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AQUATIC PRODUCTION SYSTEMS IN PERI-URBAN OF HO CHI MINH CITY: *PAPUSSA STUDIES*

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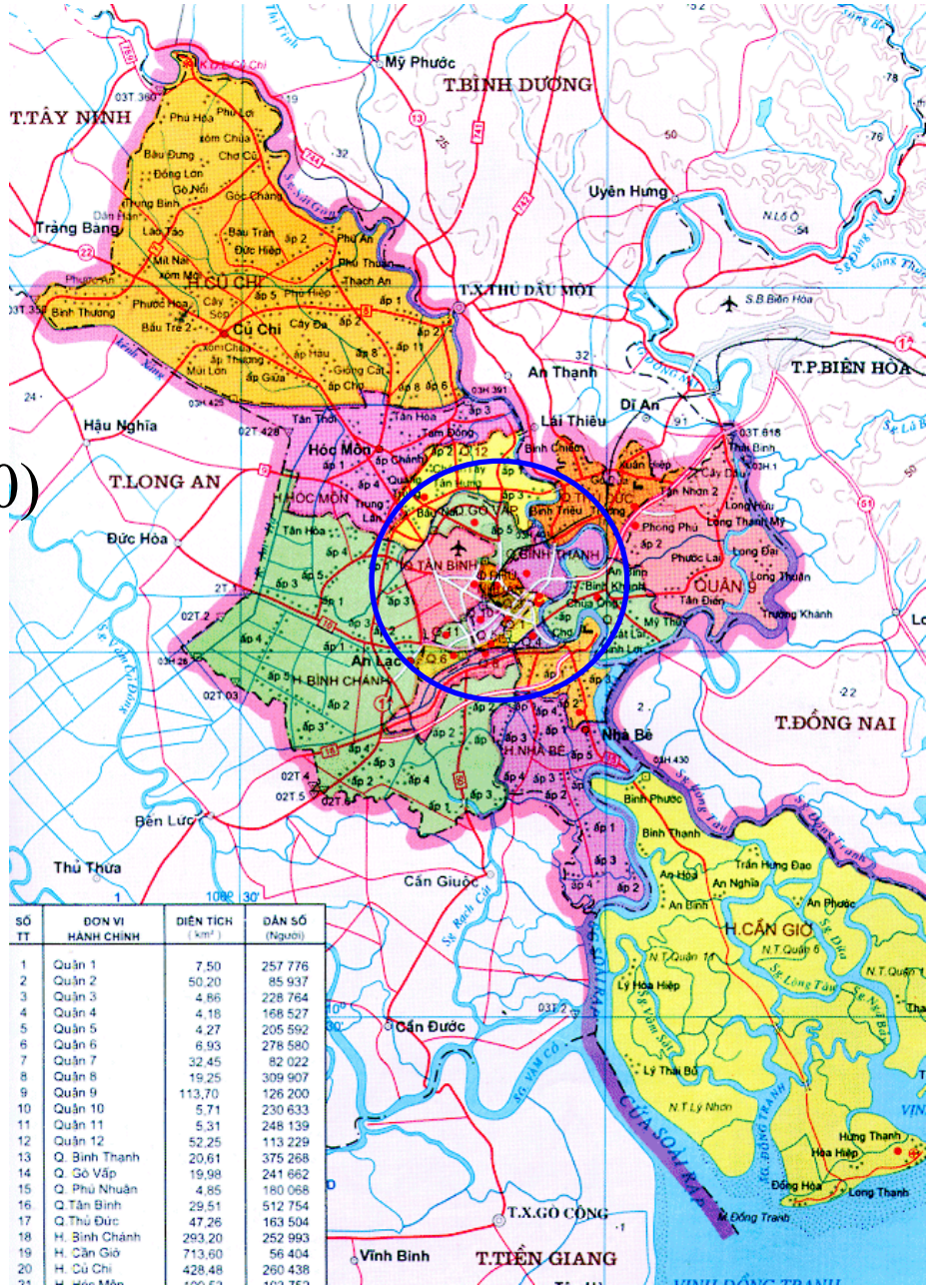
MAP OF HO CHI MINH CITY

- Biggest city of Vietnam
- Population over 5.5 millions (2000)
- Agricultural land is still high (60-70%
- Urbanization speed up recently
- Aquatic production systems cover a large area of HCM peri-urban to profit land and water available



SỐ TT	ĐƠN VỊ HÀNH CHÍNH	DIỆN TÍCH (km²)	DÂN SỐ (Người)
1	Quận 1	7,50	257 776
2	Quận 2	50,20	85 937
3	Quận 3	4,86	228 764
4	Quận 4	4,18	168 527
5	Quận 5	4,27	205 592
6	Quận 6	6,93	278 580
7	Quận 7	32,45	82 022
8	Quận 8	19,25	309 907
9	Quận 9	113,70	126 200
10	Quận 10	5,71	230 633
11	Quận 11	5,31	248 139
12	Quận 12	52,25	113 229
13	Q. Bình Thạnh	20,61	375 268
14	Q. Gò Vấp	19,98	241 662
15	Q. Phú Nhuận	4,85	180 068
16	Q.Tân Bình	29,51	512 754
17	Q.Thủ Đức	47,26	163 504
18	H. Bình Chánh	293,20	252 993
19	H. Cần Giờ	713,60	56 404
20	H. Củ Chi	428,48	260 438

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AQUATIC PRODUCTION SYSTEMS IN PERI-URBAN OF HCM

Aquatic production systems in Peri-urban 2 types:

- Wastewater fed systems: in wetland, flooded area prone to be polluted with sewage (mainly in South, South West).
- Non wastewater fed systems: in upland area (mainly in North and North East)

Production systems:

- Fish: Tilapia, common carp, Panga catfish, hybrid Clarias, Indian carps, Kissing gouramy, Ornamental fish
- Aquatic plants: Morning glory, Mimosa, Lotus, Duckweed

Aquatic production systems are useful for poor peoples who tolerate urbanization and pollution.

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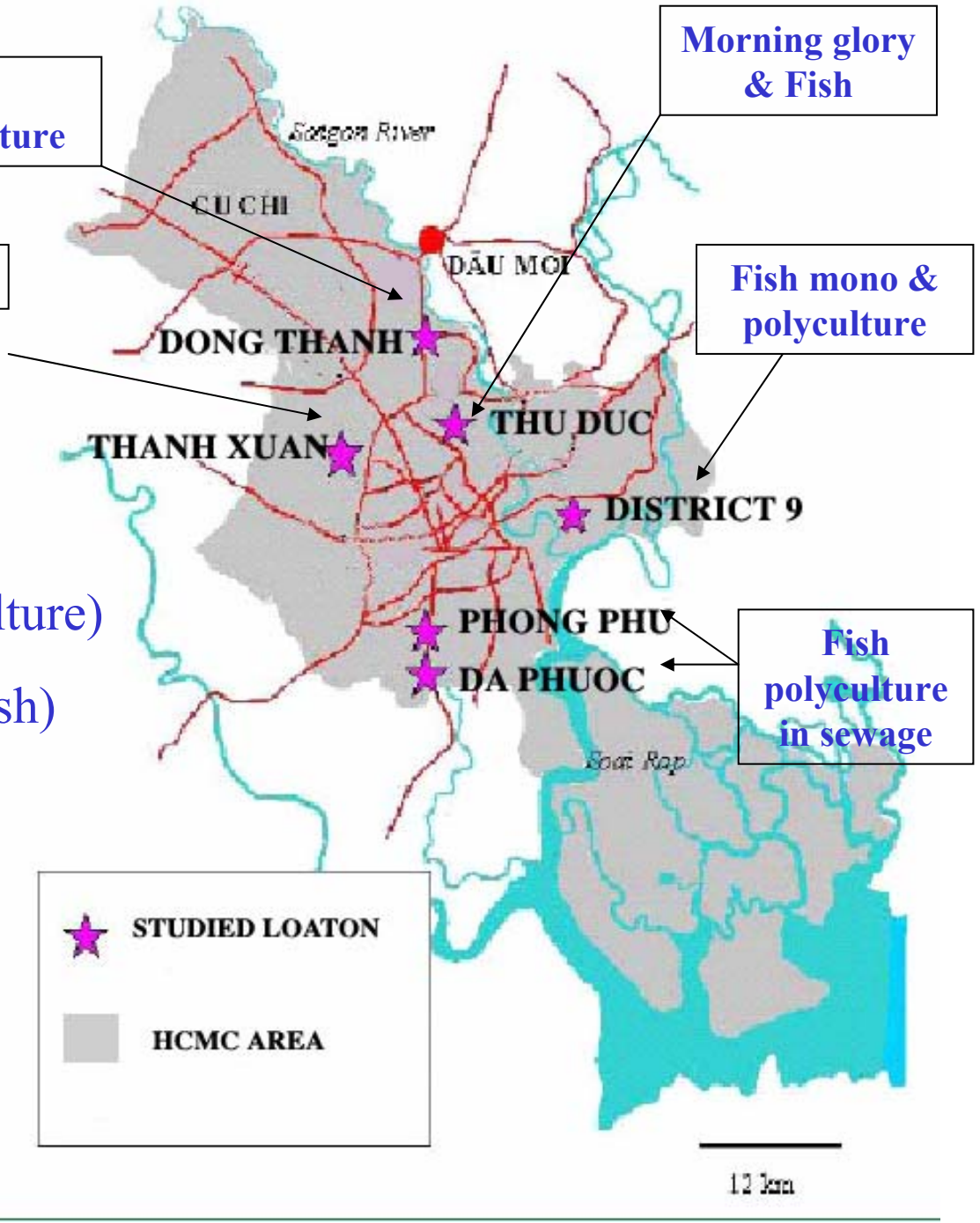
Six studied sites in peri urbans of HCM city

- Dong Thanh (Fish & monoculture)
- Thu Duc (Morning glory & fish)
- Phong Phu (Fish culture)
- Da Phuoc (Fish culture)
- District 9 (Fish culture)
- Thanh Xuan (Mimosa)



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AQUATIC PRODUCTION SYSTEMS IN NON-WASTEWATER OF HCM

Six aquatic production systems of non using wastewater

- Fish monoculture
- Fish polyculture
- Fish seed production
- Ornamental fish
- Morning glory
- Water mimosa

Fish pond 10 km from city center

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Fish polyculture in non wastewater system

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AQUATIC PRODUCTION SYSTEMS IN WASTEWATER OF HCM

Six aquatic production systems using wastewater:

- Fish seed production in wastewater
- Morning glory wastewater
- Fish polyculture in sewage
- Fish monoculture in sewage
- Fish and lotus integration

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Mimosa culture in wastewater in peri-urban

Mimosa cultivation 10 km from city center

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Morning glory cultivation in dispersed wastewater, 6 km from city center

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Seed production of Tilapia in sewage fed ponds in peri urbans of HCM city

- Highly effective production system of Tilapia using sewage to develop natural food in ponds

- Tilapia seed supplies to Mekong delta, North Vietnam and Cambodia

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Duckweed cultivation in wastewater 7 km from the city center

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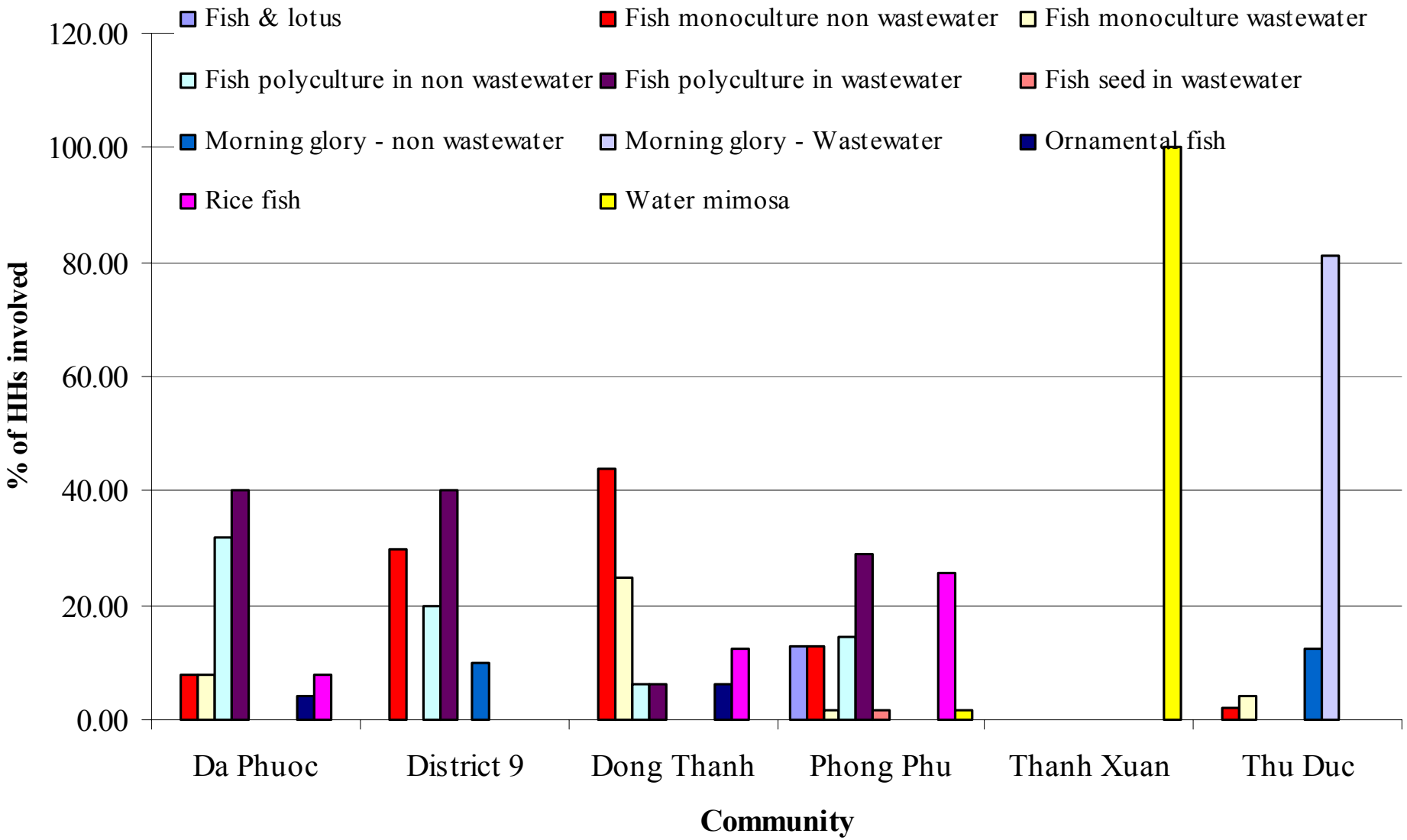
Distribution of aquatic production systems in 6 surveyed sites



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Surface Area of Different Production Systems

Production system	Average (m^2)	S.D
Duck weed	7,000.00	0.00
Fish & lotus	13,860.00	11,410.54
Fish monoculture non wastewater	8,447.50	9,490.01
Fish monoculture wastewater	**3,761.31**	2,261.57
Fish polyculture in non wastewater	5,759.83	4,878.42
Fish polyculture in wastewater	8,619.65	7,570.88
Fish seed in non wastewater	8,500.00	9,192.39
Fish seed in wastewater	**18,333.33**	11,150.49
Morning glory - non wastewater	7,850.00	11,552.62
Morning glory - Wastewater	4,021.19	2,662.72
Ornamental fish	6,250.00	1,060.66
Rice fish	7,500.00	7,088.72
Water mimosa	5,769.32	6,430.36

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Surface area of production categories in aquatic production systems in peri-urbans of HCM city

Production category	Average	S.D
Aquatic plants	5,528.20	6,381.13
Fish	7,281.95	8,054.99
Fish & aquatic plants	10,140.00	10,557.88
Rice fish culture	9,722.22	9,292.71

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LAND OWNERSHIP BY COMMUNITY

	Owned		Rented in from others		Rented out to others		Common property resource	
	No.	%	No.	%	No.	%	No.	%
Da Phuoc	25	100.00	1	4.00	0	0.00	0	0.00
District 9	10	100.00	0	0.00	0	0.00	0	0.00
Dong Thanh	16	100.00	1	6.25	0	0.00	1	6.25
Phong Phu	55	100.00	3	5.45	0	0.00	0	0.00
Thanh Xuan	15	34.88	35	81.40	2	4.65	1	2.33
Thu Duc	36	75.00	28	58.33	0	0.00	1	2.08

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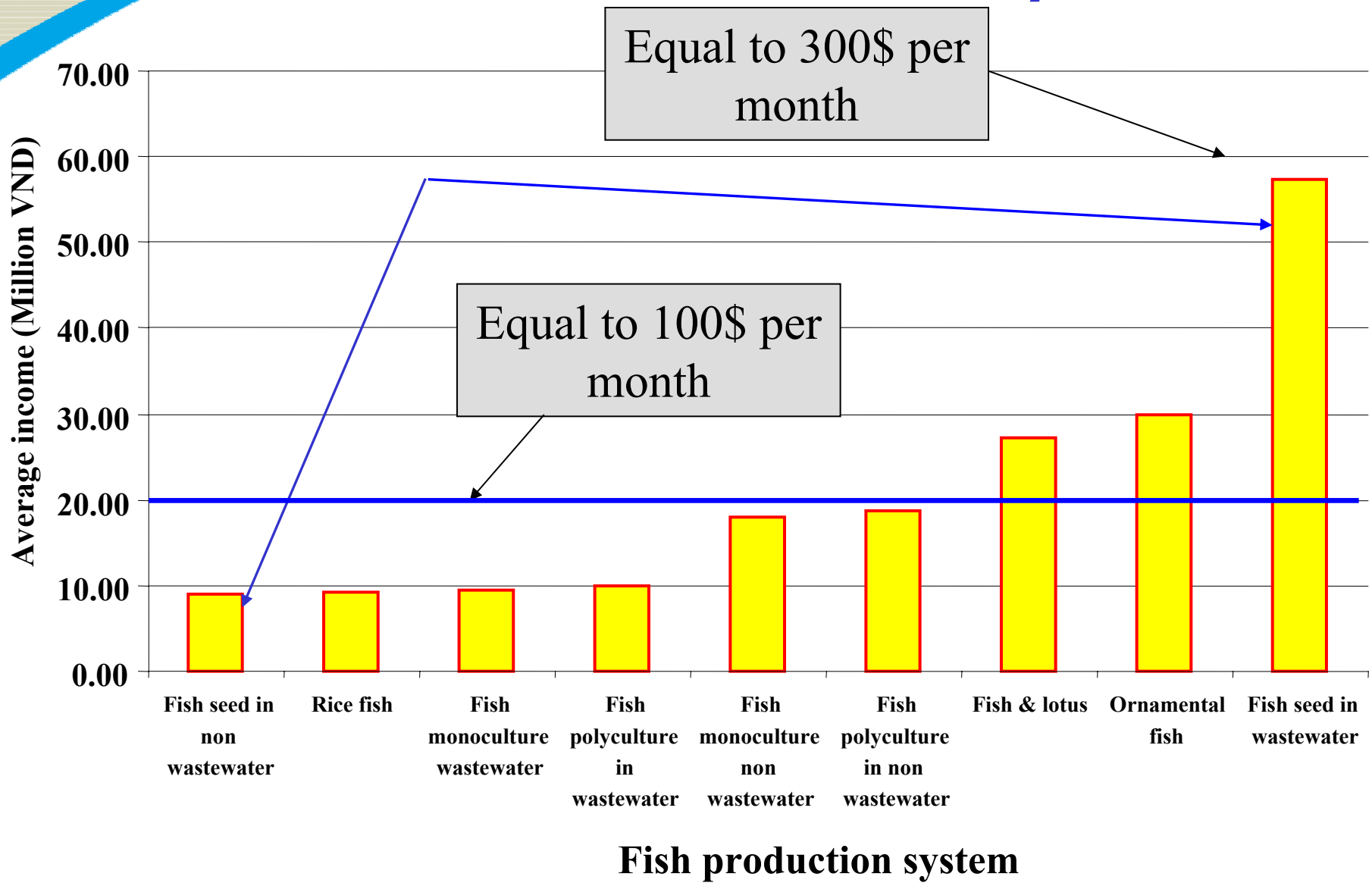
Average Annual Income of different Fish Production Systems



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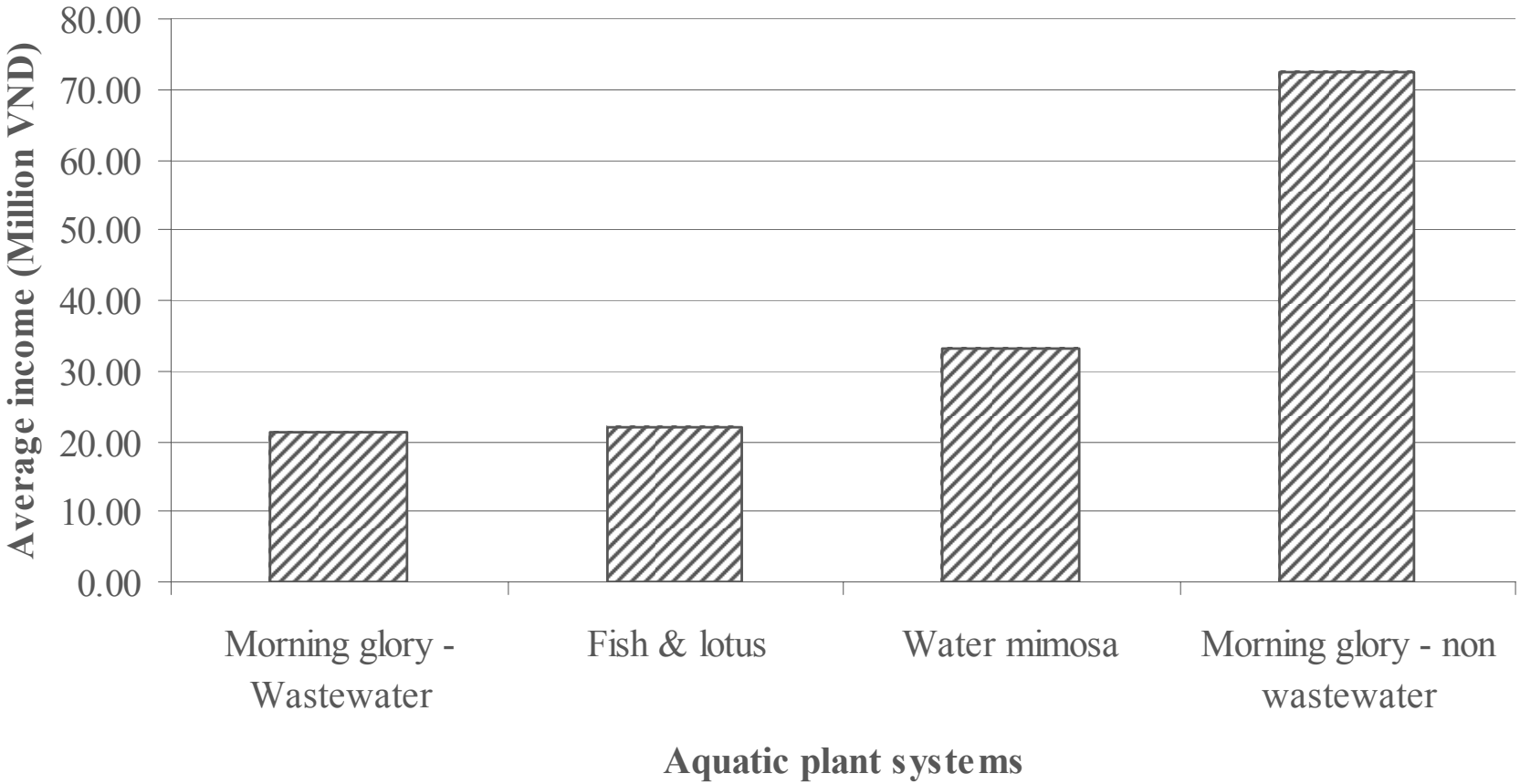
Average Annual Income of different Aquatic Plant Production Systems



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Contribution of fish and vegetable in householders' income

Villages	% aquatic plant farming contribution			% fish farming contribution		
	Average	Min.	Max.	Average	Min.	Max.
Dong Thanh	-	-	-	47.5	10	100
Thu Duc	**70.85**	10	100	38.75	0	80
Phong Phu	40.36	5	80	67.02	10	100
Da Phuoc	47.5	25	70	68.2	20	100
District 9	35	20	50	65.56	30	100
Thanh Xuan	**93.77**	**20**	100	-	-	-

Nearly 50-60% householders' income came from aquatic production systems in peri-urbans of HCMC

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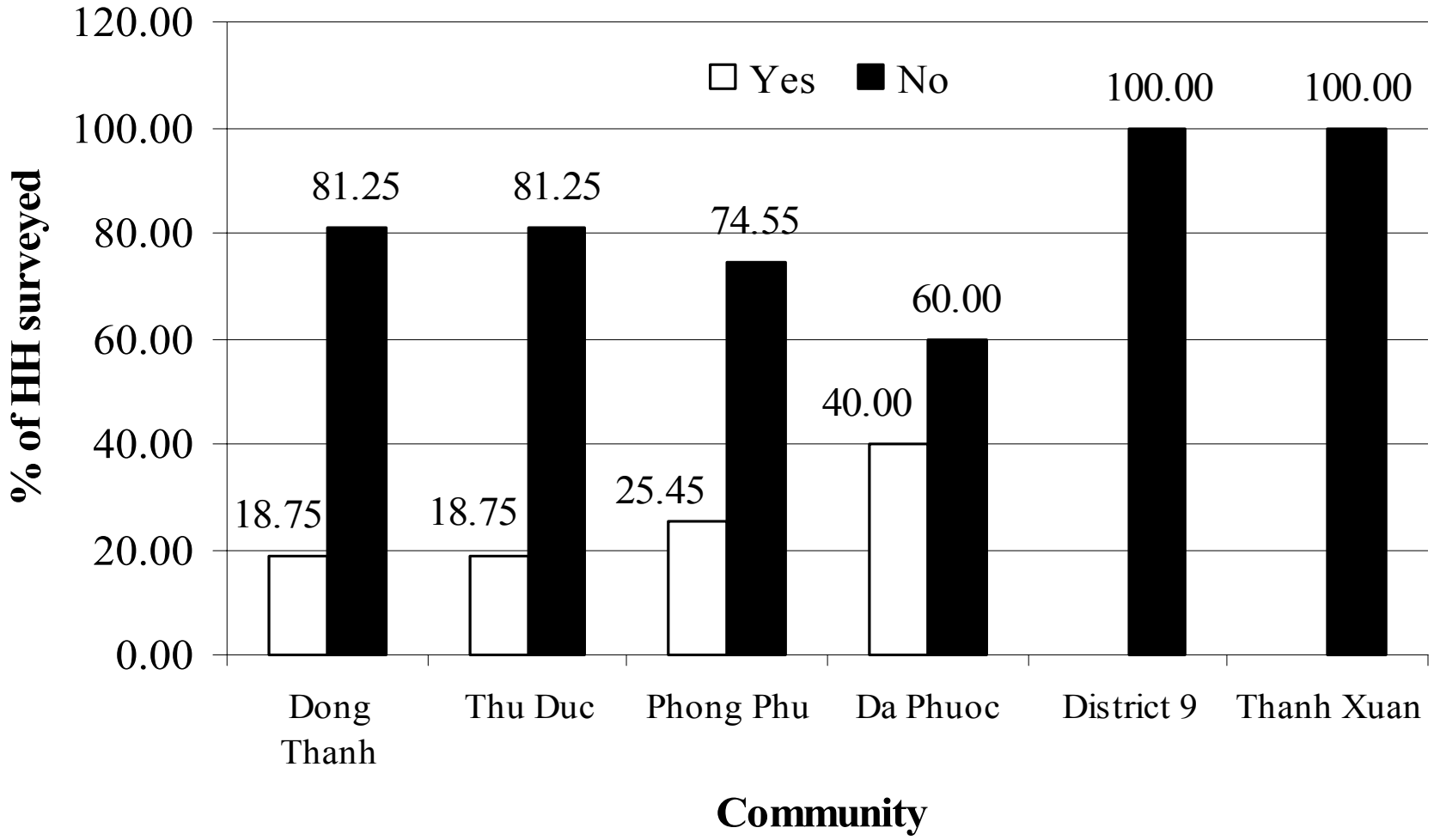
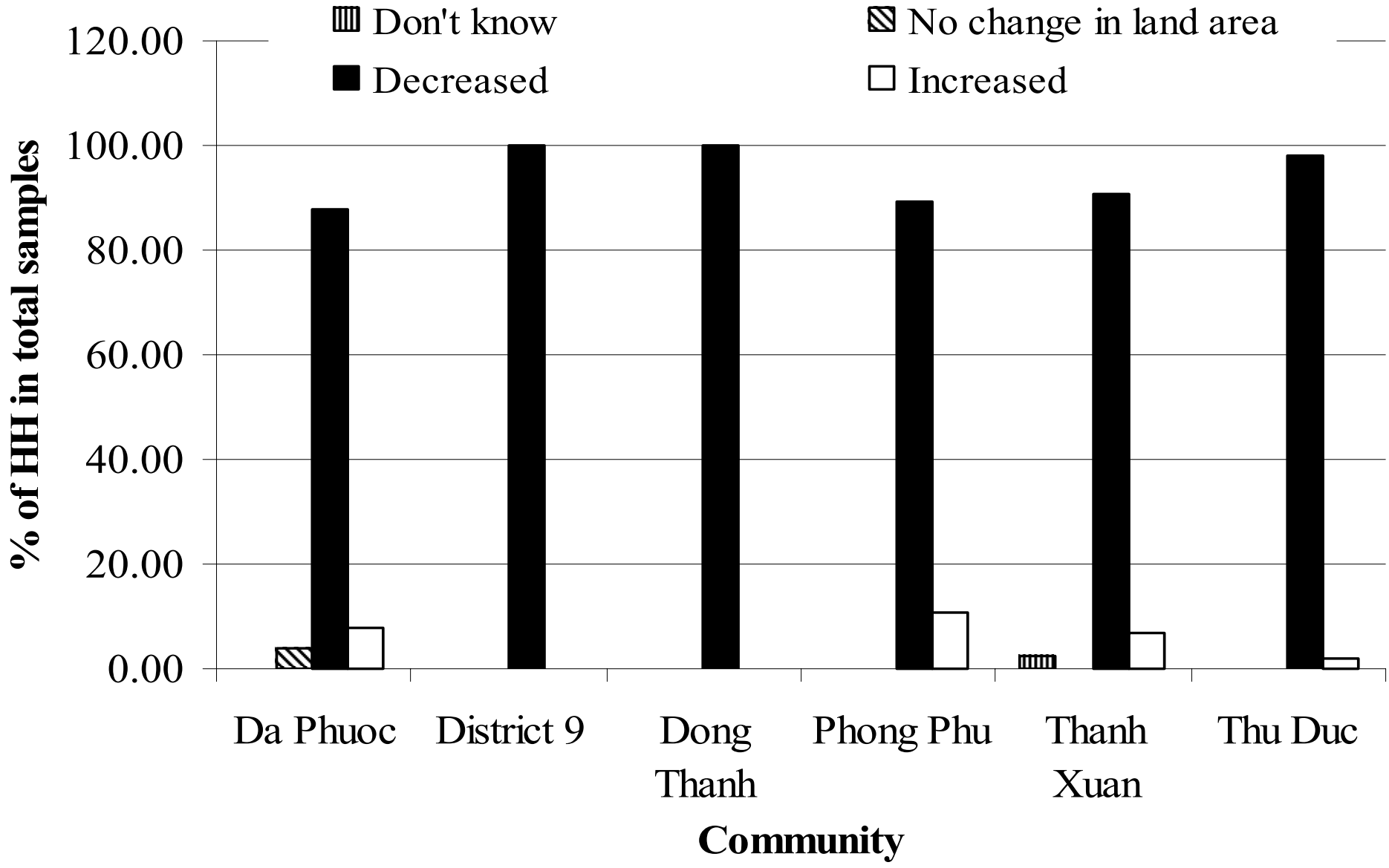
Credit by Householders in Different Communities



Future change of land area for aquatic production by farmers



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Threats for future development of systems

- Seed quality
- Pollution
- Poaching
- Natural disaster (flooding, disease outbreak)
- Lack of capital
- Increasing transport cost
- Increasing seed cost
- Increasing land price/rent price
- Increase input cost (feed cost)
- Household's health

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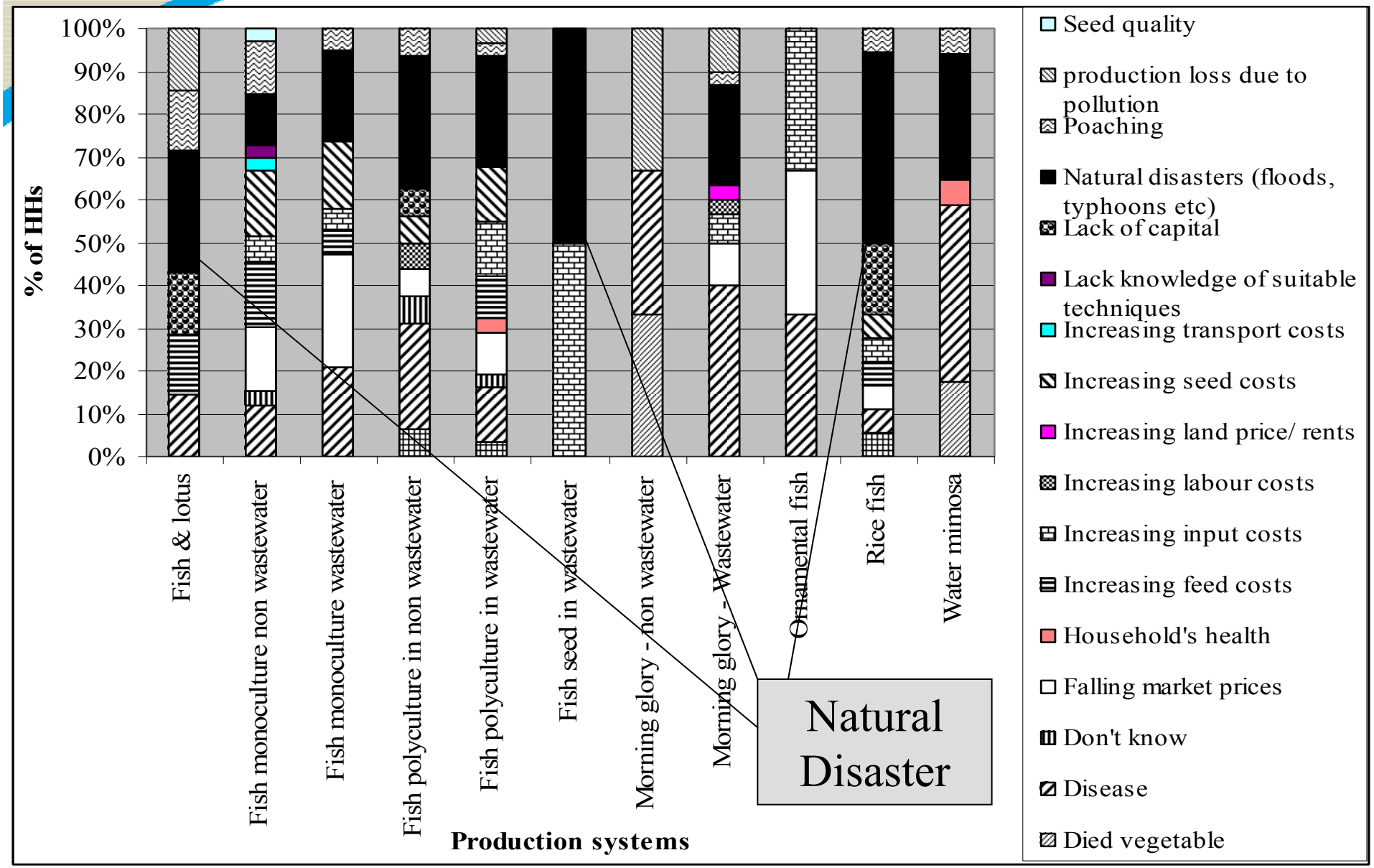
Threats for future development of systems



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Future development of different aquatic production systems

- Abandon production
- Decrease the production
- Do another work
- Increase the production area
- Relocation
- **Diversify the production**
- Become vegetable or fish collector
- Don’t know
- Not change the production
- Change to high valued species
- Increase intensification

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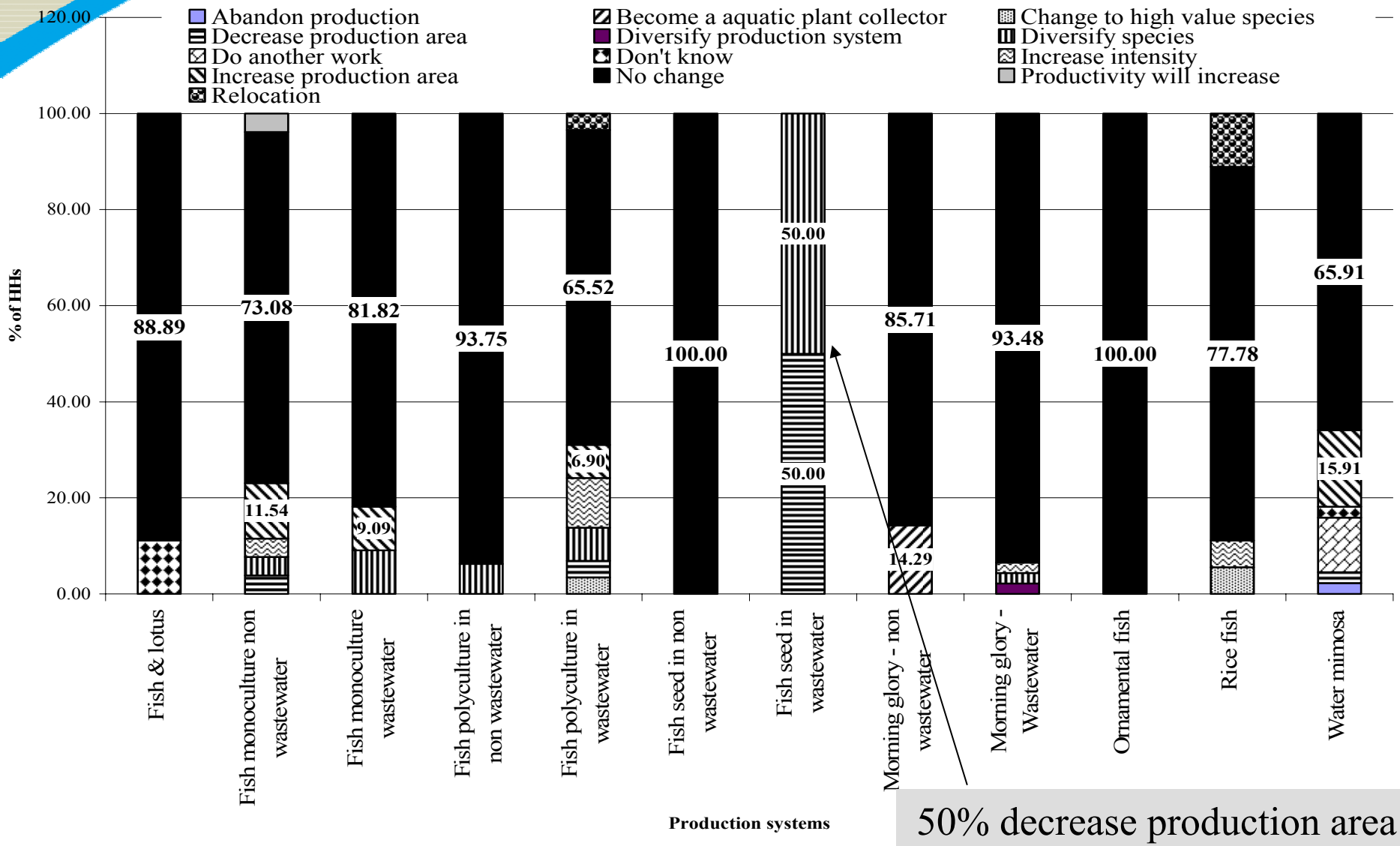
Future development of different aquatic production systems



50% decrease production area

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CONCLUSION

- Aquatic production systems are still kept important in livehoods of involved farmers
- 2-3 income activities in farmer family except Thanh Xuan shows that aquatic production systems are not their main income
- High income in fish seed production, ornamental fish and morning glory systems mainly in specialized systems
- The most concern for aquatic productions systems is natural disaster (flood, pest…)
- For future development of the systems, most farmers want diversify the systems to make profit and reduce the risk


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