

QUANG NGAI RURAL DEVELOPMENT PROGRAM (RUDEP) - PHASE 2

Home Garden Report



VIETNAM-AUSTRALIA

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Acronyms

IPM	Integrated Pest Management
NGO	Non Government Organisation
PRA	Participatory Rapid Appraisal
RUDEP	Quang Ngai Rural Development Program
UNDP	United Nations Development Program

1 Introduction

The home garden has appeared on the international development agenda since at least 1950s. However, unlike field agriculture development, gardens seldom attracted sustained support from development agencies in the following two decades, despite their potential to address the food and income needs of the most deprived groups in the developing world.

This report addresses key issues concerning the role of home garden programs in rural development and identifies variable implementation strategies. We hope that these conclusions will prompt policymakers and development manager to reassess the much neglected potential role of small scale household food production in enhancing nutrition and income generation.

2 Rational

2.1 Home Gardens: Sustainable Food Production

Food production on small plot adjacent to human settlements is an age - old survival strategy in the developing world. Food gardens make a substantial, though rarely appreciated contribution to the food security of the poorest segments of society. For instance, sales from homestead vegetable gardens in Bangladesh contribute more than 10% of the income of landless households; the value of the produce retained for home consumption is often higher.

The 1990s are a particularly appropriate time for progressive policymakers to push for the wide and sustained development of small scale household cropping. More food will have to be produced and distributed during the first three decades of the 21st century than since the agricultural revolution that started over 10,000 years ago.

Increasing numbers of small farmers are being marginalized by ecological, social and demographic forces. The emphasis on commercial agriculture tends to exclude such resource poor households from access to government technical services. Meanwhile, growing landlessness, compounded by the shift to less labour intensive technologies, is squeezing opportunities for farm labour. With rapidly increasing migration from rural areas into large cities the challenge of providing adequate food to the urban poor will only intensify.

Despite dramatic jumps in cereal crop production, the UNDP estimates that over 800 million people remain chronically hungry. Further, the commercialization of agriculture based on plantation crops and basic staples such as rice and maize using mono-cropping technologies has seriously unbalanced the diets of rural poor by reducing the intake of vegetables, fruits and other supplementary foods. As the price of vegetable doubles, intake of vitamin A and C declines by more than one half with a corresponding increase in illness. More worrying still, the incidence of vitamin A deficiency has not declined despite increased income and prosperity in many parts of the developing world.

Home gardens by themselves will not solve all these problems. Nevertheless, a number of successful initiatives in countries as diverse as Bangladesh, the Philippines and Thailand have demonstrated that home gardens represent a direct, cost -effective and ecologically sound strategy for tackling the socioeconomic and nutritional needs of the poor.

2.2 What are Home Gardens?

Home gardens are mixed cropping of fruits, vegetables, trees and condiments that serve as supplementary sources of food and income. They have a functional relationship with the homestead but are also found in pots, along fields and in strips along railway tracks, highways and canals.

The function of gardens is largely shaped by their purpose for the "users". A home garden does not have to have a residence on it to qualify. The garden may be purely for subsistence or partially market orientated and it can consist solely of vegetable crops or mixtures of annuals and perennials.

For those who are promoting interest in gardens, the challenge is how to promote low cost, ecological sound cropping technologies that can enhance nutrition and income for the poorest households. Where the garden is planted or what it must consist of are completely dependent on the family's needs and resources. The development facilitators seek only to enable these choices, unrestricted by preconceived notions.

2.3 Why Home Gardens?

Small-scale home gardening as a food production strategy has been overlooked by development policymakers in favour of field-based commercially oriented agriculture. However, few have benefited from large-scale production orientated programs biased towards land owners and dependent on costly industrial inputs.

- Reaching the poorest: Homestead or underutilized marginal land is often the only resource available to landless and near -landless groups and urban slum dwellers. Intensive gardening can turn this land into a productive source of food and economic security. There are few, if any, barriers to adoption of intensive household production using organic manure, regenerative agricultural practices and locally adapted societies. The technology entails very little capital investment land and because of the marginal nature of resources used and variety of crop grown, carries very little risk.
- Providing food security: Family gardens may constitute the only source of certain nutrients to less well off households and the major -or only- source of food between harvest or when harvest fails. They provide critical sources of energy and protein especially for weaning - age children. Habitat destruction and migration to urban areas mean that wild foods are no longer available to the poorest groups. The commercialization of agriculture has displaced many indigenous crops that ensured a balanced rural diet. Year -round, readily available and continuously harvested garden production can be a source of nutritious and pesticide-free fresh vegetable and fruits for the poorest families who may otherwise have no access to them.
- Intensifying food supply: An efficient user of soil, water, sunlight and household waste to realize high and sustained yields, home gardens exemplify the oft -noticed relationship between intensification of land use and higher yield. In semi arid areas where low and erratic rainfall has made the introduction of vegetables into existing farms a difficult task, water conserving garden systems that recycle water used in the home can achieve substantial production.
- Fostering economic security: Gardens generate income through the marketing of surplus produce and from the savings created by producing items that were formerly purchased. The small amounts of cash income that home gardens provide can make the vital difference between relative well being and hardship, crippling debt and starvation in cash poor societies.
- Generating employment for women: Limited access to resources means that land poor women are more likely to be under-employed. Home gardening offers women an important means of earning incomes without overtly challenging cultural and social restrictions on their activities. Since women are frequently the principal providers for family diets, enhancing their purchasing power and food production capacity has a direct impact on household nutrition and health.
- Protecting the environment: Home gardens can be ecologically sound land management systems. Multi-cropping prevents depletion of soil nutrition; the combination of trees, shorter plants, creepers and tubers enhances soil conservation. An advantage of poly-cropped, intensively managed gardens planted with locally - adapted species is their primary reliance on cultivation practices rather than toxic

chemicals to control weeds, pests and diseases. Household food production will rarely poison people or the environment - a serious problem in agrochemical intensive field-based agriculture. Traditional-style home gardens are also crucial repositories of diverse plant genetic resources.

- Using available resources: Among low income households the factors of production, including time, energy, money and land are available in small discrete increments through time and space. Accumulation of these factors to make larger investments can be difficult. Home gardens are a very efficient way to use these resources without competing with staple crop production or other productive activities. Labour inputs effectively utilize small amounts of the spare time of family members, especially women, children and the elderly, and can be conveniently combined with childcare and domestic tasks.
- Contributing vitamin A: Vitamin A deficiency contributes not only to xerophthalmia and blindness, but to high child mortality rates as well. Lasting long-term solutions to vitamin A deficiency rest on increasing the availability of vitamin A- rich foods to the most vulnerable groups. Household cultivation of vegetable and fruits (86% of vitamin A intake in Asia and Africa comes from plant sources) has proved to be the most effective solution.

In short, support for small-scale family food production can provide improve health and economic benefits to the most deprived sectors of the developing world population at a relatively low cost while safeguarding the environment.

3 Objectives of the Study

- Review the potential for fruit trees and home gardens to be practiced in the existing Program Communes.
- Outline the main vegetable and fruit varieties, constraints facing these farmers and opportunities to improve household vegetable and fruit production levels in the Communes.
- Identify suitable varieties that could be cultivated and outline technical requirements to successfully cultivate.
- Identify reliable sources of vegetable and fruit tree seeds and saplings that are produced/available locally, and provide technical recommendations on the cultivation of such varieties.
- Outline the feasibility of introducing varieties tolerant to such conditions and provide a series of technical recommendations on the cultivation of these varieties, seed/sapling sources and other technical requirements.
- Provide information on relevant programs, fruit and vegetable varieties and cultivation practices (e.g. VAC, organic farming, IPM etc).

4 Materials and Method

4.1 The Studied Ecosites

Nine program communes in seven districts selected for the studies were the locations identified as poor areas in Quang Ngai province and the farmers still maintained home gardens. The ecosites were:

- Son Hai, Son Giang and Son Trung communes (Son Ha district) and Nghia Tho commune (Tu Nghia district), representative for mountainous ecosystem;
- Hanh Phuoc commune (Nghia Hanh district), Tinh Tho commune (Son Tinh district), Binh Minh commune (Binh Son district), representative for lowland ecosystem; and
- Pho Chau commune (Duc Pho district) and Duc Phong commune (Mo Duc district), representative for coastal ecosystem.

4.2 The PRA Survey

Participatory research methodology was used for baseline survey to collect primary data. A panel of core villagers were selected to serve as the key informants and they were facilitated to participate in the group discussion. This activity focused on participatory assessment and collection of data at community level, such as changes in village socioeconomic characteristics and home garden, identification of constraints and potentials and development of home garden, seed source systems, and provision of supplementary information from individual respondents. We interviewed 20 individual households to collect the data of home garden at household level by a set of questionnaires. A list of the households were selected randomly.

4.3 Scope of Study

- Provincial level: The range of activities at this level included:
 - Reviewing geography, soil and different climatic ecological condition in the province.
 - Reviewing the current situation of home garden in the province.
This data was collected from departments and divisions in the province from reports, statistical books, development strategies and direct interview.
- District level: The range of activities at this level included:
 - Reviewing the current situation of home garden in 7 districts.
 - Identifying advantages and disadvantages in the current home garden to orientated research and development activities in different ecological regions.
These data were also collected from departments and divisions in district from reports, statistical books, development strategies and direct interview.
- Commune level: The range of activities at this level concentrated on:
 - Determining the current status of home garden in nine communes.

- Identifying advantages and disadvantages in the home garden to orientated research and development activities in different ecological regions.
- Seasonal calendar:
Data from commune level was collected as follows:
 - Official data from the statistical book, reports and development orientation of communes.
 - PRA work in communes which included commune leaders, organization mass and hamlet leaders.
 - Direct interview and observation.
- Household level: The range of activities at this level concentrated on:
 - Households' home garden systems (fruit trees and vegetables).
 - Current situation and solution for home garden.
 - Agricultural management practices.
 - Determining the economic efficiency of the identified fruit trees and vegetables in the interviewed households of nine RUDEP communes.
 - Total revenue = total production in kg multiplied with price per kg
 - Total variable cost = land preparation + fertilizer + seed + pesticides + irrigation costs
 - Gross margin = total revenue - total variable costs

The results of the above study have been used to propose a research and development orientation for each ecological region and RUDEP can use as resources for strategy of poverty alleviation and sustainable income generation and improve household living standard.

5 Results and Discussion

1. Land resource

Table 1: Land use in Quang Ngai Province (ha)

Type of use	Years			
	1997	1998	2000	2001
Agricultural land	87.126,5	87.269,9	99.055,6	99.055,6
Annual crops land	66.501,2	66.991,1	73.694,5	73.694,5
Perennial crops land	6.036,8	5.940,9	8.515,9	8.515,9
Unused land				
- Flat land				243.852,8
- Mountainous land				204.532,9
- Other unused land				11.674,6

Source: *Quang Ngai statistical Yearbook, 2002*

Data from table 1 shown that land area of perennial crops is only occupying 6.9% (1997) to 8.6% (2001) as compared with agricultural land area. However, this area is increasing from 1997 to 2001. Unused land area in Quang Ngai is still high. It can be used to grow forestry and fruit trees depending on the condition of each ecological zone.

Table 2: Land use at district level

Districts	Land use type		
	Agricultural land (ha)	Perennial crops land (ha)	% as compared with agricultural land
Binh Son	15,928.5	1,579,9	9.91
Son Tinh	17,770.3	1,246,8	7.01
Tu Nghia	10,476.2	330,7	3.15
Nghia Hanh	8,183.6	763,9	9.33
Mo Duc	8,853	205,9	2.33
Duc Pho	12,442.3	763,3	6.13
Son Ha	7,601	729	9.59

Source: *Quang Ngai statistical Yearbook, 2002*

Table 3: Land use at program communes

Communes	Land type (ha)		
	Agricultural land (ha)	Mixed garden land (ha)	Perennial crops land (ha)
Binh Minh	1,740,2	250.0	-
Tinh Tho	2,219,6	481,2	138,5
Nghia Tho	129.0	22.0	-
Duc Phong	635.0	40.0	-
Hanh Phuoc	896,5	258.0	7,8
Pho Chau	368,2	83.0	83.0
Son Trung	368,8	5,9	23,6
Son Giang		30.0	-
Son Hai	360.0	-	-

Source: Official data from surveyed communes

Table 4: Main soil groups in Quang Ngai province

No.	Soil type	Area (ha)	Percent (%)	Distribution
Group I	Coastal sandy soil	6,290.0	1.22	Binh Son, Son Tinh, Tu Nghia, Duc Pho, Mo Duc
Group II	Saline soil	1,573.1	0.30	Binh Son, Son Tinh, Tu Nghia, Duc Pho, Mo Duc
Group III	Alluvial soil	97,157.5	18.97	Binh Son, Son Tinh, Tu Nghia, Duc Pho, Mo Duc, Nghia Hanh, Quang Ngai town
Group IV	Grey soil	2,052.4	0.39	Binh Son, Son Tinh, Tu Nghia, Duc Pho, Mo Duc
Group V	Grey soil	376,547.2	73.42	Ba to, Minh Long, Son Tay, Son Ha, Tra Bong
Group VI	Red soil	8,142,2	1,58	Binh Son, Son Tinh
Group VII	Black soil	2,328.4	0,45	Binh Son, Son Tinh and other districts
Group VIII	Cracking soil	634	0.12	Binh Son
Group IX	Stone and gravel soil	9,696	1.89	All districts in the province

Source: Report on results of soil map construction and survey in Quang Ngai province following FAO - UNESCO classification, 1998.

Main soil groups have following general characteristics:

- Light soil texture
- Soil reaction is from acid to very acid
- Poor total and available nutrients
- Mountainous and hilly land have mixed stones

In Quang Ngai province, rather fertile soils are alluvial, red and black soils occupying 21,41% total natural land area, average fertile soil is Grey soil occupying 73,43%, and the rest are very low soil fertility including coastal sandy soil and saline soil (3.45%).

2. Fruit and vegetable kinds at nine Program communes

Table 5: Vegetables (commune averages & unique lists of existing vegetables where applicable)

Current veget. kinds	Area (m ²)	% of household who have		Contribution to (%)		Years that crop has been grown	Any program or demons. from GOV in previous years	Evaluation of impact of these programs
		PRA at commune	Hhs interviewed	Consumption	Sale			
I. SON HAI COMMUNE								
1. Sweet potato	300	100	100	100		Long time		
2. Pumpkin, wax	50	5	10	100				
3. Banana flower		40	50	100				
II. SON TRUNG COMMUNE								
1. Kangkong	10	60	40	100		Long time	Trained on nutritional meal for women	Some household applied in growing vegetables and fruits
2. Sweet potato	100	100	100	100		Long time		
3. Mustard	20	50	30	100		>5		
4. Pumpkin	50	50	80	20	80	Long time		
5. Eggplant	10	30	20	100		>5		
III. SON GIANG COMMUNE								
1. French bean	20	80	100	100		>5	Provincial Centre of Agri. Extension introduced some kinds of vegetable like mustard, lettuce for Hre people	They are growing, but vegetable's performance is not good due to lack of water, even though they have well
2. Cucumber	20	80	100	100		>5		
3. Sweet potato	100	100	100	100		Long time		
4. Other veget.	20	80	70	100		>5		
IV. BINH MINH COMMUNE								
1. Kangkong	50	60	20	50	50	>5		
2. Mustard	50	10	10	30	70	>5		
3. French bean	30	30	10	80	20	>5		
4. Cucumber	20	40	20	100		>5		
5. Sweet potato	100	100	100	100		Long time		
6. Bitter gourd	50	10	0	50	50	>5		
V. NGHIA THO COMMUNE								
1. Kangkong	50	5	2	100		>3		
2. Mustard	50	40	10	100		>5		
3. Gourd	50	50	10	100		Long time		
4. Cucumber	30	20	5	100		>5		
5. Pumpkin	50	80	50	100		Long time		

Current veget. kinds	Area (m ²)	% of household who have		Contribution to (%)		Years that crop has been grown	Any program or demons. from GOV in previous years	Evaluation of impact of these programs
		PRA at commune	Hhs interviewed	Consumption	Sale			
6. French bean	20	50	50	100		>5		
7. Wax	50	30	50	100		Long time		
8. Sweet potato	50	100	100	100		Long time		
9. Taro	10	50	50	100		Long time		
VI. TINH THO COMMUNE								
1. Mustard	100	80	5	100		>5		
2. Lettuce	100	80	0	100		>5		
3. Kangkong	50	70	20	100		Long time		
4. Pumpkin	50	100	50	50	50	>5		
5. French bean	50	100	30	100		>5		
6. Sweet potato	100	100	100	100		Long time		
7. Sauropus	20	50	50	100		Long time		
VII. DUC PHONG COMMUNE								
1. Sweet potato	100	100	90	100		Long time		
2. Lettuce	100	30	50	50	50	>5		
3. Onion	50	30	40	20	80	Long time		
4. Egg plant	20	10	5	90	10	>5		
5. Bitter gourd	20	20	50	100		>5		
VIII. HANH PHUOC COMMUNE								
1. Sweet potato	200	100	100	100		Long time		
2. Onion	100	2	30	20	80	Long time		
3. Sauropus	50	10	10	20	80	>5		
4. Lettuce	20	30	20	50	50	>5		
5. Hot pepper	50	10	10	10	90	>5		
6. Eggplant	50	10	20	80	20	>5		
7. Pumpkin	30	50	50	80	20	>5		
IX. PHO CHAU COMMUNE								
1. Kangkong	30	10	10	100		>5		
2. Eggplant	10	1	5	100		>5		
3. Sweet potato	50	100	100	100		Long time		
4. Bunching Onion	50	5	2	5	95	Long time		

Table 6: Fruit trees (commune averages & unique lists of existing vegetables where applicable)

Current veget. kinds	Quantity (plants/hh)	% of household who have		Contribution to (%)		Years that crop has been grown	Any program or demonstrations from GOV in previous years	Evaluation of impact of these programs
		PRA at commune	Hhs interviewed	Consumption	Sale			
I. SON HAI COMMUNE								
1. Jack fruit	5	90	100	100		Long time		
2. Banana	8	100	100	50	50	>2		
3. Papaya	3	90	90	100		>2		
4. Mango	0.5	5	50	-	-	>3	Demonstrations of Centre for Agri. Extension with area 1 ha	Become to die due to lack of water
II. SON TRUNG COMMUNE								
1. Mango	3	50	50	-	-	>4	Centre of Agri. Extension supplied some seedlings	Have not fruit
2. Star apple	3	30	50	100		>5		
3. Guava	6	50	60	50	50	>3		
4. Orange	5	80	100	100		>4		
5. Lemon	4	20	20	80	20	>2		
6. Banana	15	100	100	90	10	>2	Crop diversification project introduced banana from tissue culture	Good result in some first years, banana is now not good due to lack of taking care
7. Jack fruit	3	100	100	100		Long time		
8. Pine apple	10	50	30	50	50	>2		
9. Papaya	5	100	80	100		>2		
III. SON GIANG COMMUNE								
1. Mango	2	10	30	-	-	>5		
2. Orange	1	3	10	90	10	5		
3. Lemon	1	90	80	50	50	5		
4. Guava	15	20	80	80	20	>2		
5. Jack fruit	4	100	90	100		Long time		

Current veget. kinds	Quantity (plants/hh)	% of household who have		Contribution to (%)		Years that crop has been grown	Any program or demons. from GOV in previous years	Evaluation of impact of these programs
		PRA at commune	Hhs interviewed	Consumption	Sale			
6. Banana	15	100	100	10	90	>3	Crop diversification project introduced banana from tissue culture	Good result in some first years, banana is now not good due to lack of taking care
7. Papaya	5	100	100	90	10	>2		
8. Watermelon	1000m2	30	50	5	90	>3		
IV. BINH MINH COMMUNE								
* Home garden								
1. Guava	3	80	100	80	20	>2		
2. Orange	15	15	50	10	90	>4	Crop diversification project introduced grafting orange	Good result but local people lack of technology and orange damaged by disease and nutrient disorder
3. Mango	3	10	30	-	-	>5	Centre of Agri. Extension supplied some seedlings	Have not fruit
4. Papaya	5	100	100	50	50	>2		
5. Jack fruit	3	100	100	100		Long time		
6. Pine apple	10	20	10	50	50	>3		
7. Dragon	5	10	20	100		>2		
8. Banana	25	100	100	10	90	>2		
* Hill garden								
1. Guava	400	5	15	5	95	>2	(3hhs in Duc An village)	
2. Lemon	30	2	15	10	90	2		
3. Papaya	100	10	15	50	50	2		
4. Longan	30	5	15	-	-	2		
V. NGHIA THO COMMUNE								
1. Jack fruit	5	100	100	100		Long time		
2. Pine apple	15	20	20	100		>3		
3. Banana	12	100	100	50	50	>2		

Current veget. kinds	Quantity (plants/hh)	% of household who have		Contribution to (%)		Years that crop has been grown	Any program or demons. from GOV in previous years	Evaluation of impact of these programs
		PRA at commune	Hhs interviewed	Consumption	Sale			
4. Mango	0.5	5	10	-		>2		
VI. TINH THO COMMUNE								
1. Guava	220	100	100	5	95	>2	5 hhs grown>500 plants	
2. Mango	5	50	50	-	-	>5	Demons from Centre of Agri. Extension on 3 ha	Have not fruit, local people want to cut
3. Banana	10	90	100	10	90	>2		
4. Jack fruit	5	100	100	100		Long time		
5. Cashew nut	500	20	5		100	>3	Grown in the hill	
6. Watermelon	1000m2	50	20	5	90	>3	Grown in the hill	
VII. DUC PHONG COMMUNE								
1. Sapodilla	5	10	20	50	50	5		
2. Guava	10	90	100	50	50	>3		
3. Mango	2	10	30	-	-	>5	Centre of Agri. Extension supplied some seedlings	Have not fruit
4. Banana	10	10	20	10	90	2	Crop diversification project introduced banana from tissue culture	Good result in some first years, banana is now not good due to lack of taking care
5. Jack fruit	3	100	100	100		Long time		
6. Pine apple	20	30	50	50	50	>2		
7. Papaya	5	50	50	70	30	2		
VIII. HANH PHUOC COMMUNE								
1. Rambutan	5	5	20	80	20	6	Centre of Agri. Extension supplied some seedlings	Lack of technology, and soil is not so suitable
2. Mango	3	1	20	-	-	5		
3. Sapodilla	2	2	10	50	50	>3		
4. Orange	1	2	10	100		>3		
5. Banana	25	80	100	15	85	>2		
6. Jack fruit	3	100	100	100		Longtime		
7. Guava	5	50	50	100		>3		

Current veget. kinds	Quantity (plants/hh)	% of household who have		Contribution to (%)		Years that crop has been grown	Any program or demons. from GOV in previous years	Evaluation of impact of these programs
		PRA at commune	Hhs interviewed	Consumption	Sale			
IX. PHO CHAU COMMUNE								
1. Coconut	15	95	100	40	60	Long time		
2. Guava	10	1	20	20	80	>3	1 hh grown >100 trees	
3. Banana	10	60	50	50	50	>2		
4. Jack fruit	2	10	30	100		Long time		
5. Anona	3	10	20	60	40	>3		
6. Watermelon	500m2	10	20	10	90	>3	Grown in the field	

3. Current situation of home garden at nine Program communes

Table 7: Analysis of factors affecting fruit tree & vegetable production in surveyed communes

Opportunities	Problems Category	Specific Issues	Solutions	Suggested activities to achieve this
I. SON HAI COMMUNE				
<ul style="list-style-type: none"> - Large land area - Rather good soil fertility Abundant labor 	Markets	<ul style="list-style-type: none"> - A lack of market information - Difficult in transport - Difficult to sell products 	<ul style="list-style-type: none"> - Provide market information - Improve infrastructure - Looking for traders 	<ul style="list-style-type: none"> - Deliver leaflets on market information - Design production zone to attract traders
	Water	<ul style="list-style-type: none"> - Lack of water in dry season 	<ul style="list-style-type: none"> - Well construction - Introduce suitable kinds of fruit trees and vegetables 	<ul style="list-style-type: none"> - Well construction - Loan capital - Support seedlings for demonstration - Teach farmers where they can get resistant varieties
	Seed	<ul style="list-style-type: none"> - Lack of seed & seedlings - Less kinds of fruit tree and vegetables 	<ul style="list-style-type: none"> - Improve seedling quality - Introduce high quality seed supply sources 	<ul style="list-style-type: none"> - Train farmers to recognize good quality seedlings - Train farmers on propagation method from good quality seedlings at local
	Education and awareness	<ul style="list-style-type: none"> - Low education and awareness 	<ul style="list-style-type: none"> - Improving awareness and knowledge 	<ul style="list-style-type: none"> - Train farmers in role of nutritional source from home garden - Conduct demonstration
	Protect product	<ul style="list-style-type: none"> - Have no fence among households 	<ul style="list-style-type: none"> - Make fence among households 	<ul style="list-style-type: none"> - Group establishing to grow fruit trees and vegetables
	Technology	<ul style="list-style-type: none"> - Lack of technology 	<ul style="list-style-type: none"> - Improving technology 	<ul style="list-style-type: none"> - Train farmers on techniques of growing fruit trees and vegetables - Conduct demonstration

Opportunities	Problems Category	Specific Issues	Solutions	Suggested activities to achieve this
II. SON TRUNG COMMUNE				
<ul style="list-style-type: none"> - Large land area - Abundant labor - Farmers have ambitious to access technology - Easy to consume in the market 	Water	- Lack of water in dry season	<ul style="list-style-type: none"> - Well construction - Introduce suitable kinds of fruit trees and vegetables 	<ul style="list-style-type: none"> - Well construction - Loan capital - Support seedlings for demonstration - Teach farmers where they can get resistant varieties - Growing drought tolerant fruit trees
	Seed	- Lack of seed & seedlings	<ul style="list-style-type: none"> - Improve seedling quality - Introduce high quality seed supply sources 	<ul style="list-style-type: none"> - Train farmers to recognize good quality seedlings - Train farmers on propagation method from good quality seedlings at local
	Technology	- Lack of technology in fruit trees and vegetables growing	- Improving technology	<ul style="list-style-type: none"> - Train farmers on techniques of growing fruit trees and vegetables - Conduct demonstration
	Diseases	- Pests and diseases cause damages on fruit trees (orange - greening disease and mango)	<ul style="list-style-type: none"> - Techniques application following guidelines - Control measures 	<ul style="list-style-type: none"> Train farmers how to control these diseases Train IPM for farmers
	Capital	- Lack of capital	Capital support	Loan capital with low rate of interest
	Soil fertility	- Low soil fertility	- Improving soil fertility	<ul style="list-style-type: none"> - Organic fertilizer application - Soil conservation by intercropping and rotation with legume crops.
III. SON GIANG COMMUNE				
<ul style="list-style-type: none"> - Large land area - Abundant labor - Fertile soil along with the river 	Technology	- Lack of technology in fruit trees and vegetables growing	- Improving technology	<ul style="list-style-type: none"> - Train farmers on techniques of growing fruit trees and vegetables - Conduct demonstration
	Seed	- Lack of seed & seedlings	<ul style="list-style-type: none"> - Improve seedling quality - Introduce high quality seed supply sources 	<ul style="list-style-type: none"> - Train farmers to recognize good quality seedlings - Train farmers on propagation method from good quality seedlings at local

Opportunities	Problems Category	Specific Issues	Solutions	Suggested activities to achieve this
	Capital	- Lack of capital	- Capital support	- Loan capital with low rate of interest - support seedlings
	Market	- A lack of market information - Low quality of product - Transportation	- Provide market information - Improve infrastructure - Looking for traders - Improve product quality	- Deliver leaflets on market information - Design production zone to attract traders - select good variety and apply right techniques
	Education and awareness	- Low education and awareness	- Improving awareness and knowledge	- Train farmers in role of nutritional source from home garden - Conduct demonstration
IV. BINH MINH COMMUNE				
<ul style="list-style-type: none"> - Large land area - Abundant labor - Fertile soil area along with the river - Near industrial zone 	Technology	- Lack of technology in fruit trees and vegetables growing	Improving technology	- Train farmers on techniques of growing fruit trees and vegetables - Conduct demonstration
	Seed	- Lack of seed & seedlings	- Improve seedling quality - Introduce high quality seed supply sources	- Train farmers to recognize good quality seedlings - Train farmers on propagation method from good quality seedlings at local
	Capital	- Lack of capital	Capital support	- Loan capital with low rate of interest - support seedlings
	Pest and diseases	- Pests and diseases cause damages on fruit trees (orange - greening disease and aphid)	- Techniques application following guidelines - Control measures	Train farmers how to control these diseases Train integrated pest management (IPM) for farmers
	Small scale production	- Only production for home consumption	Commodity production	- Design production zone - Conduct demonstration

Opportunities	Problems Category	Specific Issues	Solutions	Suggested activities to achieve this
	Natural condition	- Drought (Loc Thanh and Duc An) and Flood (My Lang)	- Well construction - Introduce suitable kinds of fruit trees and vegetables	- Well construction - Loan capital - Support seedlings for demonstration - Teach farmers where they can get resistant varieties - Growing drought and flood tolerant fruit trees
V. NGHIA THO COMMUNE				
- Large land area - Abundant labour	Water	- Lack of water in dry season	- Well construction - Introduce suitable kinds of fruit trees and vegetables	- Well construction - Loan capital - Support seedlings for demonstration - Teach farmers where they can get resistant varieties - Growing drought tolerant fruit trees
	Seed	- Lack of seed & seedlings	- Improve seedling quality - Introduce high quality seed supply sources	- Train farmers to recognize good quality seedlings - Train farmers on propagation method from good quality seedlings at local
	Technology	- Lack of technology in fruit trees and vegetables growing	- Improving technology	- Train farmers on techniques of growing fruit trees and vegetables - Conduct demonstration
	Capital	- Lack of capital	- Capital support	- Loan capital with low rate of interest - Support seedlings
	Small scale production	- Only production for home consumption	- Commodity production	- Design production zone - Conduct demonstration
	Education and awareness	- Low education and awareness	- Improving awareness and knowledge	- Train farmers in role of nutritional source from home garden - Conduct demonstration

Opportunities	Problems Category	Specific Issues	Solutions	Suggested activities to achieve this
VI. TINH THO COMMUNE				
<ul style="list-style-type: none"> - Large land area - Abundant labour - Soil is suitable with fruit trees - Water enough condition (except Tho Tay and Tho Nam villages) 	Market	<ul style="list-style-type: none"> - Low price - Low product quality 	<ul style="list-style-type: none"> - Provide market information - Improve fruit quality - Looking for traders 	<ul style="list-style-type: none"> - Deliver leaflets on market information - Design production zone to attract traders - Introduce good seed sources supply
	Small scale production	<ul style="list-style-type: none"> - Only production for home consumption 	Commodity production	<ul style="list-style-type: none"> - Design production zone - Conduct demonstration - Capital loan
	Seed	<ul style="list-style-type: none"> - Lack of seed & seedlings - High seedling price 	<ul style="list-style-type: none"> - Improve seedling quality - Introduce high quality seed supply sources 	<ul style="list-style-type: none"> - Train farmers to recognize good quality seedlings - Train farmers on propagation method from good quality seedlings at local
	Technology	<ul style="list-style-type: none"> - Lack of technology in fruit trees and vegetables growing 	<ul style="list-style-type: none"> - Improving technology 	<ul style="list-style-type: none"> - Train farmers on techniques of growing fruit trees and vegetables - Conduct demonstration
	Capital	<ul style="list-style-type: none"> - Lack of capital 	<ul style="list-style-type: none"> - Capital support 	<ul style="list-style-type: none"> - Loan capital with low rate of interest - support seedlings
	Diseases	<ul style="list-style-type: none"> -Pests and diseases cause damages on fruit trees (guava - fungi- disease and aphid) 	<ul style="list-style-type: none"> - Techniques application following guidelines - Control measures 	<ul style="list-style-type: none"> - Train farmers how to control these diseases - Train IPM for farmers
VII. DUC PHONG COMMUNE				
<ul style="list-style-type: none"> - Large land area - Abundant labor - Water enough condition - Farmers can access 	Seed	<ul style="list-style-type: none"> - Lack of seed & seedlings - High seedling price 	<ul style="list-style-type: none"> - Improve seedling quality - Introduce high quality seed supply sources 	<ul style="list-style-type: none"> - Train farmers to recognize good quality seedlings - Train farmers on propagation method from good quality seedlings at local
<ul style="list-style-type: none"> - Technology 	Technology	<ul style="list-style-type: none"> - Lack of technology in fruit trees and vegetables growing - Less opportunity to train 	<ul style="list-style-type: none"> - Improving technology 	<ul style="list-style-type: none"> - Train farmers on techniques of growing fruit trees and vegetables - Conduct demonstration

Opportunities	Problems Category	Specific Issues	Solutions	Suggested activities to achieve this
VIII. HANH PHUOC COMMUNE				
<ul style="list-style-type: none"> - Water enough condition - Abundant labour - High fertile soil 	Seed	<ul style="list-style-type: none"> - Lack of high yielding seed & seedlings 	<ul style="list-style-type: none"> - Improve seedling quality - Introduce high quality seed supply sources - Introduce high yielding varieties. 	<ul style="list-style-type: none"> - Train farmers to recognize good quality seedlings - Train farmers on propagation method from good quality seedlings at local
	Technology	<ul style="list-style-type: none"> - Lack of technology in fruit trees and vegetables growing - Less opportunity to train 	<ul style="list-style-type: none"> - Improving technology 	<ul style="list-style-type: none"> - Train farmers on techniques of growing fruit trees and vegetables - Conduct demonstration
	Natural condition	<ul style="list-style-type: none"> - Submergence in 3 months (August - October) 	<ul style="list-style-type: none"> - Introduce suitable variety 	<ul style="list-style-type: none"> - Plant fruit trees to tolerate with submergence condition
	Small scale production	<ul style="list-style-type: none"> - Only production for home consumption - Have not concentrated fruit trees growing area 	<ul style="list-style-type: none"> - Commodity production 	<ul style="list-style-type: none"> - Design production zone - Conduct demonstration - Capital loan
IX. PHO CHAU COMMUNE				
	Market	<ul style="list-style-type: none"> - Low price - Lack market information 	<ul style="list-style-type: none"> - Provide market information - Improve fruit quality - Looking for traders 	<ul style="list-style-type: none"> - Deliver leaflets on market information - Design production zone to attract traders
	Soil fertility	<ul style="list-style-type: none"> - Low soil fertility 	<ul style="list-style-type: none"> - Improving soil fertility 	<ul style="list-style-type: none"> - Organic fertilizer application - Soil conservation by intercropping and rotation with legume crops.
	Water	<ul style="list-style-type: none"> - Lack of water in dry season 	<ul style="list-style-type: none"> - Well construction - Introduce suitable kinds of fruit trees and vegetables 	<ul style="list-style-type: none"> - Well construction - Loan capital - Support seedlings for demonstration - Teach farmers where they can get resistant varieties - Growing drought tolerant fruit trees

Opportunities	Problems Category	Specific Issues	Solutions	Suggested activities to achieve this
	Technology	- Lack of technology in fruit trees and vegetables growing - Less opportunity to train	- Improving technology	- Train farmers on techniques of growing fruit trees and vegetables - Conduct demonstration
	Pest and disease	- Coconut and guava	- Techniques application following guidelines - Control measures	- Train farmers how to control these diseases - Train integrated pest management for farmers
	Capital	- Lack of capital	- Capital support	- Loan capital with low rate of interest - Support seedlings

4. Home garden scale at nine Program communes

Table 8: Home garden scale at nine Program communes

No.	Commune	Scale of home garden (m ²)	% hhs applied at communes from PRA at communes	Actual average area of home garden from household interview (m ²)
1	Son Hai	<500	30	1670
		500 -1000	60	
		>1000	10	
2	Son Trung	<500	70	560
		500 -1000	20	
		>1000	10	
3	Son Giang	<500	10	1380
		500 -1000	30	
		>1000	60	
4	Nghia Tho	<500	60	460
		500 -1000	40	
		>1000	0	
5	Binh Minh	500 -1000	50	950
		>1000	50	
6	Tinh Tho	<500	20	1540
		500 -2000	70	
		>2000	10	
7	Duc Phong	<500	40	670
		500 -1000	30	
		>1000	30	
8	Hanh Phuoc	<500	87	680
		500 -1000	2	
		1500 -2500	10	
		>2500	1	
9	Pho Chau	<500	5	1250
		500 -1000	25	
		>1000	70	

Note: - The column currently called “Scale of Home garden” is actually the average area around the households – not the area actually growing the crops.

- The percentages listed are for the 3 ranges of “home garden area

5. Cropping patterns used in home garden

Table 9: Cropping pattern in the home garden

No.	Type of crops	Cropping patterns		
		Monoculture	Intercropping	Under story to other trees
I	ANNUAL CROPS			
1	Lettuce	X	X	
2	Mustard	X	X	
3	French bean	X		
4	Cucumber	X		
5	Eggplant	X	X	
6	Onion	X		
7	Pumpkin, wax	X		
8	Sweet potato	X		
9	Bitter gourd	X		
10	Hot pepper	X		
II	PERENNIAL CROPS			
1	Coconut	X	X	
2	Cashew nut	X		
3	Pepper	X	X	
4	Areca	X	X	
III	FRUIT TREES			
1	Guava	X	X	
2	Mango	X	X	
3	Banana	X	X	X
4	Pineapple	X	X	X
5	Papaya	X	X	X
6	Jack fruit	X	X	
7	Orange	X	X	X
8	Lemon	X	X	
9	Anona	X	X	X
10	Sapodilla	X	X	
11	Dragon	X	X	X

6. Propagation methods of fruit trees

Table 10: List of the Propagation Methods

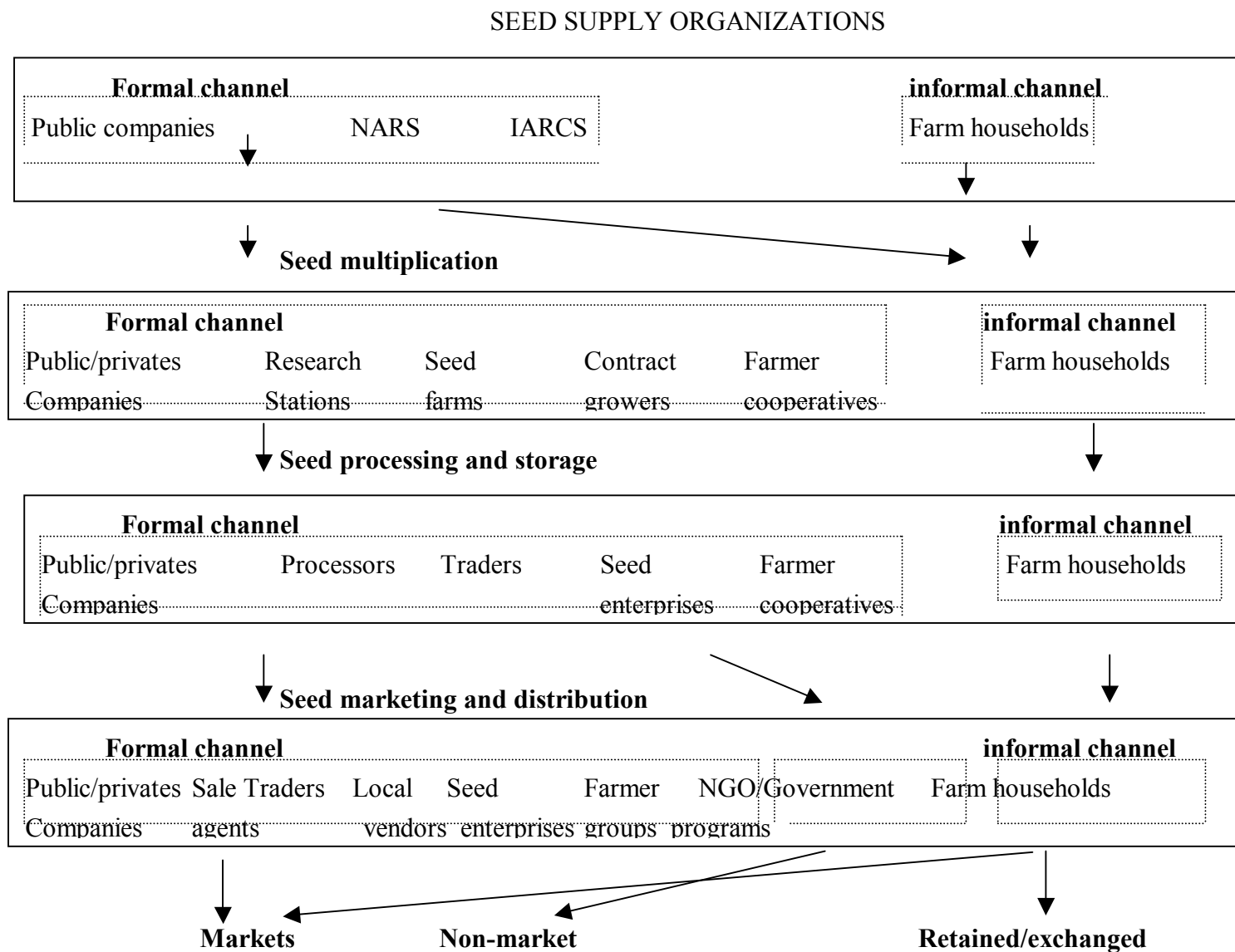
No.	Method Trees	Air layer	Cutting	Grafting	Seed	Seedling
1	Guava	X			X	
2	Mango			V	X	X
3	Papaya				X	
4	Pine apple		X			X
5	Sapodilla	V			X	X
6	Lemon	X		V	X	X
7	Orange	V		V		X
8	Dragon	X				
9	Banana		X			X
10	Anona	V			X	

Note: - X: have been used to produce the existing trees
- V: can be used to propagate these types of trees

Table 11: Identified Propagation Issues

Propagation method	Who uses	They do it well or not (Why)	Need training in the propagation method	Need other assistance to improve the propagation method	Evaluation on propagation method	Explain why good or bad
Air layer	Few farmers	Not good, lack of technology	Need training	Need tools for propagation	Good	Simple and easy to apply
Cutting	Some farmers	Good, because of simple	Need training		Good	Easy to apply
Grafting	Technician, extension staff, few farmers	Not good, lack of technology, all farmers unknown how to graft	Need training	Need tools for propagation	Good	Easy to apply
Seed	All farmers	Good because of very easy	Need training on seed preservation	Need tools for seed preservation	- Good - Bad	Simple Low quality seed or germination
Seedling	All farmers	Good, there are supports and buying from other place	Need training		Bad	Do not ensure seedling quality and high price

7. Seed source systems



- Informal seed supply systems refer to those in which seed originates from and is disseminated by small scale farmers, while formal seed supply systems typically supply modern varieties developed by plant breeders and distributed by non local institutions like national research and extension programs, seed companies, international organizations and NGOs.

- Informal seed systems are composed largely of individual farm households, each carrying out most seed systems functions - the development, multiplication, processing, storage, distribution and marketing of seeds. They include all the methods, apart from buying seed from formal sector organizations. Most of small scale farmers obtain seed of new varieties from informal seed source, primarily from within their own communities.

- The formal seed system is composed of public and private organization with specialized roles in supplying mainly new varieties. The structure, coordination and performance of formal seed systems is controlled by various rules and regulations that influence the type, quality and quantity of seed that is supplied through formal channels.

Table 12: Original rice seed sources and exchanges of fruit trees at household level

Original seeds	Guava	Mango	Papaya	Pineapple	Sapodilla	Lemon	Orange	Dragon	Banana	Anona	Vegetables
Farmers within the village	V		V	V	V	V	V	V	V	V	V
Agricultural cooperative											
Seed company shops											V
Government organizations	V	V		V			V		V		
Other sources	V	V	V			V	V	V	V	V	V

Table 13: Original rice seed sources and exchanges of program communes

District	Commune	Type of seed supply available:		
		GOV	Commercial	Informal (eg farmer to farmer)
Son Ha	Son Hai		V	v
	Son Trung		V	v
	Son Giang		V	V
Binh Son	Binh Minh	V	V	V
Tu Nghia	Nghia Tho		V	V
Son Tinh	Tinh Tho	V	V	V
Nghia Hanh	Hanh Phuoc	V	V	V
Mo Duc	Duc Phong	V	V	V
Duc Pho	Pho Chau		V	v

8. Advantages of the fruit trees currently grown

Table 14: Advantages of the fruit trees currently grown

Fruit trees	Advantages	Disadvantages	Solution	Suitable for consumption/sale
Jack fruit	<ul style="list-style-type: none"> - Traditional fruit tree - Long history - Provide fruit and vegetable for home consumption - Drought tolerant - Local adaptation - Soil adaptation - Easy to grow 	<ul style="list-style-type: none"> - Low price - Occupy land area - Low economic efficiency 	Use for pillar of pepper	No

Fruit trees	Advantages	Disadvantages	Solution	Suitable for consumption/sale
Mango	- Easy to grow - Drought tolerance	- No fruit setting - Pests and diseases	- Improving seedling quality - Technique management - Introduce seedling source providing	Both consumption and sale
Orange, lemon	- Local adaptation - Easy to grow	- Pests and disease - Lack of seedlings	- Improving seedling quality - Techniques management - Propagation from local	Both consumption and sale
Guava	- Local adaptation - Short duration - High economic efficiency - Easy to consume	- Pests and diseases - Low seedling quality	- Improve seedling quality - Technique management - Control pests and diseases - Train IPM	Both consumption and sale
Pine apple	- Local adaptation - Easy to grow - Drought and acid soil tolerance	- Low price - Low fruit quality	- Looking for market - Technique management - Select high quality variety	Consumption
Banana	- Easy to grow - Local adaptation	- Require water enough	Select good banana variety to adapt with local condition	Both consumption and sale
Rambutan	Fruit setting in off season	- Drop fruit resulting to low yield - Low fruit quality	- Technique management - Improving seedling quality	Both consumption and sale
Anona	- Drought tolerance - Easy to grow - Intercrop with other trees	- pests and diseases - Low fruit setting	- Techniques management - Select good variety	Both consumption and sale

9. Economic efficiency from home garden

Table 15: Output and value of main fruit trees in home garden from program communes

No.	Fruit trees	Output (kg/tree/year)			Value (VND/tree)		
		Average	Highest	Lowest	Average	Highest	Lowest
1	Lemon	24,54	31,00	15,00	29.550	36.000	18.000
2	Orange	21,46	30,70	15,20	54.600	83.000	38.400
3	Pepper	1,29	1,70	0,30	74.800	98.600	16.800
4	Banana	15,05	19,00	12,00	14.450	18.000	10.000
5	Pine apple	1,14	1,50	0,70	1.000	1.300	700
6	Areca	8,10	11,00	6,00	13.200	18.000	10.000
7	Sapodilla	21,55	40,00	17,00	61.800	120.000	46.800
8	Guava	40,00	50,00	20,00	80.000	100.000	40.000
9	Jack fruit	8.5	13.0	6.5	10.500	16.055	8.028

Table 16: Economic efficiency of fruit trees as monoculture growing

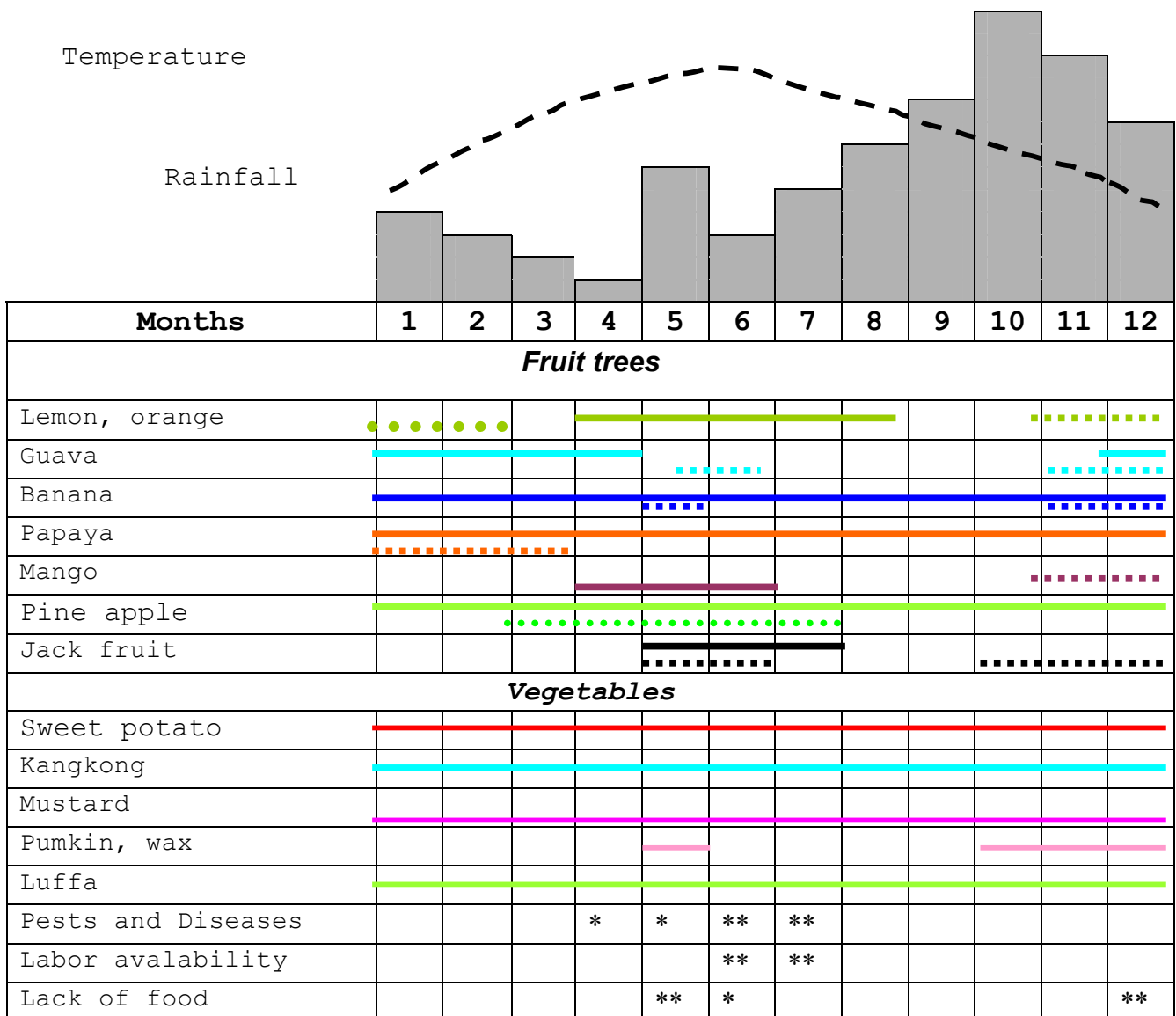
Fruit trees	Area (sao = 500m ²)	Plant density (no. of plant)	Income (1000VND)	Expenditure (1000VND)	Gross margin (1000VND)	Ranking
Lemon	1	36	1063,8	78,2	985,6	5
Orange	1	30	1638,0	78,2	1559,8	3
Banana	1	128	1849,6	89,6	1760,0	2
Pine apple	1	882	882,0	241,6	640,0	7
Areca	1	76	1003,2	92,7	901,5	6
Sapodilla	1	20	1236,0	88,4	1174.6	4
Guava	1	50	4000,0	1.225	2775,0	1
Jack fruit	1	16	176,0	20.480	156.520	8

Table 17: Economic efficiency of vegetable production (500m²/crop season)

No.	Vegetables	Total income (VND)	Total expenditure (VND)	Gross margin (VND)
1	Kangkong	744,166	437,377	306,383
2	Bitter gourd	1,192,260	784,434	404,826
3	French bean	808,925	595,000	223,925
4	Cucumber	720,000	408,200	221,800
5	Hot pepper	2,400,000	737,916	1,662,084
6	Watermelon	1,619,700	619,700	1,000,000
7	Mustard	1,181,490	559,524	621,996
8	Lettuce	1,082,240	556,062	526,178
9	Onion	1,513,580	1,029,067	484,531
10	Coriander	635,375	410,640	224,735
11	Pumpkin	1,250,000	515,000	735,000
12	Eggplant	826,400	435,100	391,300

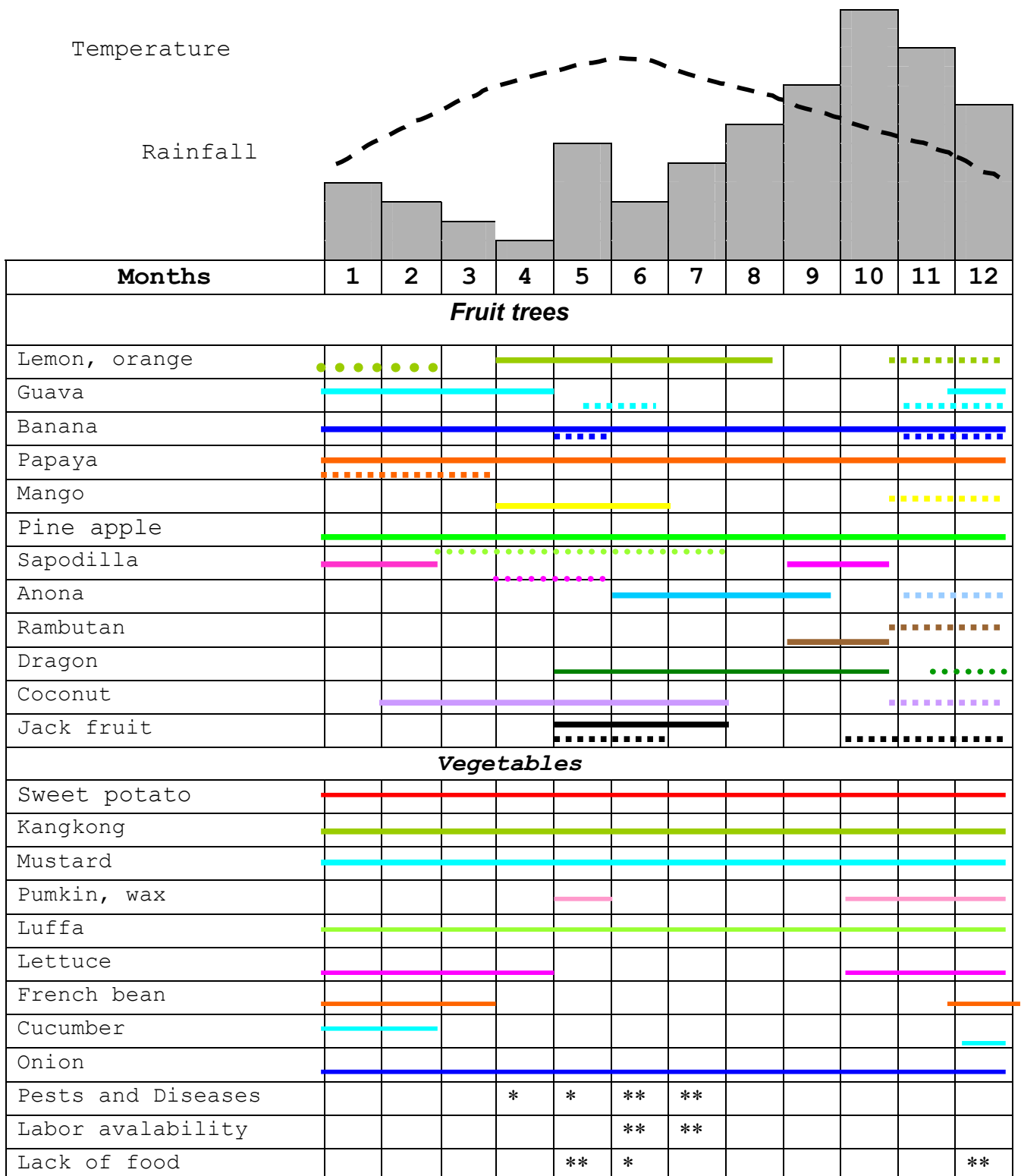
10. Seasonal calendar of fruit trees and other crops

10.1. Mountainous ecosystems (Son Trung, Son Giang, Son Hai and Nghia Tho)



Note: -----: Planting time of fruit trees
 —————: Harvesting time of fruit trees

10.2. Lowland and coastal ecosystem (Hanh Phuoc, Tinh Tho, Binh Minh, Duc Phong, Pho Chau)



11. Orientation in home garden development

11.1. Introduce some models

* *Areca - pepper - pineapple model*

- Describe model: Farmers can harvest three product kinds per area. Structure of this model includes three layers.

+ Areca is in the highest layer. We can harvest areca fruit and use this plant as pillar for pepper climbing. Because, areca stem is long and straight, story of areca is narrow which it avoid direct sunlight and heavy rainy for pepper.

+ Pepper is grown in the middle story and climbed in the areca stem, therefore decreases expenditures.

+ Pineapple is grown in the lowest layer, it can tolerate with shade condition. Growing pineapple aims to utilize soil, light, fertilizer and decreases erosion.

Plant spacing of areca (pepper) is 2.0 m x 2.5 m. We grow 1 pineapple row between two areca (pepper) row.

- Advantages of the model:

- + Increase income per area unit from 1.5 to 2 times
- + Decrease input for pepper
- + Utilize natural resource
- + Soil erosion limitation and environment protection

- Disadvantages of the model:

- + Standard of areca pillar for pepper (stem is higher than 3m) spend 8 years
- + Areca fruit harvest can affect to pepper
- + Control pepper diseases will affect to areca

* *Orange - banana - pineapple model*

- Describe model: banana and pineapple can be harvested after one-year planting. This model includes two layers:

+ Higher layer: orange and banana will be grown intercropping following strip, three orange rows with 1 banana row. Spacing between oranges are 3m x 3m and between banana are 2m x 1,5m, spacing between strips are 3m.

+ Lower layer: growing pineapple between banana row

- Advantages of the model:

- + Decrease risk due to lost harvest, year round products
- + Limit pests and diseases
- + Decrease soil erosion
- + Easy to management

- Disadvantages of this model:

- + Harvest oranges will affect to banana and pineapple
- + Have not utilized all spaces due to only 2 layers

11.2. General orientation of home garden for program commune

*** Improve knowledge and awareness for local people**

- Technical training:

Training on fruit trees and vegetable growing is needed to introduce practical techniques for the staff and farmers in program communes. Two training sessions are expected as follows:

- Initial training will be provided as soon as possible and will concentrate on introducing general techniques. The specific knowledge and skill will be introduced and discussed elaborately so those beneficiaries can understand and apply in planting fruit trees and vegetables.
- There will be a second training on the follow up techniques after running project from 8 - 10 months. The training is aimed at improving knowledge and skill learned from the initial training and giving new techniques that will be apply for the coming time.
- Training on propagation methods for fruit trees for the staff and farmers in program communes.
- Training on IPM for fruit trees and vegetables for the staff and farmers in program communes.
- Training on nutritional vegetables and fruits garden for farmers.
- Training on reclamation of mixed garden.

- Technical assistance:

- Design gardens based on local ecology and soil regime.
- Select good fruit tree seedlings help farmers in multiplication seedlings at local.
- Monitoring on situation of plant growth and development.

Field visiting and experience exchanging among project communes of from available good models.

Management practices for home garden

- Soil improvement by planting green manure and legume crops intercrop with fruit trees and vegetables or increasing organic fertilizer use.
- Design hill garden follows contour line (Son Hai, Son Trung, Son Giang and Nghia Tho communes), growing green manure trees (*Leucoena glauca* Benth, *Tephrosia*).
- Select good seedlings at local to grow in the model (banana, papaya, pumpkin).
- Arrange appropriate cropping pattern (main crops, intercropping crops, rotation).
- Investment pesticides, fertilizers for models because we can multiply seeds and seedlings from these.

Conduct demonstrations at program communes

Son Trung, Son Hai, Son Giang and Nghia Tho communes:

- Conduct VAC demonstrations on nutritional fruit trees and vegetables garden using mainly good quality plants adapted with local condition.

Orange, lemon - banana - pineapple - vegetables (sweet potato, mustard, kangkong, eggplant, beans, spices, pumpkin, gourd)

Papaya - Guava - vegetables

Combined wells from program for irrigation

Making fences (Son Hai commune)

Applied techniques management for home gardens

Passion flower (above frame) - vegetable growing above frame (centella, perilla, spices)

Bitter gourd, pumpkin - ginger, centella, spices

Pumpkin, luffa, wax above frame of pond, taro around pond

Watermelon - legumes

- Conduct VAC model through introducing new crop varieties and new techniques aiming at multiplying seeds and seedlings and transferring technology for local people.

Notes:

Select right households for model establishing

- Households have conditions enough as large land area, water source, labour availability, ambitious access to technology, exchanging experiences for neighbours if model is successful.

- Selecting new varieties use in the model which can be multiplied easy by propagation methods such as air layer, grafting and seeds and these crops have early product harvesting as well as consume in the market.

Hanh Phuoc, Tinh Tho, Duc Phong, Pho Chau and Binh Minh communes

- Protect and improve available fruit trees models (Guava models in Tinh Tho, Pho Chau communes; orange model at Binh Minh communes) through providing necessary techniques for households and loaning capital for buying equipment, fertilizer, pesticides).

- Orientation in safety vegetable production for commodity production zone (Tinh Tho, Duc Phong, Hanh Phuoc and Binh Minh) by providing information on variety, fertilizer application and pesticide using.

- Conduct demonstrations on nutritional fruit trees and vegetables garden using mainly good quality plants adapted with local condition for home consumption and commodity production

Orange, lemon - banana - pineapple - vegetables (sweet potato, mustard, changing, eggplant, beans, spices, pumpkin, gourd) (applicable at Binh Minh, Tinh tho and Pho Chau)

Guava - anona - vegetables (Tinh Tho, Pho Chau, Hanh Phuoc communes)

Coconut - anona - pineapple - vegetables (Pho Chau commune)

Guava - banana (anona) - pineapple - vegetables (Duc Phong commune)

Guava - banana - vegetables (Hanh Phuoc commune)

Passion flower (above frame) - vegetable growing above frame (centella, perilla, spices)

Bitter gourd, pumpkin - ginger, centella, spices

Pumpkin, luffa, wax above frame of pond, taro around pond

Watermelon - legumes

- Pay attention to fruit seedlings quality and hope from good models can multiply seedlings to provide for local consumption.

12. Guidelines for management practices of fruit trees and vegetables (Present later)

Limitations

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