Supplementary material

Table S1. Answers (% of famers) related to pesticides and pest management strategies among rice and rice-fish farmers in the Hau Giang province in 2021

	RIPM (15)	R (15)	RFL (15)	RFH (15)
1. Any problems related to pesticides that you think is important?				
Environmental pollution	87	93	100	80
Kill natural enemies to pests	80	93	80	93
Human health effects	67	93	80	100
Increase production costs	33	93	47	100
Pest resurgence	53	93	40	73
Decrease rice productivity	13	80	20	0
2. Do you think pesticides can have a negative effect on the rice yield?				
Yes	87	100	93	100
No	13	0	7	0
If yes, why?				
reduce the growth of rice	38	87	93	13
increase resistance of pests	69	13	7	73
kill natural enemies	0	0	0	60
3. Which methods do you use to control pests?				
Pesticides	100	47	87	100
Pest resistant rice variety	73	27	80	87
Biological control	13	7	0	0
4. Which are the most problematic pests?				
Insects	73	100	87	76
Diseases/fungi	100	100	93	100
Bacteria	93	85	93	100
Snail	7	87	53	20
Weeds	13	33	33	13
5. Have the pesticides been a problem for your health?				
Yes	87	100	85	100
No	13	0	15	0
6. From which pesticides?				
Insecticide	93	93	93	100
Herbicide	20	73	47	53
Fungicides	13	27	33	67
Molluscicides	0	0	0	0
7. Do you apply IPM?				
Yes	93	47	80	40
No	7	53	20	60
8. Has IPM changed your income?				
Yes	100	73	73	33

No	0	13	13	0
% increase?	NA*	20	12	15
Why?				
Reduced production costs	90	100	100	60
Higher rice yield	10	0	0	40
9. Number of pesticide applications per crop				
Mean	6,5[ab]	7,5[a]	5,6[b]	6,2[b]
SD	±1,7	±1,5	±0,7	±1,4
10. Average number of different pesticides used per farmer	4,5	4,9	3,7	4,8

*NA-No answer

Table S2. The most commonly used pesticides by rice farmers and rice-fish farmers in the Hau Giang province in 2021. The figures in brackets shows the total number of fungicides, herbicides, insecticides and molluscicides found.

Pesticide category	Pesticide formula	Percent farmers using	Active ingredient (a.i)	WHO class[a]
Fungicides (8)	Anvil	36,7%	Hexaconazole 50g/L	III
	Katana	25,0%	Fenoxanil 200 g/l	III
	Tilt Super	25,0%	Propiconazole 150 g/L, Difenoconazole 15g/L	II, II
	Filia	18,3%	Tricyclazole 400g/l, Propiconazole 125g/l	II, II
	Map Famy	16,7%	Tricylazole 250 g/l Fenoxanil 100g/l	II, III
	Beam	16,7%	Tricylazole, 75%	II
	Kasumin	11,7%	Kasugamycin, 2%	U
Herbicides (4)	Sofit	71,7%	Pretilachlor 300g/L, Fenclorim 100g/L	U, U
	Cantanil	20,0%	Butachlor 27,5%, Propanil 27,5%	III, II
	Push	10,0%	Acetochlor 500g/L	III
Insecticides (6)				
	Sulfaron	30,0%	Carbosulfan 200g/L, Chlorfluazuron 50g/L	II, U
	IndoSuper	10,0%	Indoxacarb 150g/l	II
	Chess	8,3%	Pymetrorize 500g/kg	III
	Chitin	6,7%	Abamectin 36g/L	Ib
Molluscicides (3)	Toxbait	55,0%	Metaldehyde 120g/kg	II
	Bolis	38,3%	Metaldehyde 120g/kg	II
	Osbuvang	8,0%	Metaldehyde 120g/kg	II
Total (21)				

a WHO classification: II—moderately hazardous; III—slightly hazardous; U—unlikely to present acute hazard in normal use (WHO, 2019)

Table S3. Answers (% of famers) related to farming strategies among rice and rice-fish farmers in the Hau Giang Province province in 2021

	RIPM (15)	R (15)	RFL (15)	RFH (15)
1. Do you think two or three crops of rice are best?				
Two crops, because;	100	100	100	100

The weather is not good for three crops	0	100	60	33
Soil can rest and restore quality	80	0	27	0
Low profit of third crop	33	0	13	0
2. What is the most critical impact of rice faming on the environment?				
Environmental pollution	100	100	100	100
Decreased soil fertility	13	0	13	13
3. How can this impact be decreased?				
Use organic fertilizers	7	100	60	100
Decreased use of pesticides	40	100	33	0
Only two rice crops per year	100	0	33	13
4. What do you see as the major constraints to rice farming?				
Unstable market	47	100	67	0
High costs for agrochemicals	20	80	67	0
Bad weather/climate change	40	13	0	100
Pest outbreaks	40	27	27	87
Shortage of labour	0	33	7	0
5. Future plans for rice farming?				
Rice-fish farming	60	20	13	27
Organic farming/high quality rice	20	47	33	0
Apply new technique/mechanise	13	0	20	0
6. Should future strategies aim for increased rice quality or quantity?				
Quality	87	100	93	100
Quantity	13	0	7	0

Table S4. Answers (% of famers) related to rice-fish farming strategies in the Hau Giang province in 2021

	RFL (15)	RFH (15)
1. Does the fish influence on the rice yield and in that case how?		
Increase	73	40
Decrease	0	0
No change	0	0
Do not know	27	60
Why increase?		
Fish provides nutrients	82	83
Fish provides pest control	82	50
2. Are your fish farming practices effected negatively by pesticides?		
Yes	67	100
No	33	0
Why		
Water pollution	100	87
3. Do you manage your rice-fish field differently from your rice fields?		
Yes, use less harmful pesticides	60	100

No	40	0
4. Why did you change from rice farming to rice-fish farming?		
Increase income through a more efficient production	100	100
5. Has rice-fish farming increased your income?		
Yes	100	100
No	0	0
% increase	16,3	9,7
SD	4,8	1,7
6. Do you plan to change your rice-farming activities in the future?		
Increase, to get higher income	0	73
Decrease	13	0
No change, because no available land	80	27
7. How should future rice farming systems be designed?		
Rice monoculture	0	0
Integrated rice-fish (concurrent)	80	7
Rotational rice-fish	20	93
Why?		
Increase income	100	100
8. What problems and risks can you see with implementing those systems?		
Low price of rice and fish	73	47
Impact of pesticides	87	0
Low fish survival rate	0	80
9. Would you be willing to start working with those systems and what support would you in that case need?		
Yes	100	100
Support needed		
Money	100	100
Technical know-how	13	27
10. How would like agriculture in the Mekong Delta develop in a long term?		
Apply high-tech	100	100
11. Which system do you think best can adapt to future environmental changes from for example upstream hydropower dams and climate change? Rice or rice-fish farming?		
Rice-fish farming	100	100