



Cambodia HARVEST Commercial Horticulture Evaluation

June 2016

Evaluation Team

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Evaluation Background

Commercial Horticulture Program: “farming as a business”

Beneficiaries:

- **Demonstration Clients:** Farmers who demonstrate program techniques and technologies to nearby farmers
- **Training Participants:** Farmers or individuals who attend trainings
- **Producer Groups:** A number of demonstration clients come together as a group to leverage market options
- **Partner Clients:** Communities and/or agribusinesses

Evaluation Objectives

- Determining knowledge, attitude, skills and behavior change impacts on:
 - Demonstration Clients
 - Training Participants
- Comparing economic impacts of adoption of commercial horticulture technology between “Demonstration Clients” and “Training Participants.”
- Soliciting participants’ opinions and suggestions for program improvement.

Study Design

- One-shot post-hoc study
- Survey-- interview schedule
- Collected mostly quantitative data
- Few open-ended questions

Sample Selection

- Commercial Horticulture Program – 34 districts, 4 provinces
- Total beneficiaries: 9,112 households
 - 3,511 Demonstration Clients
 - 5,603 Training Participants
- Sample size: 560 households
- 50% of districts selected for geographical representation
- Selected 56 Clusters– 28 for Demo Clients and 28 for Training Participants
- Random selection of ~10 households from each cluster
- 545 interviews completed

Sample Selection

	Demo Clients			Training Participants			Total Sample	
	Popn.	# of Sample	# of cluster	Popn.	# of Sample	# of Cluster	# of Sample	# of Cluster
Battambang	1,382	110	11	1,447	72	7	183	18
Kampong Thom	633	50	5	1,248	62	7	113	12
Pursat	871	69	7	1,439	72	7	141	14
Siem Reap	625	50	5	1,469	73	7	123	12
Total	3,511	280	28	5,603	280	28	560	56

Survey Questionnaire Development

- Interview schedule was developed by evaluation team members
- The instrument was reviewed by HARVEST staff
- Changes and modifications were made
- Instrument was translated into Khmer language
- The interview schedule was field tested in Pursat outside the cluster village

Selection and Training of Enumerators

- Ten senior/junior students from Agronomy Faculty of RUA were recruited to be enumerators
- They received 2-day enumerator training (March 5 & 6)
- Participated in field-testing the instrument (March 7)

Field Data Collection

Fieldwork: March 08 – 19, 2016

- 2 teams (1 Team = 5 enumerators + 2 supervisors)
- 1 MSU staff coordinated the overall fieldwork
- 4 PE Short Course Participants supervised the fieldwork



Data Entry and Analysis

- Data were entered in SPSS
- Data were cleaned by examining frequency counts, cross-tab, and cross-checking hard copy data
- Data were analyzed using STATA and SPSS

Findings: Demo Clients and Training Participants

Description	Demo Clients (N= 287)	Training Participants (N= 258)	Pearson chi2	Sig.
<i>Gender</i>				
Male	54.70%	41.47%	9.52	0.01
Female	45.30%	58.53%		
<i>Poverty status</i>				
ID poor 1	5.92%	11.63%	23.09	0.01
ID poor 2	8.36%	19.77%		
Other	85.71%	68.60%		

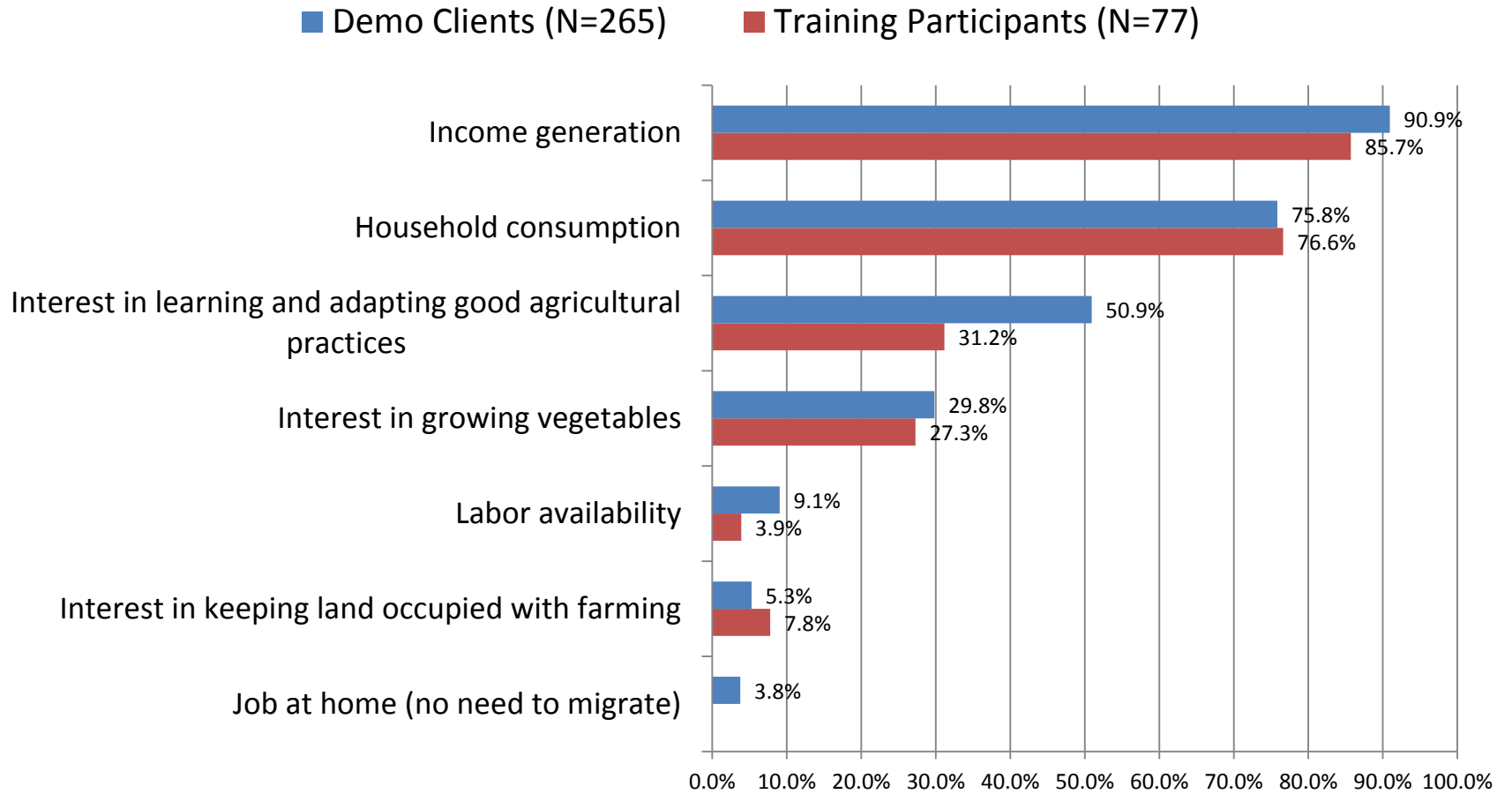
	Demo Clients Mean (SD)	Training Participants Mean (SD)	t-value	prob.
<i>Education</i>				
Years of schooling	5.29 (3.28)	4.69 (3.53)	2.07	0.05
<i>Household size</i>				
Persons engaged in CH production	2.91 (1.21)	2.56 (1.49)	2.10	0.05
Persons earning income	2.65 (1.05)	2.26 (1.17)	4.08	0.01
% of income earners	55.57 (26.03)	49.00 (24.08)	3.05	0.01

Household Growing CH Production

	Demo Clients (N=287) (%)	Training Participants (N=258) (%)
Over the last 5 years	98.61%	60.47%
In the last 12 months	92.3%	29.8%



Motivation for Commercial Horticulture



Farmers Producer Group

Description	Demo Clients (N= 265)	Training Participants (N= 77)	Pearson Chi2	Sig.
Aware of a Commercial Horticulture Farmer Producer Group in the area	43.0%	33.8%	2.11	NS
Member of a Farmer Producer Group	37.4%	9.1%	22.29	0.01
Sold Horticulture Products during the last 12 months	100.0%	96.1%	10.42	0.01
If sold, % sold thru Farmer Producer Group during the last 12 months	6.4%	2.7%	1.51	NS

	Demo Clients		Training Participants	
	N	Mean (SD)	N	Mean (SD)
Average group size (number of members)	99	10.76 (07.25)	7	10.57 (04.30)
Average % of produce "Sold Collectively"	17	61.18 (31.85)	2	53.00 (52.30)

*Reason for not selling all products collectively: different planting schedule

Use of Input in CH Production

Input	Demo Clients (N=265)	Training Participants (N=77)	Pearson chi2	Sig.
Seeds/Seedlings	99.3%	97.4%	1.75	NS
Chemical fertilizer	98.5%	81.8%	33.26	0.01
Pesticide(s)	95.1%	74.0%	30.38	0.01
Oil/gas/gasoline/diesel	94.7%	68.8%	40.48	0.01
Sprayers	84.9%	57.1%	27.39	0.01
Drip irrigation	83.4%	26.0%	94.53	0.01
Plastic mulch	80.4%	15.6%	111.29	0.01
Trellising	80.0%	44.2%	37.97	0.01
Seedling trays	78.1%	15.6%	101.29	0.01
Post-harvest materials	77.4%	36.4%	46.18	0.01
Transportation	60.4%	41.6%	8.58	0.01
Packaging Materials	59.3%	37.7%	11.2	0.01
Other	27.2%	9.1%	10.98	0.01
Hired labor	27.2%	13.0%	6.58	0.01
Land rental	16.6%	7.8%	3.79	NS

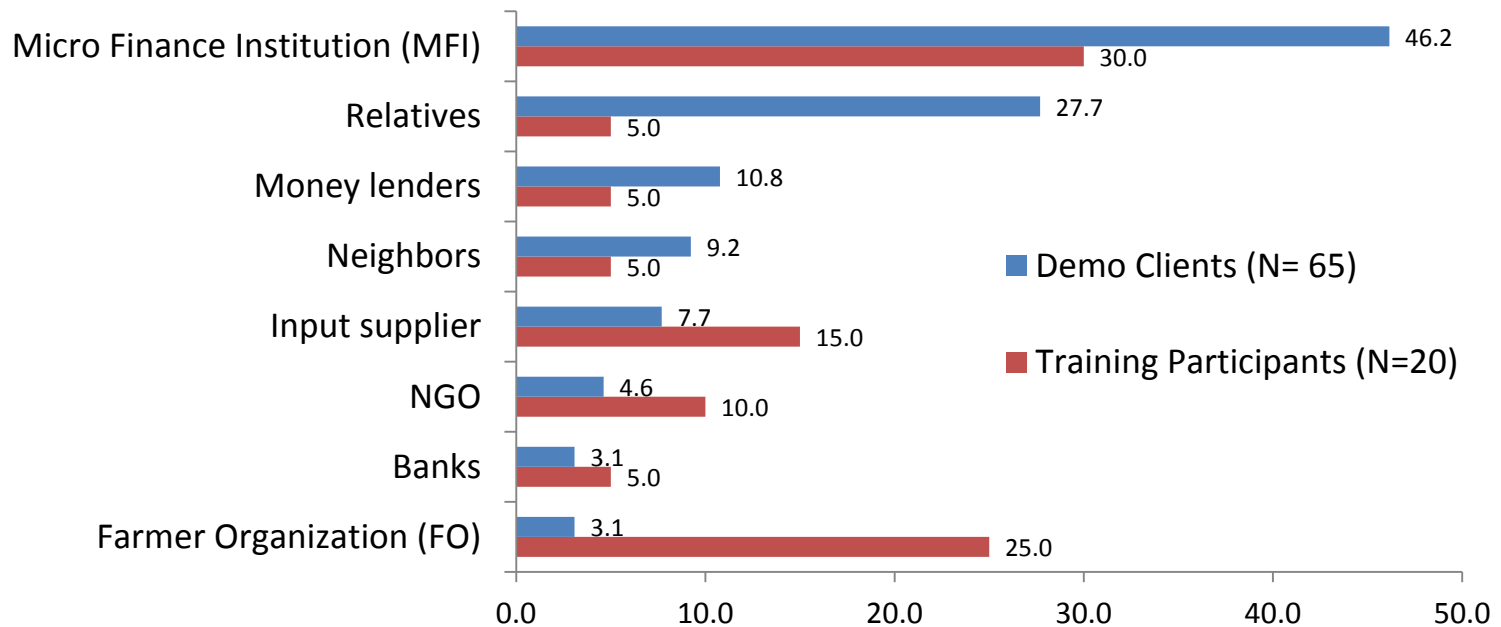
If Input Used, Average Cost of Inputs Paid by Respondent

Input Types	Demo Clients		Training Participants		t-value	prob.
	N	Mean (\$)	N	Mean (\$)		
Seeds/Seedlings	245	\$ 51.0	72	\$ 29.3	1.51	NS
Chemical fertilizer	249	\$ 78.9	60	\$ 50.4	2.17	0.05
Pesticide(s)	249	\$ 46.2	54	\$ 35.3	0.85	NS
Oil/gas/gasoline/diesel	250	\$ 78.7	49	\$ 58.4	1.13	NS
Drip irrigation	76	\$ 100.6	10	\$ 373.0	1.45	0.01
Land rental	24	\$ 79.9	4	\$ 87.5	0.18	NS
Hired labor	58	\$ 126.6	9	\$ 222.5	1.08	NS
Packaging Materials	130	\$ 10.0	25	\$ 12.4	0.68	NS
Transportation	132	\$ 26.3	27	\$ 23.5	0.27	NS
Seedling trays	69	\$ 20.0	9	\$ 20.3	0.04	NS
Plastic mulch	96	\$ 59.6	8	\$ 42.5	1.95	NS
Trellising	127	\$ 45.8	20	\$ 41.3	0.33	NS
Sprayers	59	\$ 57.1	25	\$ 45.6	1.20	NS
Post-harvest materials	9	\$ 13.1	13	\$ 5.7	2.19	0.05
Other	40	\$ 136.9	7	\$ 185.2	0.19	NS
Total Input Cost	265	\$ 403.4	76	\$ 273.5	1.74	NS

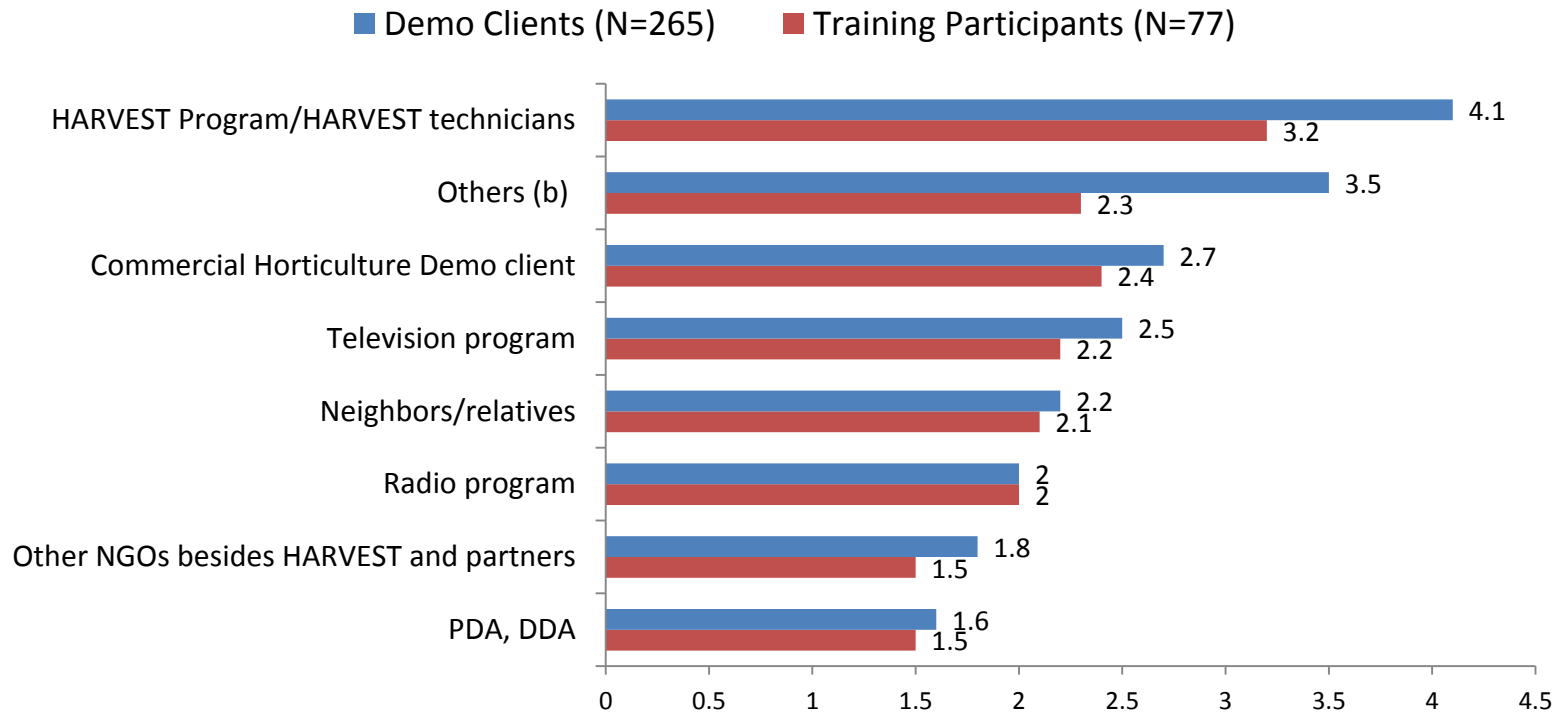
Borrowed Money to Buy Inputs for CH Production

- Borrowed money for inputs:
 - Demo Client: 24.5% (65/265)
 - Training Participants 26.0% (20/77)

Main source of money borrowed



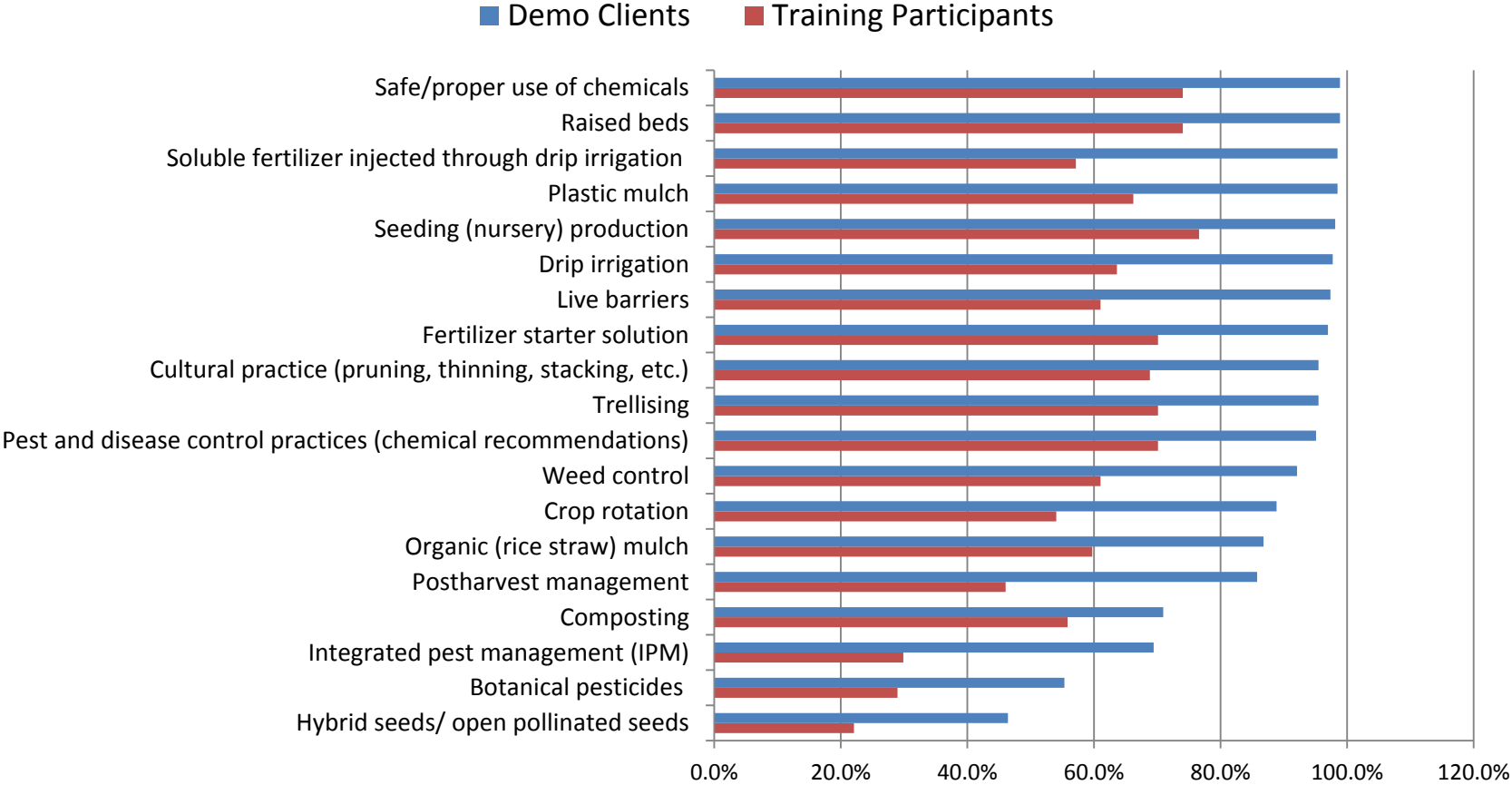
Frequency of Access to Technical Assistance



Scale: 1= Never, 2= Seldom, 3= Sometime, 4= Frequently, 5= Very frequently

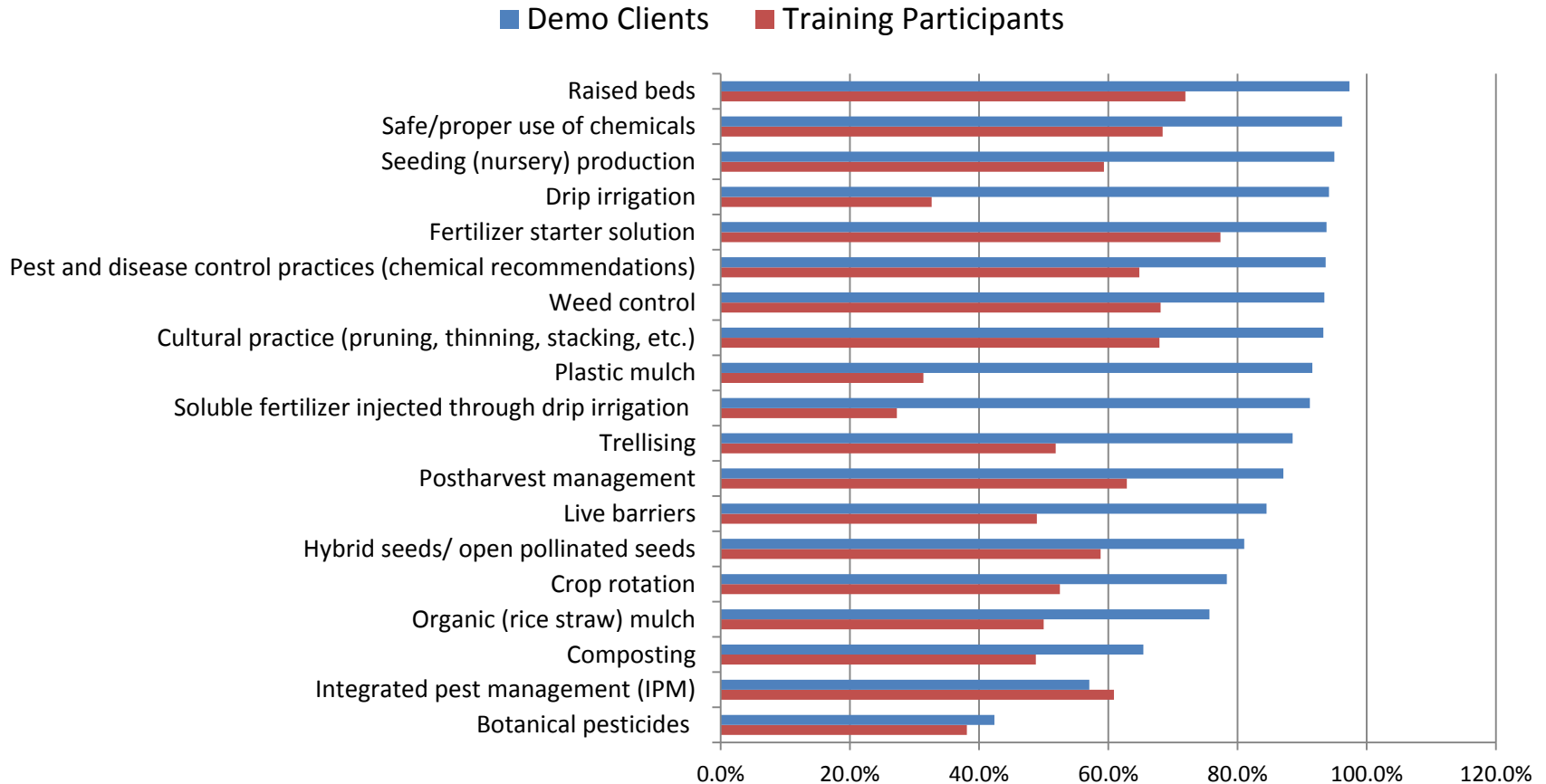
Note: Others= input supplier company, seed and pesticide promoter, village chief, Russey Vocational Training Center, Trapaing, Youtube, and Facebook

CH Technologies Learned



Note: Differences were significant for all types of **CH technologies learned** between Demo Clients and Training Participants

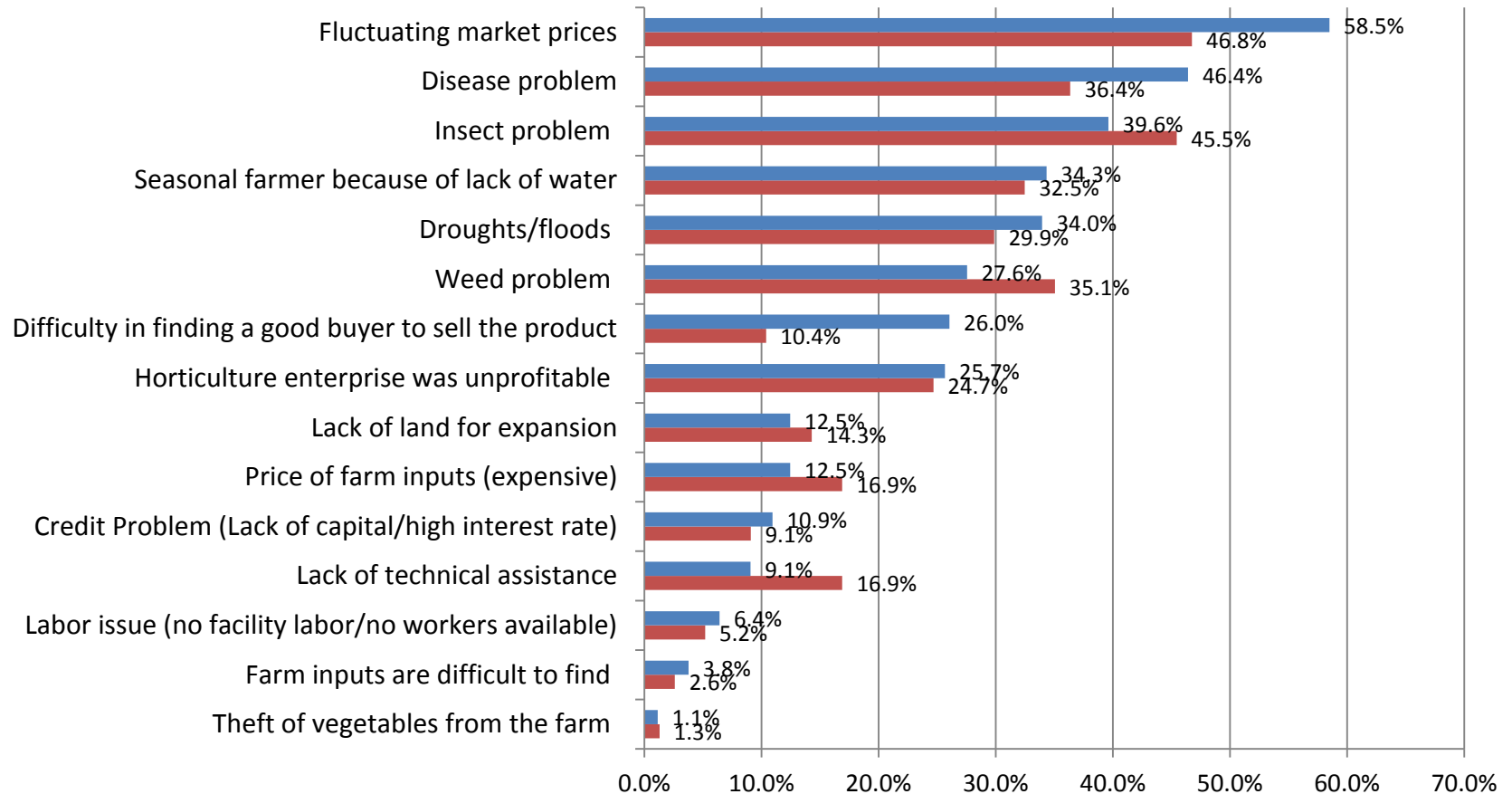
Adoption of CH Technologies



*Note: Adoption rate for all types of **CH technologies** were higher among Demo Clients than Training Participants except for “botanical pesticides” and “IPM techniques”*

Major Barriers to CH Perceived by Adopters

■ Demo Clients (N=265) ■ Training Participants (N=77)



Source of Household Income

Income sources	Demo Clients (N=287)	Training Participants (N=258)	Total (N=545)	Pearson chi2	prob.
Rice production	57.80%	36.00%	47.50%	25.87	0.01
Horticulture	91.60%	28.70%	61.80%	228.18	0.01
Fishing	8.40%	5.00%	6.80%	2.37	NS
Livestock Raising	42.50%	37.20%	40.00%	1.59	NS
Self-employment	23.70%	29.50%	26.40%	2.32	NS
Permanent labor work	22.00%	35.70%	28.40%	12.54	0.01
Seasonal labor work	20.90%	29.10%	24.80%	4.86	0.05
Others activities	17.40%	14.00%	15.80%	1.23	NS

Household Income (**Excluding Horticulture**)

Source on Income	Demo Clients		Training Participants		Total		t-value	prob.
	N	Mean	N	Mean	N	Mean		
Rice production	166	\$ 1,563.9	93	\$ 939.1	259	\$ 1,339.6	2.73	0.02
Horticulture								
Fishing	24	\$ 737.1	13	\$ 1,174.6	37	\$ 890.8	0.88	0.30
Livestock Raising	122	\$ 763.0	96	\$ 578.0	218	\$ 681.5	1.06	0.29
Self-employment	66	\$ 2,166.7	76	\$ 2,877.0	142	\$ 2,546.9	0.85	0.40
Permanent labor work	63	\$ 2,207.2	91	\$ 2,945.6	154	\$ 2,643.5	1.26	0.21
Seasonal labor work	61	\$ 1,398.1	75	\$ 829.4	136	\$ 1,084.5	1.24	0.22
Others activities	48	\$ 1,635.6	31	\$ 2,363.0	79	\$ 1,921.1	0.78	0.44
Total HH income (excl. CH income)	267	\$ 3,057.1	247	\$ 3,159.0	514	\$ 3,106.0	0.25	0.80

Household Income (Including Horticulture)

Sources	Demo Clients		Training Participants		Total		t-value	prob.
	N	Mean	N	Mean	N	Mean		
Rice production	166	\$ 1,563.9	93	\$ 939.1	259	\$ 1,339.6	2.73	0.02
Horticulture	263	\$ 1,544.0	74	\$ 658.8	337	\$ 1,349.6	4.53	0.00
Fishing	24	\$ 737.1	13	\$ 1,174.6	37	\$ 890.8	0.88	0.30
Livestock Raising	122	\$ 763.0	96	\$ 578.0	218	\$ 681.5	1.06	0.29
Self-employment	66	\$ 2,166.7	76	\$ 2,877.0	142	\$ 2,546.9	0.85	0.40
Permanent work	63	\$ 2,207.2	91	\$ 2,945.6	154	\$ 2,643.5	1.26	0.21
Seasonal work	61	\$ 1,398.1	75	\$ 829.4	136	\$ 1,084.5	1.24	0.22
Others activities	48	\$ 1,635.6	31	\$ 2,363.0	79	\$ 1,921.1	0.78	0.44
Total HH income (Including CH income)	286	\$ 4,273.8	256	\$ 3,238.3	542	\$ 3,784.7	2.47	0.01

Area (sq. m.) and Net Income from Commercial Horticulture

Income Indicators	Demo Clients		Training Participants		Total		Difference	
	N	Mean	N	Mean	N	Mean	t-value	prob.
Area of CH production in 2015 -2016 (m2)	265	3,937.7m2	77	2,341.8m2	342	3,578.4	2.64	0.01
Net CH income in 2015-2016 (\$USD)	263	\$ 1,138.8	73	\$ 390.0	336	\$ 976.1	5.04	0.01
Net CH Income in 2015-2016 per m2 (\$USD)	263	\$ 0.32	73	\$ 0.25	336	\$ 0.31	1.25	0.21

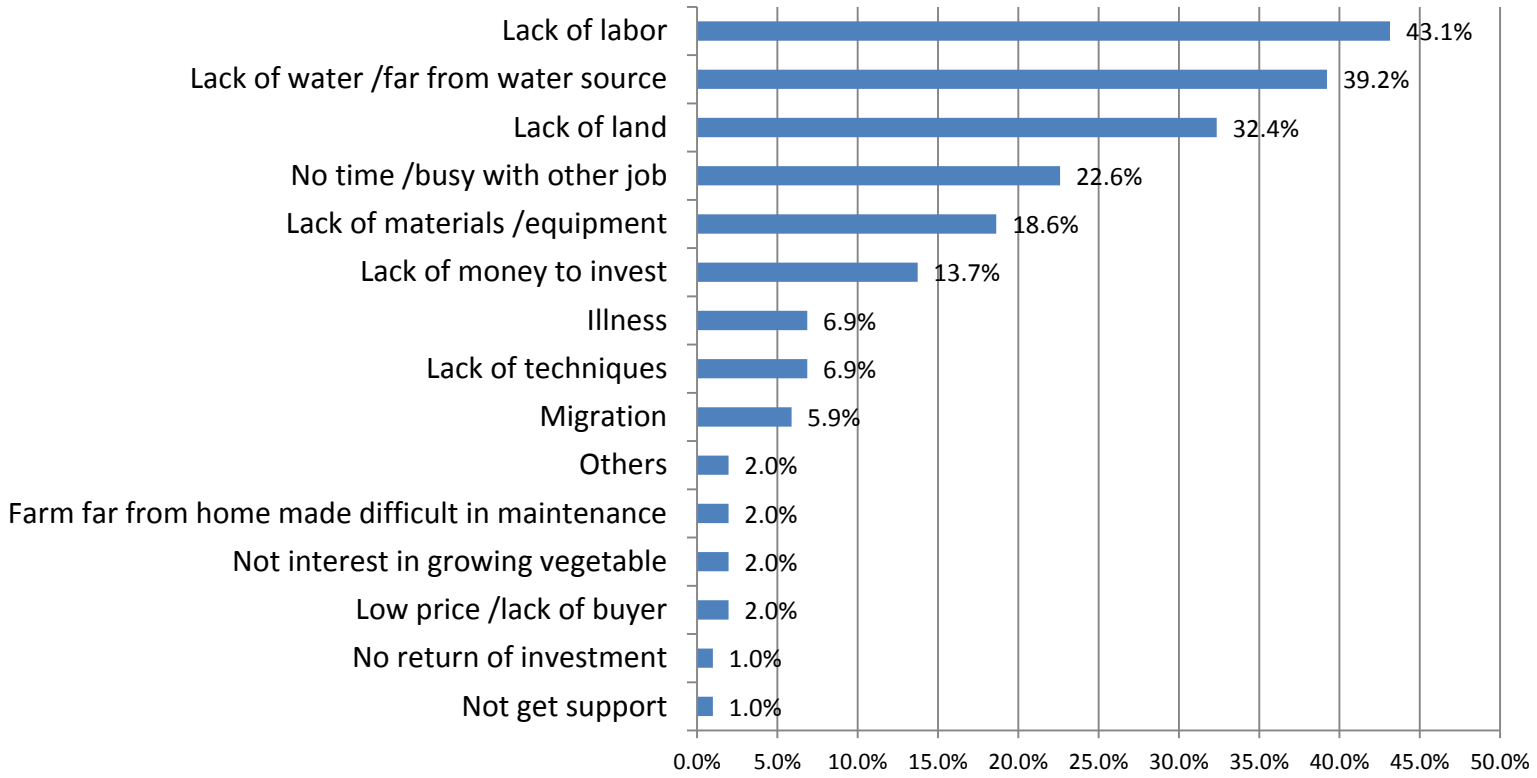
- Higher gross and net commercial horticulture income among Demo Clients than Training Participants.

Impact of CH on Household Income

Group	Before HARVEST	Past 12 months	Mean Difference	t-value (Sig.)
Demo Client	\$ 1,012	\$1,562	+ \$550	3.61 (.01)
Training Participants	\$ 561	\$ 692	+ \$131	1.0 (.32)
		Difference	= \$419	
		t-value (Sig)	2.01 (0.05)	

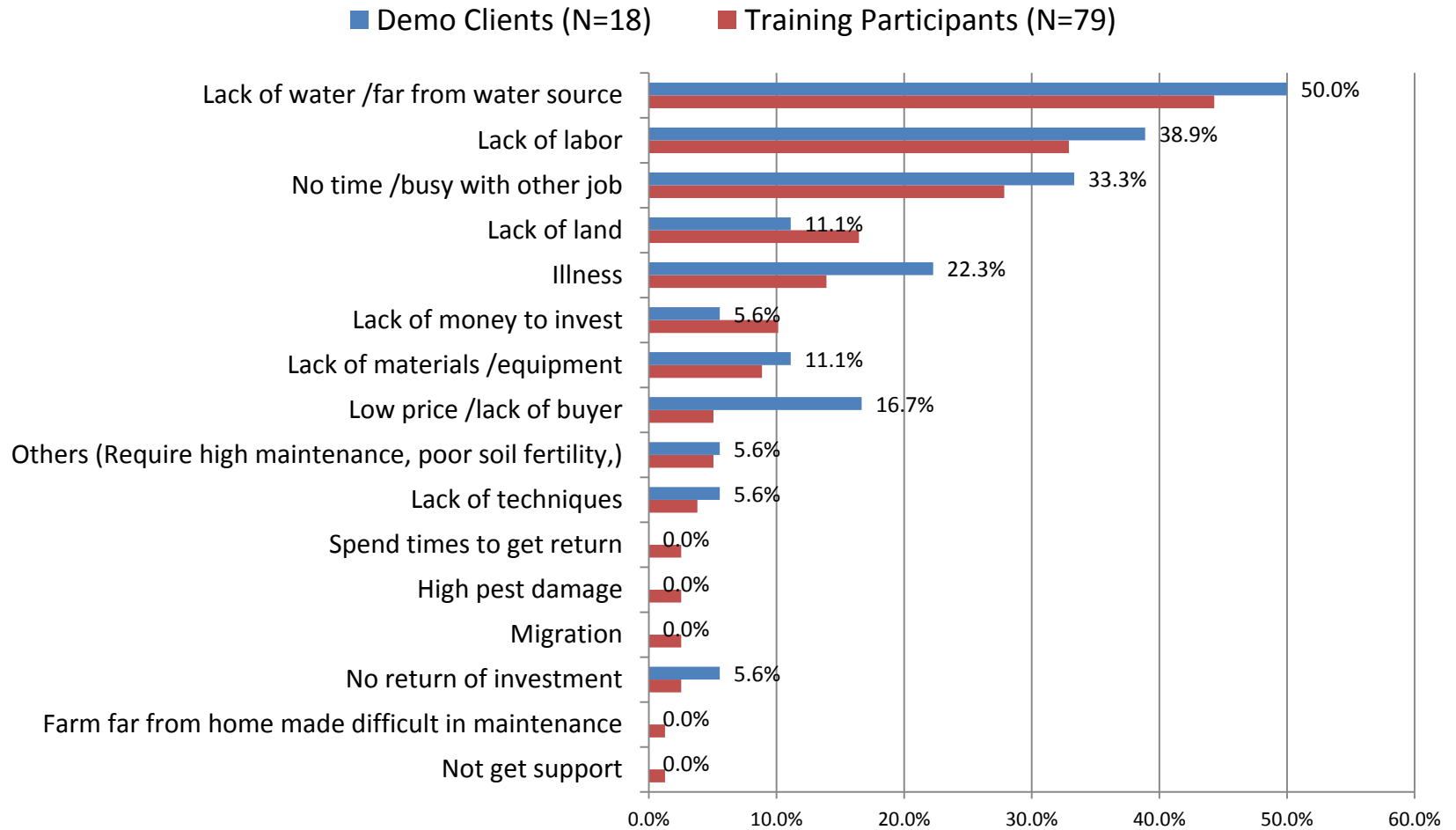
Non-adoption: Reason Behind Farmers Not Starting CH Production

■ Training Participants (N=102)



Note: only 4 Demo Clients did not start the home vegetables /CH production

Discontinuance: Reason Behind Not Growing CH Crops During the Last 12 Months



Conclusion

Economic impact of adoption of commercial horticulture technologies

- 98% Demonstration Clients and 60% Training Participants grew vegetables in the last 5 years.
- Adoption dropped to 92% for Demo Clients and 30% for Training Participants in the past year.
- Differential impact of CH program was found between Demonstration Clients and Training Participants with the former more inclined to adopt recommended CH practices than the latter.
- Demonstration Clients reported significant increase in income as a result of participation in HARVEST Program. No significant difference was observed for Training Participants.

Conclusion

Participants' opinions and suggestions for program improvement:

- Lack of irrigation and shortage of labor were the most frequently cited problems for adoption of commercial horticulture technologies by both groups.
- Demo Clients suggested more trainings on new technologies followed by marketing support.
- Training Participants wanted more support in materials and equipment followed by training on new technologies.
- Training participants -- irrigation water management is more important than provision of market information.
- Training participants are still struggling with production and it may take some time before they start thinking about marketing of products.

Implications and Recommendation

- Promote water conserving and labor saving technologies.
- Demo farmers show a promise to serve as change agents at the village level. Extension service could use this approach to disseminate new technology.
- More hands-on training on disease and pest control, use of IPM and botanical pest control practices.
- Initiate/strengthen programs to link farmers to markets.
- Further develop “farmer producer groups” to enable them for input supply and marketing services.

Thank you

Questions and feedback are welcome!

Acknowledgement



This evaluation was supported through the United States Agency for International Development (USAID) Michigan State University Food Security III Cooperative Agreement.

<http://fsg.afre.msu.edu/>

Leader with Associates # AID-442-LA-12-00001

The study was made possible by the generous support of the American people through USAID.

The contents are the responsibility of the authors and do not necessarily reflect the views of USAID, the United States government or Michigan State University.