0006	0,004	0,005	0,0004
2	MN2	0,005	0,004	0,005	0,0003
3	MN3	0,005	0,004	0,004	0,0005

Unit mg/kg (mg heavy metal per litter of waterl)

Table 4. Results for analysis of heavy metal in soil samples in Linh Nam - Hoang Mai – Hanoi

No	Samples	As	Cd	Pb	Hg
1	MN1	1,78	0,45	28,43	21,30
2	MN2	2,28	0,23	20,18	37,78
3	MN3	2,61	0,30	33,53	27,20

Unit mg/kg (mg heavy metal per kilogram dried soil)

Table 6. Results for analysis of heavy metal in water samples in Phu Ho - Phu Tho

No	Samples	As	Cd	Pb	Hg
1	MN1	0,003	0,003	0,005	0,0004
2	MN2	0,003	0,004	0,003	0,0004
3	MN3	0,004	0,003	0,004	0,0005

Unit mg/kg (mg heavy metal per litter of waterl)

Table 7. Results for analysis of heavy metal in soil samples in Phu Ho - Phu Tho

No	Samples	As	Cd	Pb	Hg
1	MN1	1,88	0,35	18,43	24,13
2	MN2	1,21	0,23	21,18	27,43
3	MN3	1,91	0,25	13,53	25,30

Unit mg/kg (mg heavy metal per kilogram dried soil)

Table 5. List of chemical pesticides use for control pests in vegetable field in Linh Nam – Hoang Mai - Hanoi

Active ingredient	Pests					
	Striped flea beetle	Diamond back moth	Oriental leafworm moth	Cabbage aphid	Late blight	Downy mildew
Abamectin		x		x		
Azadirachtin		x		x		
Bacillus thuringiensis		x				
Diafenthiuron		x				
Dinotefuran	x					
Emamectin benzoate		x		x		
Etofenprox				x		
Fenvalerate			x			
Imidacloprid				x		
Matrine	x					
Nitenpyram	x			x		
Permethrin			x			
Thiamethoxam						
Chlorothalonil						
Difenoconazole						x
Hexaconazole						x
Mancozeb					x	
Metalaxyl-M					x	
Propiconazole						x
Thiophanate-Methyl					x	
Validamycin						

Results:

Development of VietGAPs model

Table 6. Process for application of fertilizers in VietGAP model for rice production Unit kg/ha

Time for application	Manure	N	P	K
First	10.000	36	85	
Second		36		50
Third		18		50
Total	10.000	90	85	100

Table 7. Main pests, pesticide and time for spray in season in rice field

Pest	Pesticides	Time of sprays	
		VietGAP model	Farmer model
Stemborer (*Scirpophaga incertulas Walker)*	Thiamethoxam (Virtako 40WG), Chlorantraniliprole (Prevathon 5SC)	1	1
Brown planthopper (*Nilaparvata lugens Stal*)	Nitenpyram (Elsin 10EC) , Thiamethoxam (Actara 25WG)	1	2
Rice skipper (*Parnara guttata Bremer et Grey*)	Thiamethoxam (Virtako 40WG), Deltamethrin (Ebato 160SC)	1	2
Bacterial blight (*Xanthomonas oryzae*)	Xanthomix 20WP, Staner 20WP	1	1
Rice blast (*Piricularia oryzae Cavara*)	Hibim 31WP, Beam 75WP	1	1
Sheath blight (*Rhizoctonia solani Kuhn*)	Anvil 5SC, Tungvil 5SC	0	0

Table 8. Analysis of pesticide residue in rice samples with VietGAP afer harvesting

Sample	Results				
	Thiamethoxam	Chlorantraniliprole	Nitenpyram	Fenobucarb	Fipronil
M1	nd	nd	nd	nd	nd
M2	nd	nd	nd	nd	nd
M3	nd	nd	nd	nd	nd
M4	nd	nd	nd	nd	nd
M5	nd	nd	nd	nd	nd

nd: none detection

Table 11. Economic efficiency of pesticide using between VietGAP and normal models in rice production per hectare

Unit	VietGAP model	Farmer model
Time for sprays (time/ha)	5	7
Pestidice price (1000 VND)	2.000	2.800
Labor for sprays (1000 VND)	2.000	2.800
Total (1000 VND)	4.000	5.600
Save amount (1000 VND)	1.600	

Table 9. Main pests, pesticide and time for spray in season in vegetable fields

Pest	Pesticides	Time of sprays	
		VietGAP model	Farmer model
Striped flea beetle (*Phyllotreta striolata*)	Thiamethoxam (Virtako 40WG), Nitenpyram (Elsin 10EC)	1	2
Oriental leafworm moth (*Spodoptera litura*)	Permethrin (Pounce 50EC), Fenvalerate (Sudin 20EC), Permethrin (Perkill 10EC).	1	1
Diamondback moth (*Plutella xylostella*)	*Bacillus thuringiensis* (V-Bt); Emamectin (Proclaim 1.9EC); Lambda-Cyhalothrin (Match 50EC);	1	2
Aphids	Abamectin (Elincol 12ME); Etofenprox (Trebon 10EC); Imidacloprid (Admire 50EC) ;	1	2
Thrip (*Thrip palmi*)	Imidacloprid (Confidor 100SL); Thiamethoxam (Actara 25WG); Dinotefuran (Oshin 20WP)	1	1
Death of seedlings (*Rhizoctonia* sp)	Hexaconazole (Anvil 5SC); Chlorothalonil (Daconil 75WP); Metalaxyl (Ridomil Gold 68WP);	1	1
Late Blight (*Phytophthora infestan*)	Metalaxyl (Ridomil Gold 68WP); Fosetyl Aluminium (Aliette 80WP)	1	1
Black spot disease (*Colletotrichum sp*)	Difenoconazole (Score 250EC); Carbendazim (Bavistin 50SC); Propiconazole + Difenoconazole (Tilt Super 300EC)	1	1
Powdery mildew (*Podosphaera xanthii*)	Hexaconazole (Anvil 5SC); Propiconazole + Difenoconazole (Tilt Super 300EC)	1	2

Table 10. Economic efficiency of pesticide using between VietGAP and normal models in vegetables production per hectare

Unit	VietGAP model				Farmer model			
	Cabbage	Chinese cabbage	Tomato	Bean	Cabbage	Chinese cabbage	Tomato	Bean
Time for sprays (time/ha)	4,2	4,1	4,7	6,1	6,1	5,1	5,8	7,8
Pestidice price (1000 VND)	1.470	1.430	1.645	2.135	2.135	1.785	2.030	2.730
Labor for sprays (1000 VND)	1.680	1.640	1.880	2.440	2.440	2.040	2.320	3.120
Total (1000 VND)	3.150	3.070	3.525	4.575	4.575	3.825	4.350	5.850
Save amount (1000 VND)	1.425	755	825	1.275	-	-	-	-

Table 11. Main pests, pesticides and time for spray in season in tea fields

Pest	Pesticides	Time of sprays	
		VietGAP model	Farmer model
Green leafhopper (*Jacobiasca formosana*)	Abamectin + Matrine (Sudoku 58EC), Buprofezin + Isoprocarb (Superista 25 EC), Abamectin (Song Mã 63EC)	1	2
Mosquito bugs (*Helopeltis sp*)	Azadirechtin (Vinaneem 2 SL), Abamectin (Acimetin 5EC)	1	1
Red spider mite (*Oligonychus coffeae*)	Fenpyroximate (Ortus 5SC), Pyridaben + Abamectin (Aben 168 EC)	1	2
Thrips (*Physothrips setiventris*)	Abamectin (Abagro 4.0 EC), Aremec 36EC	1	2
Colletotrichum thaee sinensis	Eugenol (Genol 0.3DD), Trichođerma viride (Biobus 1.00WP)	1	1
Exobasidium spp Masse	Imibenconazole (Manage 5WP)	1	1

Table 12. Economic efficiency of pesticide using between VietGAP and normal models in tea production per hectare

Unit	VietGAP model	Farmer model
Time for sprays (time/ha)	7	9
Pestidice price (1000 VND)	500	500
Labor for sprays (1000 VND)	250	250
Total (1000 VND)	5.250	6.750
Save amount (1000 VND)	1.500	

Conclusion and discussion:

- Our work investigate and compares the farming practices of three crops (tea, vegetables, tea) show:

  + The level of heavy metals and pesticides in soil and water from area for growing crops are under VietGAP standard.

  + There are the main 21 main active ingredients for using in fields

  + Pesticide sprays in farmer models are higher than VietGAP models

  + Cost in farmer models is automatically higher than VietGAP models.

- Development of VietGAPS.

  + Suitable policies for registration and training farmers, VietGAP will extend in a large area to other crops

Discussion and conclusion:

- Limitation of VietGAP:

  + Economic issues (frastructure including water and irrigation, transportation, storage), funding for expend of VietGAP.

  + Social issues: Farmer knowledge, linkage farm – market, consumer confidence, policies and management, etc.

  + Technical issues: VietGAP standard, management of VietGAP process after certification, etc.

THANK FOR YOUR ATTENTION