

ANNEX

**(1) Summary Results for Agriculture Section of
Rural Socio-Economic Survey (Master Plan Study)**

Summary Results for Agriculture Section of Rural Socio-Economic Survey

Item	Kratie	Kampong Cham	Prey Veng	Kandal	Takeo	TOTAL (Average)
1. INTERVIEWEE CLASSIFICATION						
<i>Land Owned Farmer</i>	32	240	257	310	33	872
-Paddy Practicing Farmer	32	231	257	302	33	855
--Wet Season Paddy Practicing Farmer (a)	6	90	87	48	1	232
--Dry Season Paddy Practicing Farmer (b)	18	64	81	159	4	326
--Wet and Dry Season Paddy Practicing Farmer (c)	8	77	89	95	28	297
-Not Paddy Practicing Farmer	0	9	0	8	0	17
<i>Tenant Farmer</i>	2	9	1	13	0	25
-Dry Season Paddy Practicing Farmer	0	1	0	1	0	2
-Not Paddy Practicing Farmer	2	8	1	12	0	23
<i>Unknown</i>	0	0	0	3	0	3
TOTAL	34	249	258	326	33	900
2. FARMLAND HOLDING						
<i>Have</i>	32	240	257	310	33	872
-Average Area (ha)	0.95	0.78	1.59	1.10	2.07	(1.19)
-Maximum (ha)	3.60	5.00	4.50	6.20	8.00	8.00
-Minimum (ha)	0.10	0.10	0.15	0.01	0.30	0.01
<i>Not Have</i>	2	9	1	13	0	25
<i>Unknown</i>	0	0	0	3	0	3
3. PADDY (based on the land owned paddy practicing farmers, 855)						
3-1. Average Paddy Planted Area (ha)						
<i>Wet Season Paddy by (a)</i>	0.59	0.58	1.57	0.91	0.30	(1.02)
<i>Dry Season Paddy by (b)</i>	1.01	0.67	1.20	0.96	2.18	(0.99)
<i>Wet Season Paddy by (c)</i>	0.53	0.57	0.92	0.60	1.22	(0.74)
<i>Dry Season Paddy by (c)</i>	0.57	0.43	0.78	0.69	0.90	(0.66)
3-2. Purpose for Cultivating Paddy						
<i>Home Consumption</i>	26	140	113	169	8	456
<i>Selling</i>	0	1	0	0	0	1
<i>Both</i>	6	85	141	129	25	386
3-3. Paddy Production						
<i>Enough</i>	14	60	132	156	19	381
<i>Not Enough</i>	18	165	119	140	14	456
3-4. Average Paddy Yield (ton/ha)						
<i>Wet Season Paddy</i>	1.62	1.66	1.12	2.01	1.81	(1.47)
<i>Dry Season Paddy</i>	1.89	2.33	2.48	3.22	2.83	(2.77)
3-5. No. of Farmers by Wet Season Paddy Variety						
<i>Bonla Pdau</i>	0	31	81	15	0	127
<i>IR varieties</i>	1	21	3	29	0	54
<i>Unknown varieties</i>	1	3	5	45	8	62
3-6. No. of Farmers by Dry Season Paddy Variety						
<i>IR 66</i>	0	37	76	158	23	294
<i>IR 36</i>	0	30	37	23	9	99
<i>IR 42</i>	0	42	31	39	0	112
3-7. Rice Seed						
<i>Self-keeping</i>	29	211	240	271	33	784
<i>DOA</i>	0	0	8	8	0	16
<i>Others</i>	0	13	6	16	0	35
4. UPLAND CROPS (based on the land owned farmers, 872)						
4-1. Upland Crops Practicing Farmers by Farmer Type						
<i>Wet Season Paddy Practicing Farmer (a)</i>	2	41	33	7	0	83
<i>Dry Season Paddy Practicing Farmer (b)</i>	10	49	51	109	0	219
<i>Wet and Dry Season Paddy Practicing Farmer (c)</i>	2	20	38	65	8	133
<i>Not Paddy Practicing Farmer</i>	0	9	0	8	0	17
<i>Total</i>	14	119	122	189	8	452
<i>Introducing Ratio (%)</i>	43.8	49.6	47.5	61.0	24.2	(51.8)

Summary Results for Agriculture Section of Rural Socio-Economic Survey

Item	Kratie	Kampong Cham	Prey Veng	Kandal	Takeo	TOTAL (Average)
4-2. Upland Crops Practising Farmers by Crop						
<i>Maize</i>	5	83	55	119	2	264
<i>Cucumber</i>	1	18	38	21	2	80
<i>Mungbean</i>	0	18	8	50	4	80
<i>Tobacco</i>	6	63	2	8	0	79
<i>Sesame</i>	6	43	13	10	0	72
<i>Chili</i>	0	7	0	28	0	35
<i>Peanut</i>	1	7	13	5	0	26
<i>Sweet Potato</i>	1	5	6	9	0	21
<i>Eggplant</i>	0	6	15	1	1	23
<i>Cabbage</i>	0	2	8	10	0	20
<i>Other Upland Crops (Cassava, Sugarcane, etc.)</i>	7	35	75	72	7	196
TOTAL	27	287	233	333	16	896
5. FARM MACHINES (based on the land owned farmers, 872)						
5-1. Plowing						
<i>Cattle</i>	22	170	186	266	30	674
<i>Buffalo</i>	4	32	53	20	1	110
<i>2-wheel Tractor</i>	0	0	2	3	1	6
<i>4-wheel Tractor</i>	0	0	0	28	1	29
<i>None</i>	3	38	19	10	0	70
5-2. Harrowing						
<i>Cattle</i>	22	170	186	276	30	684
<i>Buffalo</i>	4	32	53	20	1	110
<i>2-wheel Tractor</i>	0	0	2	1	1	4
<i>4-wheel Tractor</i>	0	0	0	10	1	11
<i>None</i>	3	38	19	10	0	70
5-3. Pulling						
<i>Cattle</i>	22	161	185	269	30	667
<i>Buffalo</i>	4	32	53	20	1	110
<i>2-wheel Tractor</i>	0	0	2	1	1	4
<i>4-wheel Tractor</i>	0	0	0	6	1	7
<i>None</i>	3	38	18	10	0	69
5-4. Threshing						
<i>Animal</i>	2	35	142	15	8	202
<i>Threshing Machine</i>	0	9	89	96	9	203
<i>Beating</i>	32	194	144	202	27	599
<i>Others</i>	0	0	0	0	0	0
5-5. Rice Milling						
<i>Pounding</i>	1	23	53	1	0	78
<i>Communal Mill</i>	0	0	0	0	0	0
<i>Private Mill</i>	32	196	210	291	33	762
<i>Others</i>	0	0	2	0	0	2
6. FERTILIZER AND AGRICULTURAL CHEMICALS (based on the land owned paddy practicing farmers, 855)						
6-1. Manure						
<i>Use</i>	12	144	183	189	26	554
<i>Not Use</i>	15	78	66	99	6	264
6-2. Fertilizer						
<i>Use (Urea, 16-20-0, 18-46-0, 15-15-15, etc.)</i>	8	132	230	271	33	674
<i>Not Use</i>	11	90	23	23	0	147
6-3. Agricultural Chemicals						
<i>Use (Methyl Parathion, Monocrotophos, etc.)</i>	12	75	157	188	23	455
<i>Not Use</i>	12	130	66	95	6	309

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Item	Kratie	Kampong Cham	Prey Veng	Kandal	Takeo	TOTAL (Average)
7. FUTURE PLAN (based on the land owned farmers, 872)						
7-1. Crop Wished To Cultivate						
<i>Paddy</i>	14	123	178	239	16	570
<i>Maize</i>	0	46	36	70	5	157
<i>Vegetable</i>	0	16	10	21	0	47
<i>Sesame</i>	1	25	5	5	0	36
<i>Tobacco</i>	2	29	1	2	0	34
<i>Mungbean</i>	0	1	3	28	0	32
<i>Others (Chili, Sugarcane, Banana, etc.)</i>	0	109	57	51	0	217
7-2. Cropping Pattern Wished To Practice						
<i>Paddy-Paddy</i>	32	115	178	218	31	574
<i>Paddy-Maize</i>	2	77	94	106	10	289
<i>Paddy-Diversified Crops</i>	0	83	38	58	5	184
<i>Vegetables</i>	1	177	72	46	10	306
<i>Fruit Trees</i>	0	112	44	9	4	169
<i>Paddy-Animal</i>	0	134	23	8	0	165
<i>Agro-forestry Crops</i>	0	25	7	0	0	32
<i>Others</i>	9	13	5	2	0	29
8. AGRICULTURAL EXTENSION						
(based on the land owned paddy practicing farmers, 855)						
<i>Provincial District Extension Officer</i>	0	170	166	263	25	624
<i>MAFF Advisor</i>	0	7	16	1	0	24
<i>NGOs</i>	0	0	58	18	0	76
<i>Others (By Himself)</i>	24	25	27	19	9	104
9. MOST SERIOUS PROBLEM OF FARMING						
(based on the land owned farmers, 872)						
<i>Lack of Irrigation Water</i>	30	177	191	219	22	639
<i>Drainage</i>	25	59	146	174	17	421
<i>Diseases</i>	32	122	110	165	14	413
<i>Pests</i>	30	167	211	219	28	655
<i>Credit</i>	2	97	69	123	4	295
<i>Transportation</i>	0	12	23	30	1	66
<i>Marketing</i>	0	10	33	44	0	87
<i>Lack of Agricultural Material</i>	27	73	83	119	10	312
<i>Others</i>	1	139	12	22	4	178
10. AVERAGE NUMBER OF FARM LABOR						
(based on the land owned paddy practicing farmers, 855)						
<i>Men (Persons)</i>	1.83	2.01	2.48	1.77	1.64	(2.05)
<i>Women (Persons)</i>	1.72	2.07	2.57	2.07	1.97	(2.20)
<i>TOTAL (Persons)</i>	3.55	4.08	5.05	3.84	3.61	(4.25)

AGRICULTURE SECTION

Province and District	No. of Interviewed Farmers	Land Title							
		Land Owned Farmer (%)		AVG (ha)	MAX (ha)	MIN (ha)	Tenant Farmer (%)		Un-known
Kratie	31	32	(94)	0.95	3.60	0.10	2	(6)	
Prek Prasap	17	17	(100)	0.94	3.60	0.10			
Chhlong	17	15	(88)	0.97	3.00	0.20	2	(12)	
Kampong Cham	249	240	(96)	0.78	5.00	0.10	9	(4)	
O Reang Ov	35	35	(100)	0.80	2.20	0.16			
Koh Sotin	35	35	(100)	0.61	2.00	0.14			
Srey Santhel	35	35	(100)	0.87	1.80	0.10			
Kang Meas	35	33	(94)	0.96	5.00	0.20	2	(6)	
Kroch Chhmar	19	18	(95)	0.48	1.00	0.10	1	(5)	
Tbong Khnum	19	17	(89)	0.85	1.70	0.14	2	(11)	
Stung Trang	19	15	(79)	0.57	1.30	0.15	4	(21)	
Kampong Seim	19	19	(100)	0.58	1.00	0.15			
Prey Chhor	11	11	(100)	0.87	1.61	0.24			
Cheung Prey	11	11	(100)	0.90	2.00	0.38			
Batheav	11	11	(100)	1.29	3.00	0.32			
Prey Veng	258	257	(100)	1.59	4.50	0.15	1	(0)	
Peam Ro	35	35	(100)	1.91	4.00	0.50			
Peam Chor	35	35	(100)	1.60	4.00	0.70			
Kanh Chreach	23	23	(100)	1.78	3.00	0.70			
Sithor Kandal	23	22	(96)	1.33	3.20	0.15	1	(4)	
Peareang	24	24	(100)	1.27	2.00	0.25			
Kampong Leav	24	24	(100)	1.86	3.00	1.00			
Prey Veng	24	24	(100)	2.05	4.50	0.30			
Ba Phnom	24	24	(100)	1.03	2.70	0.30			
Kamchay Mear	11	11	(100)	1.25	2.50	0.50			
Kampong Travek	11	11	(100)	1.55	2.50	0.50			
Prea Sdech	24	24	(100)	1.54	3.50	0.18			
Kandal	326	310	(95)	1.10	6.20	0.01	13	(4)	3
Ksach Kandal	35	35	(100)	0.95	4.50	0.20			
Muk Kampoul	35	35	(100)	0.75	2.00	0.01			
Lvea Em	35	34	(97)	1.81	6.00	0.31	1	(3)	
Kean Svay	35	34	(97)	1.12	3.00	0.15	1	(3)	
Saang	35	32	(91)	1.06	2.70	0.06			3
Leuk Dek	35	24	(69)	0.81	2.50	0.25	11	(31)	
Koh Thom	35	35	(100)	1.47	6.20	0.33			
Ponhea Leu	35	35	(100)	1.02	3.05	0.24			
Ang Snourl	23	23	(100)	0.74	1.50	0.35			
Kandal Stung	23	23	(100)	1.16	3.00	0.50			
Takeo	33	33	(100)	2.07	8.00	0.30			
Bati	11	11	(100)	1.64	2.50	1.00			
Prey Kabass	11	11	(100)	2.10	8.00	0.30			
Angkor Borey	11	11	(100)	2.45	3.50	1.20			
TOTAL	900	872	(97)	1.19	8.00	0.01	25	(3)	3

AGRICULTURE SECTION

Province and District	No. of Paddy Practicing Farmers	Paddy-1 Planted Area															Not Paddy Practicing Farmer No. (%)
		Wet Season Paddy ¹⁾					Dry Season Paddy ²⁾				Wet & Dry Season Paddy ³⁾						
		No. (%)	AVG (ha)	MAX (ha)	MIN (ha)	No. (%)	AVG (ha)	MAX (ha)	MIN (ha)	No. (%)	Wet			Dry			
											AVG	MAX	MIN	AVG	MAX	MIN	
Kratie	32	6 (19)	0.59	1.00	0.20	18 (56)	1.01	3.60	0.10	8 (25)	0.53	1.00	0.30	0.57	1.00	0.25	
Prek Prasap	17	2 (12)	0.90	1.00	0.80	11 (65)	0.82	3.60	0.10	4 (24)	0.58	1.00	0.30	0.70	1.00	0.30	
Chhlong	15	4 (27)	0.44	0.70	0.20	7 (47)	1.31	3.00	0.70	4 (27)	0.49	0.80	0.30	0.44	0.70	0.25	
Kampong Cham	231	90 (38)	0.58	2.20	0.10	64 (27)	0.67	1.50	0.10	77 (33)	0.57	2.50	0.08	0.43	2.50	0.07	9 (4)
O Reang Ov	35	20 (57)	0.80	2.20	0.16					15 (43)	0.43	1.00	0.10	0.37	1.00	0.07	
Koh Sotin	26	18 (61)	0.18	0.40	0.10	7 (26)	0.44	1.00	0.15	1 (3)	0.25	0.25	0.25	0.25	0.25	0.25	9 (26)
Srey Santhel	35	11 (31)	0.76	1.20	0.40	2 (6)	0.30	0.50	0.10	22 (63)	0.61	1.50	0.12	0.37	1.00	0.10	
Kang Meas	33	14 (42)	0.57	1.50	0.20	14 (42)	1.05	1.50	0.50	5 (15)	0.82	2.50	0.08	0.98	2.50	0.30	
Kroch Chhmar	18	6 (33)	0.33	0.67	0.10	12 (67)	0.54	1.00	0.10								
Tbong Khmum	17	1 (6)	0.50	0.50	0.50	13 (76)	0.80	1.50	0.14	3 (18)	0.63	1.20	0.20	0.57	0.90	0.30	
Stung Trang	15	1 (7)	0.60	0.60	0.60	13 (87)	0.52	1.30	0.15	1 (7)	0.50	0.50	0.50	0.40	0.40	0.40	
Kampong Scim	19	12 (63)	0.70	1.00	0.40	1 (5)	0.15	0.15	0.15	6 (32)	0.20	0.30	0.10	0.21	0.30	0.10	
Prey Chhor	11	2 (18)	0.32	0.40	0.24	1 (9)	0.80	0.80	0.80	8 (73)	0.63	1.14	0.18	0.40	0.60	0.09	
Cheung Prey	11	1 (9)	0.76	0.76	0.76	1 (9)	0.60	0.60	0.60	9 (82)	0.52	1.40	0.10	0.45	0.80	0.13	
Batheay	11	1 (9)	0.87	1.50	0.32					7 (64)	0.97	2.50	0.37	0.56	1.00	0.21	
Prey Veng	257	87 (34)	1.57	3.78	0.15	81 (32)	1.20	3.50	0.15	89 (35)	0.92	2.50	0.15	0.78	3.00	0.09	
Peam Ro	35	1 (3)	1.60	1.60	1.60	23 (66)	1.34	3.50	0.30	11 (31)	0.79	1.12	0.32	1.38	3.00	0.50	
Peam Chor	35					35 (100)	1.15	2.00	0.15								
Kanh Chreach	23	23 (100)	1.78	3.00	0.70												
Sithor Kandal	22	6 (27)	1.14	3.00	0.15	7 (32)	0.76	1.50	0.40	9 (41)	1.23	2.50	0.50	0.68	1.00	0.25	
Pearcang	24	10 (42)	1.26	2.00	0.50	1 (4)	0.80	0.80	0.80	13 (54)	0.97	1.70	0.15	0.42	1.00	0.20	
Kampong Leav	24	2 (8)	2.50	3.00	2.00	7 (29)	1.40	2.00	1.00	15 (63)	0.73	1.00	0.50	1.26	2.00	1.00	
Prey Veng	24	17 (71)	1.74	3.78	0.30					7 (29)	1.93	2.50	1.00	0.87	2.00	0.40	
Ba Phnom	24	5 (21)	0.89	1.50	0.35	2 (8)	1.05	1.80	0.30	17 (71)	0.61	1.00	0.20	0.46	1.70	0.10	
Kamchay Mear	11	8 (73)	1.16	1.50	0.50					3 (27)	1.17	2.00	0.50	0.32	0.50	0.20	
Kampong Travek	11	3 (27)	1.50	2.50	1.00	6 (55)	1.33	2.00	0.50	2 (18)	1.00	1.50	0.50	1.50	2.00	1.00	
Prea Sdech	24	12 (50)	1.91	3.50	0.18					12 (50)	0.73	1.50	0.20	0.43	1.00	0.09	
Kandal	302	48 (15)	0.91	3.00	0.20	159 (51)	0.96	4.00	0.06	95 (31)	0.60	3.50	0.05	0.69	6.00	0.06	8 (3)
Ksach Kandal	35	2 (6)	0.40	0.60	0.20	9 (26)	0.54	1.50	0.20	24 (69)	0.81	3.50	0.10	0.35	1.00	0.10	
Muk Kampoul	32	1 (3)	0.20	0.20	0.20	25 (71)	0.57	1.50	0.06	6 (17)	0.25	0.65	0.06	0.48	1.20	0.06	3 (9)
Uva Em	34					31 (100)	1.61	4.00	0.25								
Kean Svay	33					22 (65)	1.04	2.60	0.15	11 (32)	0.51	1.00	0.10	0.49	1.00	0.20	1 (3)
Saang	32	2 (6)	1.25	1.50	1.00	12 (38)	0.47	1.30	0.06	18 (56)	0.76	2.00	0.10	0.68	1.50	0.10	
Leuk Dek	21					19 (79)	0.76	2.40	0.25	2 (8)	0.15	0.20	0.10	0.38	0.50	0.25	3 (13)
Koh Thom	34	2 (6)	0.77	1.13	0.40	4 (11)	1.03	2.00	0.33	28 (89)	0.49	1.44	0.05	1.13	6.00	0.16	1 (3)
Ponhea Leu	35					32 (91)	0.93	2.50	0.24	3 (9)	0.28	0.30	0.25	0.89	1.70	0.22	
Ang Snoul	23	21 (91)	0.75	1.50	0.35	1 (4)	0.64	0.64	0.64	1 (4)	0.60	0.60	0.60	0.10	0.10	0.10	
Kandal Stung	23	20 (87)	1.14	3.00	0.50	1 (4)	1.50	1.50	1.50	2 (9)	0.65	0.80	0.50	0.60	0.70	0.50	
Takeo	33	1 (3)	0.30	0.30	0.30	4 (12)	2.18	3.00	1.20	28 (85)	1.22	2.80	0.25	0.90	6.00	0.20	
Bati	11									11 (100)	1.18	2.00	0.50	0.46	0.70	0.20	
Prey Kabass	11	1 (9)	0.30	0.30	0.30					10 (91)	0.99	2.80	0.25	1.30	6.00	0.25	
Angkor Borey	11					4 (36)	2.18	3.00	1.20	7 (64)	1.60	2.50	0.50	1.01	2.00	0.30	
TOTAL	855	232 (27)	1.02	3.78	0.10	326 (37)	0.99	4.00	0.06	297 (34)	0.74	3.50	0.05	0.66	6.00	0.06	17 (2)

Note: 1) Wet Season Paddy Practicing Farmer

2) Dry Season Paddy Practicing Farmer

3) Wet and Dry Season Paddy Practicing Farmer

AGRICULTURE SECTION

Province and District	No. of Paddy Practicing Farmers	Paddy-2																
		Production									Purpose							
		AVG. Yield (ton ha)		Wet Season		Dry Season		Wet & Dry		Wet Season Paddy			Dry Season Paddy			Wet & Dry Paddy		
		Wet	Dry	Eno-ugh	Not enough	Eno-ugh	Not enough	Eno-ugh	Not enough	Home Consum.	Sell-ing	Both	Home Consum.	Sell-ing	Both	Home Consum.	Sell-ing	Both
Kratie	32	1.62	1.89	1	5	9	9	4	4	5	1	15	3	6	2			
Prek Prasap	17	1.59	1.74		2	2	9	1	3	1	1	11		3	1			
Chhlong	15	1.64	2.04	1	3	7		3	1	4		4	3	3	1			
Kampong Cham	231	1.66	2.33	15	73	22	39	23	53	62		26	50	1	11	28	48	
O Reang Ov	35	1.03	1.79	1	19			6	9	17		3			9	6		
Koh Sotin	26	1.78	2.00		17		6		1	17			6	1	1			
Srey Santhel	35	1.25	1.80		11		1		21		11			2	1	21		
Kang Meas	33	1.84	2.30	2	12	11	3	3	2	14			8	1	5	2	3	
Kroch Chhmar	18	2.40	2.84		5	5	7			5			12					
Tbong Khnum	17	1.98	2.45		1	5	8	1	2	1			10		1	2		
Stung Trang	15	2.40	2.11		1		12		1	1			12		1	1		
Kampong Seim	19	3.61	4.16	12			1	2	4	2	10		1		6			
Prey Chhor	11	2.04	3.27		2	1		7	1	2			1		1	7		
Cheung Prey	11	1.62	2.89		1		1	3	6	1				1	2	7		
Batheay	11	1.38	1.69		4			1	6	2	2				3	4		
Prey Veng	257	1.12	2.48	28	59	51	26	53	34	42	45	29	1	49	42	47		
Peam Ro	35	1.74	2.87		1	15	8	10	1	1		9	1	12	4	7		
Peam Chor	35	2.00	3.12			26	6					9	1	25				
Kanh Chreach	23	0.91		12	12					6	17							
Sithor Kandal	22	1.06	1.19	1	4	1	6	3	5	5	1	7			5	4		
Peareang	24	1.72	1.54	6	4	1		8	5	6	4			1	8	5		
Kampong Leav	24	1.33	2.61	1	1	7		13	1	1	1	3	4	8	7			
Prey Veng	24	0.85	1.16	4	13			3	4	1	16					7		
Ba Phnom	24	1.09	1.72	1	4		1	10	7	4	1	1	1	8	9			
Kanchay Mear	11	0.94	1.47		8				3	8					3			
Kampong Travck	11	1.08	1.68	2	1	1	5	2		3				6		2		
Prea Sdech	24	1.07	2.71	1	11			4	8	7	5				6	6		
Kandal	302	2.01	3.22	26	22	78	75	52	43	24	24	95	63	50	42			
Ksach Kandal	35	1.43	2.93		2	4	5	12	12	2		8	1	15	9			
Mok Kampout	32	3.70	3.30		1	9	15	2	4	1		22	3	4	2			
Lvea Em	34		3.25			25	9					18	16					
Kean Svay	33	2.36	3.68			14	7	6	5			11	10	3	7			
Saang	32	2.35	3.52	1	1	5	5	14	4	1	1	10	2	7	11			
Leuk Dek	21	1.50	3.16			3	14		2			18	1	2				
Koh Thom	34	1.04	3.01		2	2	2	15	13	1	1	1	3	16	10			
Ponhea Leu	35	0.78	2.91			14	18	1	2			7	25	2	1			
Ang Snourl	23	2.10	3.24	11	10	1		1		16	5			1				
Kandal Stung	23	2.18	3.52	14	6	1		1	1	3	17			1		2		
Takeo	33	1.84	2.83	1		4		14	14			1		4	8	20		
Bati	11	2.30	3.26					3	8						7	4		
Prey Kabass	11	1.21	1.98	1				4	6			1		1	9			
Angkor Borey	11	1.83	3.39			4		7						4		7		
TOTAL (Percentage*)	855	1.47	2.77	71	159	164	149	146	148	133	97	189	2	130	134	159		
				(31)	(69)	(52)	(48)	(50)	(50)	(58)	(42)	(59)	(1)	(40)	(46)	(54)		

AGRICULTURE SECTION

Province and District	No. of Paddy Practicing Farmers	Rice Seed											
		Wet Season Paddy			Dry Season Paddy			Wet & Dry Season Paddy			Total		
		Self Keeping (%)	Dept of Agro.	Others	Self Keeping (%)	Dept of Agro.	Others	Self Keeping (%)	Dept of Agro.	Others	Self Keeping (%)	Dept of Agro.	Others
Kratie	32	5 (100)	0	0	16 (100)	0	0	8 (100)	0	0	29 (100)	0	0
Prek Prasap	17	2 (100)	0	0	11 (100)	0	0	4 (100)	0	0	17 (100)	0	0
Chhlong	15	3 (100)	0	0	5 (100)	0	0	4 (100)	0	0	12 (100)	0	0
Kampong Cham	231	81 (93)	0	6	56 (90)	0	6	74 (99)	0	1	211 (94)	0	13
O Reang Ov	35	19 (100)	0	0				14 (100)	0	0	33 (100)	0	0
Koh Sotin	26	15 (100)	0	0	4 (100)	0	0	1 (100)	0	0	20 (100)	0	0
Srey Santhel	35	11 (100)	0	0	2 (100)	0	0	21 (100)	0	0	34 (100)	0	0
Kang Meas	33	10 (67)	0	5	14 (88)	0	2	5 (83)	0	1	29 (78)	0	8
Kroch Chhmar	18	6 (100)	0	0	12 (100)	0	0				18 (100)	0	0
Tbong Khnum	17	0	0	1	10 (77)	0	3	3 (100)	0	0	13 (76)	0	4
Stung Trang	15	1 (100)	0	0	11 (92)	0	1	1 (100)	0	0	13 (93)	0	1
Kampong Seim	19	12 (100)	0	0	1 (100)	0	0	6 (100)	0	0	19 (100)	0	0
Prey Chhor	11	2 (100)	0	0	1 (100)	0	0	8 (100)	0	0	11 (100)	0	0
Cheung Prey	11	1 (100)	0	0	1 (100)	0	0	8 (100)	0	0	10 (100)	0	0
Batheay	11	4 (100)	0	0				7 (100)	0	0	11 (100)	0	0
Prey Veng	257	83 (98)	2	0	73 (88)	5	5	81 (98)	1	1	240 (94)	8	6
Peam Ro	35	1 (100)	0	0	20 (77)	4	2	10 (91)	1	0	31 (82)	5	2
Peam Chor	35				32 (94)	1	1				32 (94)	1	1
Kanh Chreach	23	21 (100)	0	0							21 (100)	0	0
Sithor Kandal	22	6 (100)	0	0	7 (100)	0	0	9 (100)	0	0	22 (100)	0	0
Peareang	24	10 (100)	0	0	1 (100)	0	0	11 (100)	0	0	22 (100)	0	0
Kampong Leav	24	2 (100)	0	0	7 (100)	0	0	15 (100)	0	0	24 (100)	0	0
Prey Veng	24	17 (94)	1	0				7 (100)	0	0	24 (96)	1	0
Ba Phnom	24	5 (100)	0	0	1 (50)	0	1	17 (100)	0	0	23 (96)	0	1
Kamchay Mear	11	6 (86)	1	0				2 (100)	0	0	8 (89)	1	0
Kampong Travek	11	3 (100)	0	0	5 (83)	0	1	1 (50)	0	1	9 (82)	0	2
Prea Sdech	24	12 (100)	0	0				12 (100)	0	0	24 (100)	0	0
Kandal	302	44 (96)	1	1	137 (88)	6	12	90 (96)	1	3	271 (92)	8	16
Ksach Kandal	35	2 (100)	0	0	9 (100)	0	0	24 (100)	0	0	35 (100)	0	0
Muk Kampoul	32	0	0	1	19 (83)	0	4	6 (100)	0	0	25 (83)	0	5
Lvea Im	34				34 (100)	0	0				34 (100)	0	0
Kean Svay	33				18 (86)	3	0	11 (92)	0	1	29 (88)	3	1
Saang	32	2 (100)	0	0	12 (100)	0	0	15 (94)	1	0	29 (97)	1	0
Leuk Dek	21				12 (67)	1	5	0	0	2	12 (60)	1	7
Koh Thom	34	1 (100)	0	0	4 (100)	0	0	28 (100)	0	0	33 (100)	0	0
Ponhea Leu	35				27 (84)	2	3	3 (100)	0	0	30 (86)	2	3
Ang Snourl	23	21 (100)	0	0	1 (100)	0	0	1 (100)	0	0	23 (100)	0	0
Kandal Stung	23	18 (95)	1	0	1 (100)	0	0	2 (100)	0	0	21 (95)	1	0
Takeo	33	1 (100)	0	0	4 (100)	0	0	28 (100)	0	0	33 (100)	0	0
Bati	11							11 (100)	0	0	11 (100)	0	0
Prey Kabass	11	1 (100)	0	0				10 (100)	0	0	11 (100)	0	0
Angkor Borey	11				4 (100)	0	0	7 (100)	0	0	11 (100)	0	0
TOTAL	855	214 (96)	3	7	286 (89)	11	23	281 (98)	2	5	784 (94)	16	35
(Percentage %)		(96)	(1)	(3)	(89)	(3)	(7)	(98)	(1)	(2)	(94)	(2)	(4)

AGRICULTURE SECTION

Province and District	No. of Practiced Patterns	Cropping Patterns of Major Upland Crops																												
		Maize		Cucumber		Tobacco		Mungbean		Sesame		Chili		Supacane		Watermelon		Soybean		Peanut		Cabbage		Eggplant		Lentil				
		Start Month	End Month	No.	Start Month	End Month	No.	Start Month	End Month	No.	Start Month	End Month	No.	Start Month	End Month	No.	Start Month	End Month	No.	Start Month	End Month	No.	Start Month	End Month	No.	Start Month	End Month	No.		
Kuala	21							3																						
Pek Praxap	13					9/10	3/4	4																						
Chilong	10								4/5	6/7	3						9/10	12/1	3											
Kumpang Cham	268				79		11	51		7					6															
O Reang Ov	4																													
Koh Sotin	79	4/5	7/8	21	11/12	3	2	12/1	3/4	20									7/10/11	1										
Srey Sambel	6																													
Kang Meas	35	5	8	10	1	3	3																							
Nesoh Chamar	15	5	7/8	6				11	3/4	6																				
Tbong Khamum	45	5	8	16	1/12	2	4	10/11	4	12																				
Sung Trany	43	5	8	12	1	3/4	2	1	4	11																				
Kampong Nerm	38	5	8	12				8	10/11	7										6	12/1	5								
Prey Chhor	2																													
Chung Prey	1																													
Bathery	0																													
Prey Veng	230				41			27														5			6		5			
Pearo	25	4/5	7/8	15																										
Pean Chor	29	4/5	8	19																										
Kanh Chreuch	1																													
Sithor Kandal	8	5	8	5																										
Peareng	8							5	7	2																				
Kampong Leav	37	2/3	5/6	4	2/1	4/5	6													1/2	7/8	5								
Prey Veng	7																													
Ba Phnum	17																													
Kamlay Meas	33				5/6	7/8	5																		1/2	3/4	1/5	5		
Kampong Tarek	4																													
Prea Sdech	61				5	7/8	10																							
Kandal	329				102			11				31		4						17		5								
Kanch Kandal	19	5	8	4							5	8	4																	
Nuk Kamppol	62	5	8	13	12/1	2/3	5				11/12	7/8	17																	
Urea Eih	12	5	8	12				12	3	10																				
Kean Svey	42	5	8	12	1/2	3/4	5																							
Saung	38	5	8	15																										
Louk Dak	31	5	8	17																										
Koh Thom	54	5	8	29							12/1	2/3	15																	
Pouhien Leu	19										11/12	2/3	6																	
Ang Snoual	1																													
Kandal Stung	1																													
Takso	16																													
Bati	1																													
Prey Kabass	15								2	4/5	4																			
Anakor Borey	0																													
TOTAL (Percentage%)	899 (100)	225 (25)	7/8	W (50)	49 (6)	55 (6)	8/10/11	W (5)	4/5	7/8	W (6)	17/12	7/8	D (11)	11 (11)	3 (6)	3 (6)	5 (7)	6 (11)	5 (7)										
Major Patterns (W:Wet Season) (D:Dry Season)		2/5	7/8	W (10)	12	W/D (12)	10/11	3/4	W/D (3)	11/12	2/3	D (4)	11/12	7/8	D (11)	2	4/5	D (2)												

AGRICULTURE SECTION

Province and District	Farm Machines (Plowing)																											
	Paddy Practicing Farmers															Not Paddy Practicing Farmers					Total							
	Wet Season Paddy					Dry Season Paddy					Wet & Dry Season Paddy					a.	b.	c.	d.	e.	Grand Total							
	a.	b.	c.	d.	e.	a.	b.	c.	d.	e.	a.	b.	c.	d.	e.	a.	b.	c.	d.	e.	Grand Total							
Kratie	5	1			6	11	3		2	16	6				1	7					22	4		3	29			
Prek Prasap	1	1			2	6	1		2	9	2				1	3					9	2		3	11			
Chhlong	4				4	5	2			7	4					4					13	2			15			
Kampong Cham	59	9		22	90	61	2		1	64	41	21		15	77	9				9	170	32		38	240			
O Reang Ov	9	4		7	20						5	6		4	15						14	10		11	35			
Koh Sotin	18				18	7				7	1				1	9				9	35				35			
Srey Santhel	3	2		6	11	2				2	6	5		11	22						11	7		17	35			
Kang Meas	5			9	14	13			1	14	5				5						23			10	33			
Kroch Chhnar	6			6	12	12				12											18				18			
Tbong Khnum	1			1	13	13				13	3				3						17				17			
Stung Trang	1			1	11	2				13	1				1						13	2			15			
Kampong Seim	11	1			12	1				1	6				6						18	1			19			
Prey Chhor	2				2	1				1	5	3			8						8	3			11			
Chung Prey	1				1	1				1	6	3			9						8	3			11			
Batheay	2	2			4						3	4			7						5	6			11			
Prey Veng	62	18		9	89	66	8	1	6	81	58	27	1	4	90						186	53	2	19	260			
Peam Ro		1			1	21	1	1	1	24	6	4			11						27	6	1	2	36			
Peam Chor						31	4			35											31	4			35			
Kanh Chreach	21	2			23																21	2			23			
Sithor Kandal	3	1		2	6	3			4	7	3	5		1	9						9	6		7	22			
Peareang	6	2		2	10				1	1	10	1		2	13						16	3		5	24			
Kampong Leav	2			2	3	3				6	7	8			15						12	11			23			
Prey Veng	9	6		3	18						3	3	1		7						12	9	1	3	25			
Ba Phnom	5			5	2					2	13	4			17						20	4			24			
Kamchay Mear	3	3		2	8						2	1			3						5	4		2	11			
Kampong Travek	3				3	6				6	2				2						11				11			
Prea Sdech	10	3			13						12	1			13						22	4			26			
Kandal	45		1	2	48	141	11	1	13	3	169	73	9	2	13	5	102	7		1	8	266	20	3	28	327		
Ksach Kandal				2	2	7			2	9	10	9		5	24						17	9		9	35			
Muk Kampoul	1			1	24	1		3		28	6		1		7	3			1	4	34	1	1	4	40			
Lyca Em					28	6				31											28	6			34			
Kean Svay					19			9		28	9		7		16	1				1	29			16	45			
Saang	1		1		2	12				12	16		3		19						29			4	33			
Leuk Dek					18	1				19	2				2	2				2	22	1			23			
Koh Thom	2			2	2	1		1	1	4	24		1	3	28	1				1	29		1	4	35			
Ponhea Leu					29	3	1			33	3				3						32	3	1		36			
Ang Snourol	21				21	1				1	1				1						23				23			
Kandal Stung	20				20	1				1	2				2						23				23			
Takeo	1				1	2		1	1	4	27	1			28						30	1	1	1	33			
Bati											11				11						11				11			
Prey Kabass	1				1						10				10						11				11			
Angkor Borey						2		1	1	4	6	1			7						8	1	1	1	11			
TOTAL	172	28		1	33	231	281	24	3	14	12	334	205	58	3	13	25	304	16		1	17	674	110	6	29	70	889
(Percentage %)	(74)	(12)		(1)	(14)	(100)	(84)	(7)	(1)	(4)	(4)	(100)	(67)	(19)	(1)	(4)	(8)	(100)	(94)		(6)	(100)	(75)	(12)	(1)	(2)	(8)	(100)

Note: a.-Cattle, b.-Buffalo, c.-2-wheel tractor, d.-1-wheel tractor, e.-None

AGRICULTURE SECTION

Province and District	Farm Machines (Harrowing)																												
	Paddy Practicing Farmers															Not Paddy Practicing Farmers					Total								
	Wet Season Paddy					Dry Season Paddy					Wet & Dry Season Paddy																		
	a.	b.	c.	d.	e.	Sub Total	a.	b.	c.	d.	e.	Sub Total	a.	b.	c.	d.	e.	Sub Total	a.	b.	c.	d.	e.	Sub Total	a.	b.	c.	d.	e.
Kratie	5	1			6	11	3			2	16	6				1	7						22	4			3	29	
Prek Prasap	1	1			2	6	1			2	9	2				1	3						9	2			3	14	
Chhlong	4				4	5	2				7	4					4						13	2				15	
Kampong Cham	59	9		22	90	61	2			1	64	41	21			15	77	9				9	170	32			38	240	
O Reang Ov	9	4		7	20							5	6			4	15						14	10			11	35	
Koh Sotin	18				18	7					7	1					1	9				9	35					35	
Srey Santhel	3	2		6	11	2					2	6	5			11	22						11	7			17	35	
Kang Meas	5			9	14	13				1	14	5					5						23				10	33	
Kroeh Chhnar	6				6	12					12												18					18	
Tboog Khamum	1				1	13					13	3					3						17					17	
Stung Trang	1				1	11	2				13	1					1						13	2				15	
Kampong Seim	11	1			12	1					1	6					6						18	1				19	
Prey Chhor	2				2	1					1	5	3				8						8	3				11	
Cheung Prey	1				1	1					1	6	3				9						8	3				11	
Batheay	2	2			4							3	4				7						5	6				11	
Prey Veng	62	18		9	89	66	8	1		6	81	58	27	1		4	90						186	53	2		19	260	
Peam Ro		1			1	21	1	1		1	24	6	4			1	11						27	6	1		2	36	
Peam Chor						31	4				35												31	4				35	
Kanh Chreach	21	2			23																		21	2				23	
Sithor Kandal	3	1		2	6	3				4	7	3	5			1	9						9	6			7	22	
Peareang	6	2		2	10					1	1	10	1			2	13						16	3			5	24	
Kampong Leav	2				2	3	3				6	7	8				15						12	11				23	
Prey Veng	9	6		3	18							3	3	1		7							12	9	1		3	25	
Ba Phnom	5				5	2					2	13	4				17						20	4				24	
Kamchay Mear	3	3			8							2	1			3							5	4			2	11	
Kampong Travek	3				3	6					6	2				2							11					11	
Prea Sdech	10	3			13							12	1			13							22	4				26	
Kandal	46			2	48	43	11		8	3	165	80	9	1	1	5	96	7			1	8	276	20	1	10	10	317	
Ksach Kandal				2	2	7				2	9	10	9			5	24						17	9			9	35	
Muk Kampool	1				1	24	1		3		28	6				6	3			1		4	34	1		4	39		
Lyca Im						28	6				34												28	6				34	
Kean Svay						20			5		25	11		1		12	1					1	32			6	38		
Saang	2				2	12					12	18				18							32					32	
Leuk Dek						18	1				19	2				2	2	2					2	22	1			23	
Koh Thom	2				2	3				1	4	27		1		28	1					1	33		1		1	35	
Ponhea Leu						29	3				32	3				3							32	3				35	
Ang Snourol	21				21	1					1	1				1							23					23	
Kandal Stung	20				20	1					1	2				2							23					23	
Takeo	1				1	2		1	1		4	27	1			28							30	1	1	1		33	
Bati												11				11							11					11	
Prey Kabass	1				1							10				10							11					11	
Angkor Borey						2		1	1		4	6	1			7							8	1	1	1		11	
TOTAL	173	28		33	234	283	24	2	9	12	330	212	58	2	1	25	298	16			1	17	684	110	4	11	70	879	
(Percentage %)	(74)	(12)		(14)	(100)	(85)	(7)	(1)	(3)	(4)	(100)	(71)	(19)	(1)	(0)	(8)	(100)	(94)			(6)	(100)	(78)	(13)	(0)	(1)	(8)	(100)	

Note: a-Cattle, b-Buffalo, c-2-wheel tractor, d-4-wheel tractor, e-None

AGRICULTURE SECTION

Province and District	Farm Machines (Puddling)																												
	Paddy Practicing Farmers															Not Paddy Practicing Farmers						Total							
	Wet Season Paddy					Dry Season Paddy					Wet & Dry Season Paddy					Practicing Farmers						Total							
	a	b	c	d	e	Sub Total	a	b	c	d	e	Sub Total	a	b	c	d	e	Sub Total	a	b	c	d	e	Sub Total	a	b	c	d	e
Kratie	5	1			6	11	3			2	16	6				1	7						22	4			3	29	
Prek Prasap	1	1			2	6	1			2	9	2				1	3						9	2			3	14	
Chhlong	4				4	5	2				7	4					4						13	2				15	
Kampong Cham	59	9		22	90	61	2			1	64	41	21			15	77						161	32			38	231	
O Reang Ov	9	4		7	20							5	6			4	15						14	10			11	35	
Koh Sotin	18				18	7					7	1					1						26					26	
Srey Santhel	3	2		6	11	2					2	6	5			11	22						11	7			17	35	
Kang Meas	5			9	14	13				1	14	5					5						23				10	33	
Kroch Chhmar	6			6	12						12												18					18	
Tbong Khmum	1			1	13						13	3					3						17					17	
Stung Trang	1			1	11	2					13	1					1						13	2				15	
Kampong Seim	11	1			12	1					1	6					6						18	1				19	
Prey Chhor	2			2	1						1	5	3				8						8	3				11	
Cheung Prey	1			1	1						1	6	3				9						8	3				11	
Batheay	2	2			4							3	4				7						5	6				11	
Prey Veng	62	18		9	89	65	8	1		5	79	58	27	1		4	90						185	53	2		18	258	
Peam Ro		1			1	21	1	1		1	24	6	4			1	11						27	6	1		2	36	
Peam Chor						30	4				34												30	4				34	
Kanh Chreach	21	2			23																		21	2				23	
Sithor Kandal	3	1		2	6	3				3	6	3	5			1	9						9	6			6	21	
Peareang	6	2		2	10					1	1	10	1			2	13						16	3			5	24	
Kampong Leav	2			2	3	3					6	7	8				15						12	11				23	
Prey Veng	9	6		3	18							3	3	1			7						12	9	1		3	25	
Ba Phnom	5			5	2						2	13	4				17						20	4				24	
Kamchay Mear	3	3		2	8							2	1				3						5	4			2	11	
Kampong Travek	3			3	6						6	2					2						11					11	
Prea Sdech	10	3			13							12	1				13						22	4				26	
Kandal	46			2	48	143	11		5	3	162	80	9	1	1	5	96						269	20	1	6	10	306	
Ksach Kandal				2	2	7				2	9	10	9			5	24						17	9			9	35	
Muk Kampoul	1			1	24	1			2		27	6					6						31	1		2		34	
Ivea Em					28	6					34												28	6				34	
Kean Svay					20				3		23	11			1		12						31			4		35	
Saang	2			2	12						12	18					18						32					32	
Leuk Dek					18	1					19	2					2						20	1				21	
Koh Thom	2			2	3					1	4	27		1			28						32		1		1	34	
Ponhea Leu					29	3					32	3					3						32	3				35	
Ang Snourl	21			21	1						1	1					1						23					23	
Kandal Stung	20			20	1						1	2					2						23					23	
Takeo	1			1	2		1	1			4	27	1				28						30	1	1	1		33	
Bati												11					11						11					11	
Prey Kabass	1			1								10					10						11					11	
Angkor Borey					2		1	1			4	6	1				7						8	1	1	1		11	
TOTAL	173	28		33	234	282	24	2	6	11	325	212	58	2	1	25	298						667	110	4	7	69	857	
(Percentage %)	(74)	(12)		(14)	(100)	(87)	(7)	(1)	(2)	(3)	(100)	(71)	(19)	(1)	(0)	(8)	(100)						(78)	(13)	(9)	(1)	(8)	(100)	

Note: a.-Cattle, b.-Buffalo, c.-2-wheel tractor, d.-4-wheel tractor, e.-None

AGRICULTURE SECTION

Province and District	Farm Machines (Threshing)																								
	Paddy Practicing Farmers															Not Paddy Practicing Farmers					Total				
	Wet Season Paddy					Dry Season Paddy					Wet & Dry Season Paddy					Practicing Farmers					Total				
a	b	c	d	Sub Total	a	b	c	d	Sub Total	a	b	c	d	Sub Total	a	b	c	d	Sub Total	a	b	c	d	Grand Total	
Kratie			6	6	2		18		20				8	8							2		32	34	
Prek Prasap			2	2	1		11		12				4	4							1		17	18	
Chhlong			4	4	1		7		8				4	4							1		15	16	
Kampong Cham	11	1	79	91	5	5	57		67	19	3	58		80						35	9	194	238		
O Reang Oy			20	20					7			15		15									35	35	
Koh Sotin			18	18			7		7			1		1									26	26	
Srey Santhel	6		5	11			2		2	8		14		22						14		21	35		
Kang Meas			14	14		1	13		14			5		5							1		32	33	
Kroeh Chhmar			6	6	1		11		12											1		17	18		
Tbong Khmum	1		1	2	4		12		16			3		3						5		16	21		
Stung Trang		1		1		3	9		12		1			1							5		9	14	
Kampong Seim			12	12			1		1			6		6									19	19	
Prey Chhor			2	2			1		1			8		8									11	11	
Cheung Prey			1	1		1	1		2	4	2	6		12						4	3	8	15		
Batheay	4			4						7				7							11			11	
Prey Veng	66	6	73	145	22	48	27		97	54	35	41		133						142	89	141	375		
Peam Ro	1		1	2	5	15	8		28	3	8	3		14						9	23	12	44		
Peam Chor					9	26	8		43											9	26	8	43		
Kanh Chreach	19		23	42																19		23	42		
Sithor Kandal	2		6	8	2		7		9	8		9		17						12		22	34		
Pearang	7	3	7	17		1			1	7	4	11		22						14	8	18	40		
Kampong Leav		2		2		6			6	1	15	1		17						1	23	1	25		
Prey Veng	14		16	30						7	1	6		14						21	1	22	44		
Ba Phnom	4		1	5	1		1		2	12	1	5		18						17	1	7	25		
Kanchay Mear	4		8	12						2		3		5						6		11	17		
Kampong Travek	3			3	5		3		8	2				2						10		3	13		
Prea Sdech	12	1	11	24						12	6	6		24						24	7	17	48		
Kandal	1	1	45	47	6	56	103		165	8	39	54		101						15	96	202	313		
Ksach Kandal			2	2		1	8		9	5	2	17		24						5	3	27	35		
Muk Kampoul		1		1		3	24		27		2	5		7							6	29	35		
Ilea Em					6	16	12		34											6	16	12	34		
Kean Svay						17	9		26		11	3		14							28	12	40		
Saang	1		1	2		2	10		12	3	3	15		21						4	5	26	35		
Leuk Dek						12	7		19		1			1							13	7	20		
Koh Thom			1	1		2	2		4		20	8		28							22	11	33		
Ponhea Leu						2	30		32			3		3							2	33	35		
Ang Snourl			21	21			1		1			1		1									23	23	
Kandal Stung			20	20			1		1			2		2							1		22	23	
Takeo			1	1		4			4	8	5	26		39						8	9	27	44		
Bati										8		10		18						8		10	18		
Prey Kabass			1	1							3	10		13							3	11	14		
Angkor Borey						4			4		2	6		8							6		6	12	
TOTAL	78	8	204	290	35	113	205		353	89	82	190		361						202	203	599	1004		
(Percentage %)	(27)	(3)	(70)	(100)	(10)	(32)	(58)		(100)	(25)	(23)	(53)		(100)						(20)	(20)	(60)	(100)		

Note: a.-Animal, b.-Threshing machine, c.-Beating, d.-Others

AGRICULTURE SECTION

Province and District	Farm Machines (Rice Milling)																								
	Paddy Practicing Farmers												Not Paddy Practicing Farmers					Total							
	Wet Season Paddy					Dry Season Paddy					Wet & Dry Season Paddy														
	a.	b.	c.	d.	Sub Total	a.	b.	c.	d.	Sub Total	a.	b.	c.	d.	Sub Total	a.	b.	c.	d.	Sub Total	a.	b.	c.	d.	Grand Total
Kratie			6		6	1	18		19			8		8							1		32		33
Prek Prasap			2		2	1	11		12			4		4							1		17		18
Chhlong			4		4		7		7			4		4									15		15
Kampong Cham	3		73		76	12	54		66	8		69		77							23		196		219
O Reang Ov			20		20							15		15									35		35
Koh Sotin			6		6		3		3														9		9
Srey Santhel			11		11		2		2			22		22									35		35
Kang Meas			14		14	6	14		20			5		5							6		33		39
Kroch Chhmar			5		5		12		12														17		17
Tboeng Khnum			1		1		13		13			3		3									17		17
Stung Trang						6	7		13	1				1							7		7		14
Kampong Seim			12		12		1		1			6		6									19		19
Prey Chhor			2		2		1		1			8		8									11		11
Cheung Prey			1		1		1		1	1		8		9							1		10		11
Batheay	3		1		4					6		2		8							9		3		12
Prey Veng	35		60		95	1	76	2	79	17		74		91							53		210	2	265
Peam Ro			1		1		22	1	23			11		11									31	1	35
Peam Chor							33	1	34														33	1	34
Kanh Chreach	13		9		22																13		9		22
Sithor Kandal	3		3		6	1	6		7	6		3		9							10		12		22
Pearcang	1		9		10		1		1	1		12		13							2		22		24
Kampong Leav			2		2		6		6			12		12									20		20
Prey Veng	15		13		28					4		7		11							19		20		39
Ba Phnom	2		3		5		2		2	5		13		18							7		18		25
Kamchay Mear	1		6		7							3		3							1		9		10
Kampong Travek			3		3		6		6			2		2									11		11
Prea Sdech			11		11					1		11		12							1		22		23
Kandal			46		46	1	152		153			93		93							1		291		292
Ksach Kandal			2		2		9		9			24		24									35		35
Muk Kampoul			1		1		20		20			5		5									26		26
Lyca Em							34		34														31		31
Kean Svay							22		22			11		11									33		33
Saang			2		2		12		12			18		18									32		32
Leuk Dck							17		17			1		1									18		18
Koh Thom			1		1		4		4			28		28									33		33
Penhea Leu						1	32		33			3		3							1		35		36
Ang Snourl			20		20		1		1			1		1									22		22
Kandal Stung			20		20		1		1			2		2									23		23
Takco			1		1		4		4			28		28									33		33
Bati												11		11									11		11
Prey Kabass			1		1							10		10									11		11
Angkor Borey							4		4			7		7									11		11
TOTAL	38		186		224	15	304	2	321	25		272		297							78		762	2	812
(Percentage %)	(17)		(83)		(100)	(5)	(95)	(1)	(100)	(5)		(92)		(100)							(5)		(99)	(0)	(100)

Note: a.-Pounding, b.-Communal Mill, c.-Private Mill, d.-Others

AGRICULTURE SECTION

Province and District	Future Plan										Not Paddy Practicing Farmers										Total																								
	Wet Season Paddy					Paddy Practicing Farmers					Wet & Dry Season Paddy					Not Paddy Practicing Farmers					Total																								
	Wet Season Paddy					Dry Season Paddy					Wet & Dry Season Paddy					Not Paddy Practicing Farmers					Total																								
	a.	b.	c.	d.	e.	f.	g.	h.	Sub Total	a.	b.	c.	d.	e.	f.	g.	h.	Sub Total	a.	b.	c.	d.	e.	f.	g.	h.	Sub Total	a.	b.	c.	d.	e.	f.	g.	h.	Sub Total									
Krante	6	2	1	1	1	1	1	6	18	3	1	1	1	1	1	1	6	25	8	1	1	1	1	1	1	6	10	2	1	1	1	1	1	1	6	44	9	3	3	3	3	3	3	27	
Prek Prasap	2	1	1	1	1	1	1	4	11	4	1	1	1	1	1	1	4	14	4	1	1	1	1	1	1	4	6	2	1	1	1	1	1	1	6	22	6	2	2	2	2	2	2	14	
Chhlong	4	1	1	1	1	1	1	5	7	1	1	1	1	1	1	1	4	11	4	1	1	1	1	1	1	4	2	1	1	1	1	1	1	1	2	6	2	1	1	1	1	1	1	6	
Kampong Cham	37	24	38	64	51	60	10	5	289	33	37	25	47	33	22	5	1	201	45	15	21	57	22	43	8	7	216	3	1	9	6	9	2	30	115	77	83	177	112	134	25	13	736		
O Reang Ov	2	3	18	19	20	20	20	62	15	1	1	1	1	1	1	1	1	15	15	1	1	1	1	1	1	1	15	4	2	3	3	3	3	3	3	30	34	5	5	5	5	5	5	5	104
Koh Sotin	7	7	12	16	15	5	5	55	1	1	1	1	1	1	1	1	1	7	23	4	1	1	1	1	1	1	7	4	3	1	1	1	1	1	1	11	112	9	9	9	9	9	9	9	81
Stev Sathel	11	1	11	9	1	4	5	42	1	1	1	1	1	1	1	1	1	9	20	1	4	21	16	5	6	7	80	4	3	1	1	1	1	1	1	12	131	12	12	12	12	12	12	12	144
Kang Meas	10	8	8	6	12	14	14	58	12	13	9	8	10	14	14	14	66	5	3	3	3	3	3	3	3	22	2	2	2	2	2	2	2	2	14	149	14	14	14	14	14	14	14	166	
Krosch Chhmar	5	2	5	6	6	6	6	18	7	7	10	6	12	1	1	43	1	1	1	1	1	1	1	1	6	1	1	1	1	1	1	1	1	6	46	6	6	6	6	6	6	6	42		
Tbong Khnum	1	1	1	1	1	1	1	3	11	8	1	1	1	1	1	34	3	2	3	3	3	3	3	3	9	9	8	4	4	4	4	4	4	36	25	8	8	8	8	8	8	8	72		
Stung Trang	1	1	1	1	1	1	1	2	6	3	10	1	1	1	20	1	1	1	1	1	1	1	1	3	3	2	1	1	1	1	1	1	10	58	17	17	17	17	17	17	17	141			
Kampong Seam	2	1	7	12	7	9	38	38	1	1	1	1	1	1	3	3	5	1	5	6	17	17	3	3	3	3	3	3	3	25	25	10	10	10	10	10	10	10	100						
Prey Chhor	2	2	2	1	1	1	7	7	1	1	1	1	1	1	2	2	7	8	2	6	25	25	7	7	7	7	7	7	7	49	41	18	18	18	18	18	18	18	162						
Chuang Prey	4	4	4	4	4	4	4	16	1	1	1	1	1	1	1	7	7	4	4	4	4	15	15	4	4	4	4	4	4	4	28	28	11	11	11	11	11	11	11	121					
Bathay	4	4	4	4	4	4	4	16	1	1	1	1	1	1	1	7	7	4	4	4	4	15	15	4	4	4	4	4	4	4	28	28	11	11	11	11	11	11	11	121					
Prey Veng	61	28	18	36	26	8	2	5	184	49	43	6	4	1	3	106	68	23	14	32	17	12	5	171	171	178	94	38	72	44	23	7	5	461											
Peam Ro	1	1	1	1	1	1	1	2	22	11	2	1	1	1	36	11	1	1	1	1	11	11	1	1	1	1	1	1	1	11	11	34	12	12	12	12	12	12	108						
Peam Chhor	22	22	22	22	22	22	22	22	13	23	1	3	1	1	41	41	1	1	1	1	41	41	1	1	1	1	1	1	1	41	41	22	22	22	22	22	22	22	198						
Kaoh Chreath	3	3	3	3	3	3	3	12	1	1	1	1	1	1	6	6	5	1	4	10	10	1	1	1	1	1	1	1	6	6	9	5	5	5	5	5	5	45							
Sitor Kandal	6	2	2	1	1	1	1	12	1	1	1	1	1	1	6	6	12	1	2	7	29	29	1	1	1	1	1	1	1	6	6	18	3	3	3	3	3	3	72						
Preaeng	1	1	1	1	1	1	1	6	5	4	1	1	1	1	12	12	4	1	2	1	22	22	1	1	1	1	1	1	1	6	6	20	9	9	9	9	9	9	81						
Kampong Leav	15	11	9	16	14	1	1	66	2	2	2	2	2	2	10	14	4	1	2	1	28	28	6	6	6	6	6	6	6	36	36	21	17	17	17	17	17	17	141						
Ba Phnom	4	1	1	1	1	1	1	8	2	2	2	2	2	2	10	10	14	4	1	2	28	28	2	2	2	2	2	2	2	10	10	20	9	9	9	9	9	9	81						
Kamohay Mear	4	3	5	8	6	6	2	34	6	6	6	6	6	6	36	36	2	2	3	3	16	16	2	2	2	2	2	2	2	8	8	6	5	5	5	5	5	5	45						
Kampong Travok	3	3	3	3	3	3	3	12	3	3	3	3	3	3	12	12	9	2	2	2	2	2	2	2	2	2	2	2	2	8	8	11	5	5	5	5	5	5	45						
Prea Nchoch	2	10	1	9	5	2	2	29	2	10	3	9	7	5	36	36	2	10	3	9	7	5	36	2	10	3	9	7	5	36	36	4	20	4	18	12	7	6	65						
Kandal	44	2	2	1	2	2	51	98	59	30	27	7	4	2	227	74	39	24	15	2	156	156	2	6	2	3	3	13	218	106	58	46	9	8	2	447									
Ksach Kandal	1	1	1	1	1	1	1	6	6	4	1	1	1	1	10	23	1	1	1	1	35	35	1	1	1	1	1	1	6	6	30	1	1	1	1	1	1	37							
Muk Kampong	1	1	1	1	1	1	1	6	2	2	2	2	2	2	10	10	6	2	2	1	21	21	1	1	1	1	1	1	6	6	7	29	14	11	6	1	6	61							
Lvea Em	15	18	6	5	1	2	2	49	15	18	6	5	1	2	49	49	36	7	4	3	6	2	1	23	23	1	25	8	4	16	6	1	60												
Kean Svay	1	1	1	1	1	1	1	6	1	1	1	1	1	1	6	6	5	1	1	6	13	13	6	1	1	1	1	1	6	6	1	25	8	4	16	6	1	60							
Stang	1	1	1	1	1	1	1	6	3	14	1	2	1	2	20	20	3	14	1	2	2	2	1	3	3	18	1	3	3	5	18	1	3	3	3	25									
Leuk Dok	2	2	2	2	2	2	2	14	5	4	4	4	4	4	20	20	8	27	28	17	72	72	1	1	1	1	1	1	6	6	2	34	35	18	2	2	2	87							
Noh Thom	2	2	2	2	2	2	2	14	29	10	9	5	1	1	54	54	3	1	2	1	7	7	1	1	1	1	1	1	6	6	32	11	9	7	2	2	2	61							
Panh Leu	20	20	20	20	20	20	20	160	22	22	22	22	22	22	88	88	1	1	1	1	4	4	1	1	1	1	1	1	4	4	21	2	2	2	2	2	2	24							
Ang Snour	20	20	20	20	20	20	20	160	20	20	20	20	20	20	80	80	1	1	1	1	4	4	1	1	1	1	1	1	4	4	23	2	2	2	2	2	2	25							
Kandal Stung	1	1	1	1	1	1	1	6	4	26	9	5	9	4	53	53	4	26	9	5	9	4	53	4	26	9	5	9	4	53	53	31	10	5	10	4	4	60							
Takoo	1	1	1	1	1	1	1	6	10	10	10	10	10	10	40	40	10	10	10	10	40	40	10	10	10	10	10	10	40	40	20	10	10	10	10	10	10	100							
Bati	1	1	1	1	1	1	1	6	10	10	10	10	10	10	40	40	10	10	10	10	40	40	10	10	10	10	10	10	40	40	11	10	4	9	4	4	38								
Prey Kalass	1	1	1	1	1	1	1	6	4	4	4	4	4	4	16	16	4	4	4	4	16	16	4	4	4	4	4	4	16	16	10	1	1	1	1	1	1	12							
Angkor Borey	1	1	1	1	1	1	1	6	4	4	4	4	4	4	16	16	4	4	4	4	16	16	4	4	4	4	4	4	16	16	10	1	1	1	1	1	1	12							
TOTAL	149	57	58	102	77	70	12	11	556	202	139	59	79	41	29	5	9	563	221	84	64	113	45	57	15	9	606	2	9	3	12	6	9	2	43	574	289	184	306	169	105	32	29	1748	

Note: Data are plural answers. a. - Rice-Rice, b. - Rice-Nutze, c. - Rice-Diversified Crops, d. - Vegetables, e. - Fruit trees, f. - Rice-Animal, g. - Agro-forestry Crops, h. - Others

AGRICULTURE SECTION

Province and District	No. of Practicing Farmers	Agricultural Extension																			
		Wet Season Paddy					Dry Season Paddy					Wet & Dry Season Paddy					Total				
		a.	b.	c.	d.	Sub Total	a.	b.	c.	d.	Sub Total	a.	b.	c.	d.	Sub Total	a.	b.	c.	d.	Sub Total
Kratie	32				4	4				14	14				6	6				24	24
Prek Prasap	17				1	1				9	9				3	3				13	13
Chhlong	15				3	3				5	5				3	3				11	11
Kampong Cham	231	77	6		1	84	44			18	62	49	1		6	56	170	7		25	202
O Reang Ov	35	11	6			17						5	1		1	7	16	7		1	24
Koh Sotin	26	18				18	7				7	1			1	26					26
Srey Santhel	35	11				11	2				2	22				22	35				35
Kang Meas	33	14				14	9			5	14	3			2	5	26			7	33
Kroch Chhmar	18	6				6	12				12						18				18
Tbong Khnum	17				1	1				13	13				3	3				17	17
Stung Trang	15	1				1	13				13	1				1	15				15
Kampong Seim	19	12				12	1				1	6				6	19				19
Prey Chhor	11											1				1	1				1
Cheung Prey	11											4				4	4				4
Batheay	11	4				4						6				6	10				10
Prey Veng	257	64	12	30	4	110	37		3	4	44	65	4	25	19	113	166	16	58	27	267
Peam Ro	35	1				1	23				23	10			6	16	34		6		40
Peam Chor	35																				
Kanh Chreach	23	23		6		29											23		6		29
Sithor Kandal	22				1	1	1				1	3			2	5	4			3	7
Pearang	24	10		10		20	1		1		2	13			12	25	24		23		47
Kampong Leav	24	2				2	4			2	6	8		1	5	14	14		1	7	22
Prey Veng	24	5	12	12		29						4	4	5		13	9	16	17		42
Ba Phnom	24	2			3	5	2			2	4	11			12	23	15			17	32
Kamchay Mear	11	7				7						2				2	9				9
Kampong Travek	11	3				3	6		2		8	2		1		3	11		3		14
Prea Sdech	24	11		2		13						12				12	23		2		25
Kandal	302	35	1	15		51	138		2	16	156	90		1	3	94	263	1	18	19	301
Ksach Kandal	35	2				2	9				9	23				23	34				34
Muk Kampoul	32	1				1	21			2	23	6				6	28			2	30
Lvea Em	34						34				34						34				34
Kean Svay	33						16			1	17	9		1		10	25		1	1	27
Saang	32	2				2	12				12	18				18	32				32
Leuk Dek	21						19				19	2				2	21				21
Koh Thom	34	2				2	4				4	28				28	34				34
Ponhea Leu	35						21		1	13	35	1			3	4	22		1	16	39
Ang Snourl	23	8	1	15		24	1		1		2	1				1	10	1	16		27
Kandal Stung	23	20				20	1				1	2				2	23				23
Takeo	33	1				1	1			3	4	23			6	29	25			9	34
Bati	11											8			4	12	8			4	12
Prey Kabass	11	1				1						10				10	11				11
Angkor Borey	11						1			3	4	5			2	7	6			5	11
TOTAL	855	177	19	45	9	250	220		5	55	280	227	5	26	40	298	624	24	76	104	828
(Percentage: %)		(71)	(8)	(18)	(4)	(100)	(79)		(2)	(20)	(100)	(76)	(2)	(9)	(13)	(100)	(75)	(3)	(9)	(13)	(100)

Note: a.-Provincial/District Extension Officer, b.-MAFF Advisor, c.-NGOs, d.-Others

AGRICULTURE SECTION

Province and District	No. of Paddy Practicing Farmers	Farm Labor															
		Average Number of Farm Labor															
		Wet Season Paddy				Dry Season Paddy				Wet & Dry Paddy				Total			
		Farm. No.	Man	Farm. No.	Woman	Farm. No.	Man	Farm. No.	Woman	Farm. No.	Man	Farm. No.	Woman	Farm. No.	Man	Farm. No.	Woman
Kratie	32	6	1.33	4	1.50	16	2.19	17	1.94	8	1.50	8	1.38	30	1.83	29	1.72
Prek Prasap	17	2	1.00			9	1.56	10	1.70	4	1.50	4	1.25	15	1.47	14	1.57
Chhlong	15	4	1.50	4	1.50	7	3.00	7	2.29	4	1.50	4	1.50	15	2.20	15	1.87
Kampong Cham	231	84	1.99	89	2.18	63	2.03	63	2.03	77	2.01	75	1.96	224	2.01	227	2.07
O Reang Ov	35	20	1.75	20	1.70					15	1.80	14	1.50	35	1.77	34	1.62
Koh Sotin	26	17	2.00	18	1.83	7	1.71	7	2.43	1	2.00	1	2.00	25	1.92	26	2.00
Srey Sanhel	35	9	1.67	11	1.82	2	1.50	2	1.50	22	1.77	22	1.73	33	1.73	35	1.74
Kang Meas	33	14	2.57	14	3.07	14	3.21	13	2.31	5	3.40	5	3.00	33	2.97	32	2.75
Kroch Chmar	18	4	2.00	6	3.33	11	1.64	12	1.75					15	1.73	18	2.28
Tbong Khmum	17	1	2.00	1	4.00	13	1.54	13	1.85	3	2.00	3	1.67	17	1.65	17	1.94
Stung Trang	15	1	2.00	1	2.00	13	1.85	13	2.15	1	3.00	1	3.00	15	1.93	15	2.20
Kampong Seim	19	11	2.18	11	2.27	1	1.00	1	1.00	6	1.67	6	2.00	18	1.94	18	2.11
Prey Chhor	11	2	2.00	2	2.00	1	1.00	1	1.00	8	2.38	8	2.63	11	2.18	11	2.36
Cheung Prey	11	1	2.00	1	1.00	1	4.00	1	3.00	9	2.44	8	2.38	11	2.55	10	2.30
Batheay	11	4	1.25	4	2.00					7	1.43	7	1.57	11	1.36	11	1.73
Prey Veng	257	85	2.73	86	2.74	78	2.24	79	2.29	88	2.45	88	2.64	251	2.48	253	2.57
Peam Ro	35	1	4.00	1	6.00	23	3.04	23	2.61	11	2.73	11	3.09	35	2.97	35	2.86
Peam Chor	35					34	1.91	35	2.06					34	1.91	35	2.06
Kanh Chreach	23	23	2.96	22	2.73									23	2.96	22	2.73
Sithor Kandal	22	6	2.83	6	2.67	6	1.33	7	2.57	8	3.38	9	2.78	20	2.60	22	2.68
Pearcang	24	10	2.10	10	2.70	1	3.00	1	1.00	13	2.38	13	2.62	24	2.29	24	2.58
Kampong Leav	24	2	1.50	2	3.00	7	2.29	6	2.17	15	2.13	14	2.79	24	2.13	22	2.64
Prey Veng	24	17	2.76	17	2.41					7	3.57	7	3.57	24	3.00	24	2.75
Ba Phnom	24	4	1.50	5	2.60	2	1.50	2	1.50	17	1.88	17	1.76	23	1.78	24	1.92
Kamchay Mear	11	7	2.86	8	3.00					3	3.33	3	3.33	10	3.00	11	3.09
Kampong Travck	11	3	1.67	3	1.67	5	2.00	5	2.80	2	2.50	2	3.00	10	2.00	10	2.50
Prea Sdech	24	12	3.42	12	3.17					12	2.00	12	2.42	24	2.71	24	2.79
Kandal	302	47	1.57	48	2.00	158	1.78	153	2.08	95	1.85	94	2.11	300	1.77	295	2.07
Ksach Kandal	35	2	1.00	2	1.50	8	1.13	8	1.25	24	1.46	24	1.54	34	1.35	34	1.47
Muk Kampoul	32	1	2.00	1	1.00	25	2.08	24	1.92	6	1.83	5	1.80	32	2.03	30	1.87
Lvea Em	34					34	2.15	34	2.35					34	2.15	34	2.35
Kean Svay	33					22	1.91	22	2.50	11	1.45	11	2.00	33	1.76	33	2.33
Saang	32	2	1.50	2	1.00	12	1.58	11	2.18	18	1.56	18	2.06	32	1.56	31	2.03
Leuk Dek	21					19	1.63	19	1.89	2	2.50	2	2.50	21	1.71	21	1.95
Koh Thom	34	2	3.00	2	5.00	4	3.25	4	3.50	28	2.61	28	2.82	34	2.71	34	3.03
Ponhea Leu	35					32	1.19	29	1.69	3	1.00	3	1.00	35	1.17	32	1.63
Ang Snourl	23	21	1.67	21	1.95	1	2.00	1	2.00	1	1.00	1	2.00	23	1.65	23	1.96
Kandal Stung	23	19	1.37	20	1.95	1	3.00	1	2.00	2	2.00	2	2.00	22	1.50	23	1.96
Takeo	33	1	1.00	1	1.00	4	2.25	4	2.00	28	1.57	28	2.00	33	1.64	33	1.97
Bati	11									11	1.55	11	1.73	11	1.55	11	1.73
Prey Kabass	11	1	1.00	1	1.00					10	1.40	10	2.20	11	1.36	11	2.09
Angkor Borey	11					4	2.25	4	2.00	7	1.86	7	2.14	11	2.00	11	2.09
TOTAL	855	223	2.16	228	2.34	319	1.97	316	2.11	296	2.04	293	2.20	838	2.05	837	2.20

ANNEX

(2) Summary Results for Agriculture Section of Rural Socio-Economic Survey (Feasibility Study)

AGRICULTURE SECTION

Province and District	Animals (average heads per household)																			
	Paddy Practicing Farmers															Not Paddy Practicing Farmers				
	Wet Season Paddy					Dry Season Paddy					Wet & Dry Season Paddy									
	a.	b.	c.	d.	e.	a.	b.	c.	d.	e.	a.	b.	c.	d.	e.	a.	b.	c.	d.	e.
Kratie	0.7	2.0	0.2	6.7		0.3	1.1	0.8	3.8			1.6	0.3	1.0						
Prek Prasap	2.0	1.0		15.0		0.2	1.0	0.8	3.3			1.0	0.5							
Chhlong		2.5	0.3	2.5		0.6	1.3	0.7	4.6			2.3		1.8						
Kampong Cham	0.2	2.1	1.5	12.8	0.2	0.1	2.4	1.0	8.8	0.3	0.6	1.9	1.5	12.1	0.3		1.9	1.2	12.6	
O Reang Ov	0.5	1.5	2.9	23.1							1.1	1.1	2.8	24.1						
Koh Sotin		2.9	0.8	13.0			2.7	1.7	7.9	1.4		3.0	1.0	15.0			1.9	1.2	12.6	
Srey Santhel	0.4	0.5	1.5	8.9	1.5			1.0	7.5	1.5	0.4	0.5	1.3	10.7	1.1					
Kang Meas		1.6	1.1	6.8			3.8	1.5	8.9			3.4	1.4	8.2						
Kroch Chhmar		2.7	0.7	7.2			2.2	0.5	7.3											
Tbong Khmum		2.0		25.0	5.0		1.9	1.2	14.1	0.3		3.3	1.0	25.3						
Stung Trang		2.0		5.0		0.3	1.7	0.6	7.1	0.2		4.0								
Kampong Seim	0.2	3.0	1.5	13.3			2.0		5.0			2.5	1.7	10.7						
Prey Chhor		7.5	2.0	4.0			2.0	1.0	2.0		0.8	4.1	1.1	5.1						
Cheung Prey		2.0		1.0			3.0	1.0			0.6	2.5	0.8	5.2	0.1					
Bathcay	1.0	1.5		6.0							1.1	1.9	0.9	6.7						
Prey Veng	0.6	1.9	1.3	5.6	0.9	0.2	2.3	1.2	6.7	0.2	0.9	2.4	1.3	4.7	0.2					
Peam Ro	3.0					0.1	2.3	1.0	4.7		1.1	2.3	1.3	3.0						
Peam Chor						0.3	3.0	1.3	9.1											
Kanh Chreach	0.2	2.2	1.4	6.1	1.5															
Sithor Kandal	0.5	2.0	0.8	5.2			1.0	0.6	3.0		1.6	0.8	1.3	5.9	0.3					
Pearcang	0.5	1.2	1.4	3.7				5.0	2.0		0.2	2.5	0.8	2.6						
Kampong Leav	1.5	2.5	1.0	3.5		1.0	0.9	1.6	3.7		1.5	1.6	1.9	3.5	0.6					
Prey Veng	0.9	1.1	1.1	6.5	0.5						1.7	2.0	1.4	6.1						
Ba Phnom		3.2	1.2	3.0			3.5	1.0	2.5		0.9	2.9	0.9	6.4						
Kamchay Mear	0.9	0.8	1.5	9.9	2.8						1.3	0.7	2.0	11.3	1.3					
Kampong Travek		2.7	2.0	8.7	2.3		1.5	1.5	10.7	2.2		4.5	2.0	7.5	2.5					
Prea Sdech	0.6	2.9	1.3	3.6	0.4						0.2	3.9	1.8	3.4						
Kandal		2.2	0.6	6.3		0.2	1.5	0.6	6.3		0.2	2.1	1.4	8.3			2.5	0.3	7.9	
Ksach Kandal			0.5	9.0			1.9	1.6	9.9		0.8	1.2	1.4	13.1						
Muk Kampoul				1.0		0.3	2.2	0.5	4.4			2.5	0.8	3.3			4.0	0.3	8.3	
Lvea Em						0.3	1.1	0.6	8.9											
Kean Svay							1.2	0.4	5.0	0.1		1.5	0.5	2.2	0.3		2.0		3.0	
Saang		1.0	0.5	8.5			1.4	0.9	4.9	0.6		2.9	1.0	5.1						
Leuk Dek						0.1	1.2	0.8	3.9			1.5	2.5	4.0			1.3	0.3	8.3	
Koh Thom		1.5	0.5				1.5	1.8	1.3			2.3	0.9	3.1			2.0		10.0	
Ponhea Leu						0.2	2.1	0.4	7.5			2.3	0.3	1.3						
Ang Snourl		2.4	0.7	6.5					15.0			2.0		5.0						
Kandal Stung		2.5	0.5	6.4			1.0		4.0			2.0	1.5	8.0						
Takeo							1.3	1.3			0.1	2.3	1.3	7.8	0.1					
Bati												1.9	0.8	2.0	0.4					
Prey Kabass												2.6	1.2	11.7						
Angkor Borey							1.3	1.3			0.3	2.6	2.3	11.4						
TOTAL	0.3	2.0	1.2	8.5	0.4	0.2	1.9	0.9	6.6	0.3	0.5	2.1	1.2	7.2	0.2		2.2	0.8	10.4	

Note: a.-Buffalo, b.-Cattle, c.-Swine, d.-Chicken for meat, e.-Chicken for egg

Summary Results for Agriculture Section of Rural Socio-Economic Survey

Item	Prek Tamerk	Pok Reusei	Sanlung	Vihear-sour	Prek Ampil	TOTAL (Average)
1. INTERVIEWEE CLASSIFICATION						
<i>Land Owned Farmer</i>	100	182	25	175	18	500
<i>Tenant Farmer</i>	0	0	0	0	0	0
TOTAL	100	182	25	175	18	500
2. FARMLAND HOLDING						
<i>Paddy Field</i>						
-Have	100	173	25	175	18	491
-Not Have	0	9	0	0	0	9
<i>Upland Field</i>						
-Have	52	130	16	18	8	224
-Not Have	48	52	9	157	10	276
<i>Field Size</i>						
-Average Paddy Field (ha)	0.54	0.49	0.77	1.62	0.61	(0.92)
-Average Upland Field (ha)	0.28	0.17	0.50	0.57	0.13	(0.25)
-Average Total Field (ha)	0.69	0.58	1.09	1.68	0.67	(1.02)
-Maximum (ha)	0.12	0.15	0.15	0.10	0.20	0.10
-Minimum (ha)	5.30	3.00	4.00	12.00	1.62	12.00
<i>Average No. of Plot</i>	2.4	2.1	1.8	2.0	1.9	(2.1)
3. INCOME SOURCE						
<i>Only Farm Income</i>	74	139	24	138	14	389
<i>Farm Income > Fishery Income</i>	24	28	1	21	4	78
<i>Fishery Income > Farm Income</i>	2	7	0	9	0	18
<i>Only Fishery Income</i>	0	1	0	3	0	4
<i>Unknown</i>	0	7	0	4	0	11
TOTAL	100	182	25	175	18	500
4. PADDY						
4-1. Practicing Paddy Type						
<i>Wet Season Paddy Practicing Farmer (a)</i>	16	36	22	8	3	85
<i>Dry Season Paddy Practicing Farmer (b)</i>	64	50	0	18	12	144
<i>Wet and Dry Season Paddy Practicing Farmer (c)</i>	20	54	3	140	2	219
4-2. Average Paddy Planted Area (ha)						
<i>Wet Season Paddy by (a)</i>	0.26	0.51	0.68	0.92	0.70	(0.55)
<i>Dry Season Paddy by (b)</i>	0.47	0.43	0.00	0.90	0.57	(0.52)
<i>Wet Season Paddy by (c)</i>	0.27	0.26	1.07	0.88	0.34	(0.67)
<i>Dry Season Paddy by (c)</i>	0.37	0.36	0.40	0.81	0.27	(0.65)
4-3. Average Paddy Paddy Production (ton)						
<i>Wet Season Paddy by (a)</i>	0.78	1.48	1.01	1.17	1.53	(1.20)
<i>Dry Season Paddy by (b)</i>	1.54	1.42	0	2.58	1.73	(1.65)
<i>Wet Season Paddy by (c)</i>	0.54	0.63	1.55	1.13	0.88	(0.96)
<i>Dry Season Paddy by (c)</i>	0.83	1.18	1.53	2.19	0.77	(1.79)
4-4. Average Paddy Yield (ton/ha)						
<i>Wet Season Paddy by (a)</i>	2.93	2.92	1.49	1.27	2.19	(2.18)
<i>Dry Season Paddy by (b)</i>	3.27	3.3	0	2.86	3.04	(3.17)
<i>Wet Season Paddy by (c)</i>	1.97	2.45	1.46	1.28	2.58	(1.42)
<i>Dry Season Paddy by (c)</i>	2.26	3.27	3.83	2.70	2.86	(2.77)
4-5. No. of Farmers by Wet Season Paddy Variety						
<i>Sar Thungun</i>	0	15	19	134	1	169
<i>Kloeng</i>	9	48	0	1	3	61
<i>IR 66</i>	28	14	0	2	1	45
<i>IR 42</i>	0	2	0	0	0	2
<i>Others</i>	0	11	6	11	0	28

Summary Results for Agriculture Section of Rural Socio-Economic Survey

Item	Prek Tamerk	Puk Reusei	Sanlung	Vihear-sour	Prek Ampil	TOTAL (Average)
4.6. No. of Farmers by Dry Season Paddy Variety						
<i>IR 66</i>	50	85	3	47	13	198
<i>IR 42</i>	0	15	0	104	3	122
<i>Kloeng</i>	33	2	0	1	0	36
<i>Others</i>	1	3	0	6	0	10
4.7. Seed Procurement						
<i>Self-keeping</i>	98	170	25	166	17	476
<i>From Market</i>	14	50	6	13	5	88
<i>From Relatives/Neighbors</i>	9	28	15	28	4	84
<i>Others</i>	1	1	0	0	0	2
5. UPLAND CROPS						
<i>No. of Practicing Farmers by Crop</i>						
-Mat grass	49	13	0	0	2	64
-Sesame	4	27	0	0	2	33
-Mungbean	0	22	0	0	1	23
-Maize	4	9	0	0	3	16
-Cassava	0	0	13	1	0	14
-Tomato	0	9	0	0	0	9
-Cucumber	0	9	0	0	0	9
-Banana	0	9	0	0	0	9
-Water melon	7	0	0	1	0	8
-Other Upland Crops (Wax gourd, Chili, etc.)	18	18	4	3	2	45
TOTAL	82	116	17	5	10	230
6. FARM MACHINES						
<i>No. of Owned Farmers by Machine</i>						
-Tractor	0	1	0	0	0	1
-Thresher	0	58	0	2	2	62
-Hand Sprayer	8	28	0	19	0	55
-Mobile Pump	16	27	0	11	1	55
7. FERTILIZER AND AGRICULTURAL CHEMICALS						
7-1. Wet Season Paddy						
<i>No. of Wet Season Paddy Practicing Farmer</i>	36	90	25	148	5	304
<i>Urea Application</i>	36	85	0	50	5	176
<i>Average Application Amount of Urea (kg/ha)</i>	181	134	0	84	137	(129)
<i>Agricultural Chemicals Application</i>	13	30	0	29	3	75
7-2. Dry Season Paddy						
<i>No. of Dry Season Paddy Practicing Farmer</i>	84	104	3	158	16	365
<i>Urea Application</i>	84	102	0	122	16	324
<i>Average Application Amount of Urea (kg/ha)</i>	181	153	0	90	105	(134)
<i>Agricultural Chemicals Application</i>	47	67	0	61	6	181
8. FUTURE FARMING						
<i>Cropping Pattern Wished To Practice</i>						
-Wet Paddy + Dry Paddy	28	91	0	105	12	236
-Wet Paddy + Dry Upland Crops	25	69	0	4	6	104
-Wet Upland Crops + Dry Upland Crops	5	5	0	1	1	12
-Paddy + Cattle	36	6	4	17	0	63
-Paddy + Pig	2	6	21	38	1	68
-Paddy + Chicken	1	1	0	4	0	6
-Paddy + Duck	0	0	0	0	0	0
-Paddy + Fruit trees	0	1	0	1	0	2
-Others	2	3	1	9	0	15

Summary Results for Agriculture Section of Rural Socio-Economic Survey

Item	Prek Tamerk	Puk Reusei	Sanlung	Vihear- sour	Prek Ampil	TOTAL (Average)
9. AGRICULTURAL EXTENSION						
NGOs	27	0	0	2	0	29
Provincial Staff	55	2	0	88	0	145
MAIT Staff	58	1	0	43	0	102
Others (District Staff)	84	3	24	80	0	191
10. NECESSARY FACILITY						
(The numbers are priority ranking by interviewee.)						
Farm road	4.2	2.9	4.2	3.9	2.2	(3.5)
Irrigation Facility	1.5	1.8	5.0	3.2	2.3	(2.4)
Electricity	5.9	7.3	8.0	6.8	7.9	(6.9)
Flood Protection	2.6	2.8	3.2	2.5	2.6	(2.7)
Drinking Water Supply Facility	4.8	7.1	6.6	5.1	7.4	(6.0)
Hospital	8.8	5.8	7.6	6.9	6.4	(6.9)
School	8.2	6.6	8.7	7.7	5.1	(7.4)
Post Harvest Facility	5.6	5.9	4.4	5.9	6.4	(5.8)
Credit System	4.8	5.2	2.0	3.2	4.7	(4.2)
Others	1.6	3.0	1.0	4.1	0.0	(2.1)
11. AVERAGE NUMBER OF FARM LABOR						
Men (Full-time Persons)	1.64	1.59	0.60	1.42	1.83	(1.50)
Men (Part-time Persons)	0.48	0.36	0.36	0.62	0.44	(0.48)
Women (Full-time Persons)	1.23	1.05	0.92	0.94	0.94	(1.04)
Women (Part-time Persons)	0.94	0.66	0.76	1.03	1.17	(0.87)
12. ANIMAL RAISING						
<i>No. of Owned Farmers by Animal</i>						
-Draft Animal	52	88	11	115	8	274
-Pig	67	100	24	119	6	316
-Chicken	82	174	24	152	18	450
-Duck	4	8	3	29	1	45
<i>Average Heads per Household</i>						
-Draft Animal	2.3	2.4	2.1	2.4	2.1	(2.3)
-Pig	1.4	1.5	2.3	1.8	1.8	(1.7)
-Chicken	9.8	9.5	11.1	12.2	9.7	(10.6)
-Duck	3.5	7.9	6.3	7.9	1.0	(7.2)

APPENDIX F

Fisheries

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F. Fisheries

Background

Fish is one of the most important diet of the Cambodians for the whole history. In the early days the Cambodian ate only fish and rice as the main stay. The other sources of protein became popular only after they have come into contact with the outsiders such as Chinese and westerners. In the former time, due to the low number of population and non-existing of intensive commercial fishing, fishes in Cambodia seems to be non-exhausted resource. However, in the recent few decades much more intensive fishing has been operated until sustainable yield is vulnerable. The study of fisheries sector for future development of objective strategy is a vital for the future food stability in Cambodia.

This study is developed as part of The Agricultural Development Study of the Mekong Flooded Area in Cambodia under the cooperation between Japan International Cooperation Agency (JICA) and Ministry of Agriculture, Forestry and Fisheries of the Royal Government of Cambodia.

The study will be divided into two parts. Part one is confine to the reviews of country's fishery sector for identification of development and constrains while part two will concentrate on the designated study area for developing of master plan for fishery development in harmony with agriculture. The priority project will be selected for studying to feasibility level. However since they are interrelated when describe part two, part one will be therefore referred to here and there.

1. Reviews of Fishery Sector

1.1 Roles of Fisheries in The Economy

Fishery production in Cambodia comes from three sources, inland capture, marine capture and aquaculture, with the current total production around 120,000 MT. Among this 72,000 MT (60%), 40,000 MT (33%) and 8,000 MT (7%) are derived from inland capture, marine capture and aquaculture respectively. Fishery production from 1980 to 1995 is shown on Table F 1.1.1. The data also reveal very clear about the contribution of inland fish capture that it is predominant with accounting about 60-70% of total production.

The figure is even higher when readjusted by adding the unrecorded fish catch from family fishing. With the increasing of dominant family fishing gears (cast net, oblong trap, drum trap and vertical slit trap) from 6,000 units in 1980 to 66,000 unit in 1995, (Table F 1.1.2) and conservatively assuming that catch per unit of effort of those gears is at 1 kg/unit/day the catch quantity about 24,000 MT or 32% of freshwater catch remained unrecorded and should be added.

Cambodia's gross domestic product in 1995 was estimated to be about 324.8 billion Riels of which fishery industry contributed about 12.2 billion Riels or 3.8% However this figure is definitely higher when readjusted with a subsistent fishery production which has

not been taken into account as described above. After readjusted with unrecorded production (described above) the contribution may be up to 4.5%. This addresses that fishery sector is one of the significant role in the country's economy.

It is not easy to estimate the Cambodian per capita fish consumption. However if the production is subtracted by quantity using for other purposes such as for animal feed, high value fish feed and export of which about 15,000 MT, thus, leaving for human consumption about 105,000 MT and with the present population of 9.7 million the annual per capita consumption figure may be around 10.8 kg. Together with unrecorded production the figure of 13-15 kg may be acceptable. However the food demand for population growth of 2.8% /year in the near future, particularly low cost protein from fish, will increase enormously.

For employment, fishery sector has also absorbed substantial number of labor force. About 10% of the Cambodians residing near the water bodies fish full-time while another 90% fish according to available opportunity.

1.2 General Characteristic of Flood Plain in Cambodia

During the flooding season, excess runoff from Mekong River causes a reversal flow into the Great Lake via the Tonle Sap. The Great Lake is therefore acts as flood retention of the Mekong during this flooding period. Maximum flow in August may reach 19,000 cu.m./sec. At the end of flood season the Great Lake releases the stored water back into Mekong at the time when the water level in the Mekong is lower, (Figure F 1.2.1). This phenomena exists every year with fluctuation not more than one month earlier or later.

At Chatomuk the Mekong River divides into the Tonle Sap of reversal flow into the Great Lake and the Bassac River of parallel flow to the delta with the Mekong itself. However there are still large amount of off-balance of runoff that can flow into the sea. This huge amount of water causes large flood plain area covering 63,400 sq.km. or 38% of the country's area.

Particularly in the Kandal, Prey Veng, Kampong Cham, Kampong Thom, and Takeo Provinces. Flood depths range from about few ten centimeters to more than 3 meters, (Figure F 1.2.2). The routes of water flow to the backwater lowland are through the colmatages, constructed for carrying nourish silt into the flood plain for enhancing agricultural production and numbering few hundreds along the Mekong, Bassac and Tonle Sap Rivers, and also through naturally low levees. Apart from carrying nourish silt it also carry substantial amount of fishes of various kinds and sizes from the main rivers and tributaries to nourish the Cambodian people.

Flood duration ranges from a few weeks to seven months depending upon an elevation of the area being flooded. Some parts become permanent water bodies or called swamps or permanent wetland depending upon the depths of remaining water during the dry season.

1.3 The Role of the Flood Plain on Fish Ecology

The ecological importance of the flood plain is that the fishes have developed themselves to survive and flourish along with the flood regime described above throughout the history. Fishes in Cambodia are able to survive well either in a running water or standing water regardless whether they are lacustrine or riverine species. The difference is mostly lying on the spawning behavior. Some fishes such as group of barb and carp require running water to spawn while the others such as some cat fish, snake-head and gourami seek still water to spawn.

Despite different spawning behaviors there is one common to all fishes that they spawn in early rainy season and both young and adult spend one part of their lives in the flood plain area. The young takes flood plain as a refuge to nurse themselves there while the adult looks for food and shelter. The routes that they migrate to and back from the flood plain are mostly via the colmatages, natural canals and low levees where the water flows in and out.

After a certain period of time, till the end of flood season, they start to migrate along with the receding current to their preferable habitats such as lakes, reservoirs, rivers and delta to complete their life cycle. The life pattern will repeat again and again in the following flood seasons to come as it had been existing for the whole history.

The fish production also fluctuates according to the flood levels of each year. Correlation between fish production and annual flood level is shown on Figure F 1.3.1. It is quite obvious that the influence of flood level will be addressed in the following year. The higher the flood level in a particular year will be followed by high fish production in a coming year. On the contrary lower flood level in any year will be also followed by low fish production. This means that the flood plain area is essential in enhancing fish breeding, feeding and growing. Any attempt to divert flood plain area for other uses fishery loss or gain must be taken into account seriously.

1.4 Freshwater Fish Exploitation

1.4.1 Fish Production

Freshwater fish production in Cambodia, like in any other countries in Southeast Asia, comes from two activities, capture and culture. Records of freshwater fish capture are available since 1980, (Table F 1.1.1). Even though it has been doubted by many experts about its reliability since many portions of catch such as a production of family fishing has not been recorded and reports from industrial fishermen may be fault, but after discussion with Cambodian fishery officer it has been found that data collection method has been standardized and also controlled by their own activities. However under-records still prevail.

Nevertheless the data recorded can be used to indicate the trend of resources exploitation because perfect data for freshwater fish capture are very difficult to obtained since the catch and consumption patterns are very irregular and so scattered. People consume fishes of almost every kind, every sizes and every where.

Total freshwater fish catch started to rise sharply from 18,400 MT (1980) to 50,780 MT (1981) and 64,181 MT (1986). From 1990 to 1995 the catch varied between 65,000 MT (1994) to 74,700 MT (1991). This suggests that during the last five years fish production has remained rather constant.

The fishing gears used in freshwater fish capture has been designed based on trial and error for a long time. Until now it can be said that most of the gears are very effective and suitable for all the fish niche. The industrial fishing is operated by barrage trap and set bag net as a main gears while the middle scale fishermen use gill net, seine net, pelagic trawl, dragged bag net, cone-shaped net and lift net. The small scale fishermen use mostly small gears and can be operated by only one man such cast net, oblong trap, drum trap, vertical slit trap, scooping basket and hooked line, (Table F 1.1.2).

To see the cause of production increment in the early years of record, it should observe the fishing effort and correlate with the production. During 1980 and 1983 the barrage trap had been increased from 159 units to 318 units as well as effective mobile fishing gears, river pelagic trawl and dragged bag net, from 73 units to 347 units. Later on during the last five years barrage trap has reached its 400 units as much as effective mobile fishing gears. Moreover the other fishing gears such as gill net and family fishing gears were also increased enormously.

After correlating the fishing efforts and the production, (Figure F 1.4.1), it is obvious that two main fishing gears, barrage trap and effective mobile fishing gears, played a major role in increasing freshwater fish production from fish capture. Despite the tremendous increment of effort from other gears in the later years the catch still remained rather constant. This suggests that exploitation of fishery resource has already reached its maximum yield. How long it will be sustainable is still doubtful.

Among this production catch from the Great Lake and Tonle Sap contributed about 60% (about 40% from the Great Lake and 20% from the Tonle Sap system). The rest is from the Mekong and other water bodies.

1.4.2 Species Exploited and Pattern

Even though fish species composition in Cambodia has been reported to be more than 300 species the frequent observations in fish market in Phnom Penh during September and October, 1996, suggest that the predominant commercial species are only about 25 species, both from capture and culture. However proportion of the species composition varies from time to time. Table F 1.4.1 shows the commercial fish species found in the market.

For economic reason the Cambodians divide fishes into three grades, depending upon the species, freshness and sizes. The first grade and second grade refer to a group of species comprising in a commercial large size fishes, normally 1 kg up for the first grade and 0.5-1 kg for second grade with exception of some preferable species. The third grade refers to a small fishes of all species that can be used for human consumption but mainly for fish feed and processing, particularly into fish paste, pra hoc, fish sauce and/or dried, fermented and smoked.

1.4.3 Aquaculture

Aquaculture in Cambodia, particularly cage and pen culture, has a long history, may be from the tenth century. This is due to a seasonal abundance of fishes that surplus catch is existing immediately after the flooding season. The high value fishes are stored in wooden and/or bamboo cages either for keeping fishes alive before marketing or speculation for rising prices.

Photo F 1.4.1 & F 1.4.2 exhibit a typical wooden cage culture.

Despite this long history of aquaculture, it has been reported that records of aquaculture was started in 1984 of which 1,610 MT was produced. The industry was developed slowly until 1995 when the production was 8,778 MT or 12% of total production.

At present cage culture in the Great Lake and main rivers is still predominated with the production about 6,000 MT or 68%. However the species cultured in cage are largely confine to two types of fishes, *Channa* and *Pangasius*. Apart from cage culture another type of practice is a pen culture, limited to the shallow area of the Great lake. Its production contribute around 18-20% of total aquaculture production.

Pond culture, among all aquaculture activities, is the least development. This due to lacking of seed and feed. However from field observation the potential for development is very high, provided sufficient water in the dry season, seed and feed are secured. At present some intensive culture for *Clarias* and *Pangasius* is developed for some certain extent even though all the supporting facilities such as aeration and efficient low cost feed are lacking. Photo F 1.4.3 and F 1.4.4 show the feeding (mainly boiled rice bran with broken rice, may be supplemented with fishmeal or bean) and harvesting of this intensive culture.

1.5 Fishery Management

A management of Cambodian fisheries is based on the Fiat Law on Fishery and Management (1987), largely reconstructed from the fisheries legislation before 1970. The law contains the definitions, exploitation of both freshwater and marine fisheries, aquaculture, and processing of fishery products. The law also commission the authorities to settle fishery violations, to fine and to regulate penalties.

By this law and its sub-laws all the temporary and permanent inundated areas are classified as fishery domain which is divided into (1) Fishery Domain assigned by group and (2) Fishery Domain protected.

The fishery domain assigned by group is furthermore subdivided into (a) fishing lots and (b) fish sanctuaries which both can be in effect by Ministry's proclamation. Outside the just mentioned area all the inundated area are belonging to the fishery domain protected.

To catch fish in a proclaimed fishing lot it can be done only by opened auction which is taken place every two years. This is known as industrial fishing.

Total number of fishing lots and fish sanctuaries already proclaimed is 279 and 15 respectively, (Table F 1.5.1). The purpose of maintaining of the fishing lots is mainly for generating of the Government's revenue more than improvement of social-economic conditions of the majority people. In 1994 total revenue from auction of fishing lots was as much as 4,796.97 million Riels, accounting 67% of the total revenue from fisheries.

The operation from fishing lots is mostly by barrage trap and d'ay (set bag). The barrage trap is operated in the colmatage or canal connecting between backwater lowland and the main rivers and the Great Lake. The barrage made of wood and bamboo screen is installed across the colmatages and canals allowing a channel for fishes to pass into a trap or d'ay when the water recedes. The d'ay fishing alone is operated in the rivers. Photo F 1.5.1 and F 1.5.2 show the barrage trap and d'ay.

The incoming and receding currents from the flood plain generate the operation of barrage trap and d'ay fishing, and are vital for the lot licensees. Any modification to slow down or stop the flow rates of both currents will definitely create the impact on fish catch from the lot, anticipated to be more negative than positive. This will in turn lead to the loss-gain of the lot's licensee. The conflict of resource uses may arise.

Apart from industrial fishing described above there are two more categories of fishing practices, small scale (family fishing) and middle scale fishing.

Small scale or family fishing refers to subsistence fishing mainly for family consumption. The catch may be also sold if it exceeds the consumption. For middle scale fishing it is mainly for sale. Both of these categories can be operated in the fishery domain protected during the fishing season, normally open from October 1st to May 31st. However family fishing is also allowed to operate all year round and also in the fishing lots during the closed season. Table 1.5.2 summarizes fishing system in Cambodia.

1.6 Institutional Framework for Freshwater Fishery Development

1.6.1 Ministry of Planning

The Ministry has already established the First Socioeconomic Development Plan (1996-2000). Fishery sub-sector has been included in the plan.

The objectives have been set up to maintain or increase a per capita consumption of fish protein in the country, to increase income generated in the industry and, at the same time, to conserve fisheries environment and ensure expansion of production at not the expense of sustainability.

1.6.2 Department of Fisheries (DOF)

DOF seems to be the sole institution that takes role in fishery management in the country. The array of internal organizations is oriented for more towards controlling of resource exploitation than for research and development, (Figure F 1.4.2). It composes of Director and two Vice-Directors, one for handling state enterprise KAMIFEX (fish import and export) and frozen factory of which both are scheduled to be privatized, while the other

for handling open water aquaculture, freshwater fishery research station and four fishing units, also scheduled to be privatized. The Director himself is handling administration, planning, inspection and provincial fishery units.

DOF has retained 1,422 employees of which 7,125 and 133 persons holding M.Sc., B.Sc., and Diploma, respectively. For M.Sc. holder, all graduated in fisheries, For B.Sc. holders the ratio of fishery graduates and other fields is 8:3 while the diploma holders ratio is 20:4.

However when taken distribution of personnel into consideration, the research unit has been allocated only 7 persons, 1 M.Sc., 2 B.Sc., and 4 diploma holders, (Table F 1.6.1). Creation of body of knowledge in the field of fisheries is therefore extremely poor. This will be great obstacles in any future development in fishery sector.

1.6.3 Education and Training

The Ministry of Agriculture, Forestry and Fisheries is running their own one university, Royal University of Agriculture (RUA), to produce a B.Sc. graduate and one college, College of Agriculture (CA), to produce a diploma graduate. Both are located in Phnom Penh's suburb area. Fishery studies are provided in both institutes.

Visiting to the Faculty of Fishery Science at the RUA, information therefrom reveals very poor quality. The faculty comprises 15 members with only 1 M.Sc. and 11 B.Sc. holders. The number of student is 42. The curriculum contains only general fisheries. The facilities for teaching and learning are very poor, almost nothing other than a few classrooms, few laboratories without any equipment, library of about 100 books (all out of date), no journal and existing five fish pond of poor drainage conditions.

The CA is in the same situation, or even worse. It has 65 students with 2.5 year curriculum after high school. The faculty in fisheries comprises 9 B.Sc. and 7 diploma holders. The teaching and learning facilities are even poorer than RUA. Only few books in the library and 14 ponds of 50 x 40 m with poor drainage system are available.

1.6.4 Highlight of Existing Human Resources

From the surveys of both DOF's employees and other institutions' existing qualified people in the fields of fisheries, (Table F 1.6.1), it is quite obvious that at present the country is shortage of qualified person both in number and quality.

Furthermore the allocation of the personnel and internal arrangement of the DOF may not meet the future ever increasing demand in fish production. Without proper remedy this shall be remained as a fundamental problem for years to come.

Apart from the DOF staff itself, the supporting units, education and training for human resource development, are also encountering substantial problems in securing qualified faculty and training & research facilities.

Table F 1.6.1 Human Resources Trained in Fisheries

Organizations	M.Sc.	B.Sc.	Diploma
DOF	5	80	54
- Inspection Units	0	7	39
- Research Unit	1	2	4
- Province & Cities	1	44	104
University	1	11	3
College	0	9	7
State Enterprises	0	0	4
Total	8	153	215

Sources : DOF, RUA & CA.

1.6.5 Fishermen/Farmers

From preliminary finding that about 10% of the Cambodian household operate full time fishing, the field reconnaissance has been therefore designed for stratified interviewing 1,000 agricultural households of which 10% is a fishery households.

Even though such a design to stratify the samples, the data still reveal that most of the farmers are opportunistic fishermen, i.e. they fish at any available opportunity and needs.

Fishing behaviors of the fishermen are mainly for two purposes, family consumption and selling (94%). Most of them (89%) own boat, often more than one. The fishing gear used by this fishermen are mostly confine to the family fishing gears (47%) and middle scale fishing gears (57%) designated by law, except some few use electro-fishing obtained power source from a car battery.

The fishing population are mainly composed of young people. Among them male and female ratio is 1.02 : 1. Age structure of both male and female is 32% under 10 year old while between 10 to 20 year old and 20 to 30 year old are 27% for male, 12% for female, and 29% for male, 8% for female, respectively. The rest belongs to the group of above 30 year old.

For their fishing ground, 18%, 4%, 34%, 17% and 27% state that they fish in colmatages, Pol Pot canals, rivers, reservoirs and lakes, respectively. This means that the majority catch fish in every natural system they find, except few responses that they catch fish in the paddy field and raising fish.

Species caught is miscellaneous depending upon what comes into fishing gears, but mostly carps, snake-head, cat fish, and swamp eel. Fishing times are varies and irregular due to convenience and need.

Twenty six percent of fishing population mentioned about certain kind of problems in their occupation. Most of the problems related to fisheries are:

- some of them feel that fishes are decreasing or getting smaller,
- some of them have a problem with fishing lot licensee,
- some of them complain about unfairly distribution of resources, particularly about monopoly in a fishing lots,
- some of them mention about not having sufficient fishing gear,
- some of them are frequently treated by armed people,
- every few have problem with government authority.

However it should be noted that these are the response from middle scale and small scale fishermen who coexist very well with the farmers, even some of their family member practice farming as well. Therefore no problem with the farmers have been stated anywhere.

1.6.6 Credit

Institutional credit availability for fisheries development is very scarce. Mostly the fishermen operate either under their own resource or borrow from private sector with very high interest rate and often subject to compulsory sale of their product with low price. This can be great obstacle for private sector to develop any fishery activities, particularly aquaculture sub-sector in the future.

1.6.7 External Assistance

Fishery sector has been receiving a number of assistance from many agencies, both non-governmental and governmental, through multilateral and bilateral cooperation. Their natures of assistance are described in brief below.

a) Mekong River Commission/DANIDA

The project is funded by the Danish Government and aiming at optimal utilization of natural fish resources in term of production and sustainability through training staff of DOF, development of data collection and creation of data base. The project is on the second year. The so-called Freshwater Resource Research Institute (FRRI) has been proposed to be established.

b) JICA Project

The project is funded by the Japanese Government on a bilateral basis for the Agricultural Development Study of the Mekong Flood Area in Cambodia which includes fishery sector into the study. The project is on going.

c) NGO

Apart from these there are many NGO actively provide their assistance in the field of fisheries such as AIT (Asian Institute of Technology, Bangkok) -establishing fishery station in Svey Rieng Province; PADEK (Partnership for Development in Cambodia, Hong Kong) -small scale aquaculture in rural area and fish fry production in Prey Veng Province; SAO (Southeast Asian Outreach, London) -small scale aquaculture in Kandal Province; WFP (World Food Program, Rome) -sponsoring budget for rehabilitation of

fishery sector; CIDSE (Cooperation Internationale pour le Development Solidarite', Brussels) -same as WFP.

However may be due to limitation of financial strength, only two projects, namely JICA and DANIDA, seem to create significant impact on fishery development, provided that they continue towards objective goal.

1.7 Fishery Development and Constrains

1.7.1 National Development and Strategy

From the statement of the Ministry of Planning it is anticipated that the production of 68,000 MT (about 4,500 MT below the present level) from freshwater fish capture, 38,000 MT (about 7,500 MT above the present level) from marine capture, and 13,800 MT (about 5,000 MT above the present level) from aquaculture may be achieved in the year 2000. In that composition about 30,000 MT are aimed for export.

This makes balance for local per capita consumption only 10.5 kg. The plan may base on the past performance which fishery sector has remained zero growth for the last five year despite effort has been increased tremendously.

To implement the policy, a number of projects has been approved inside the DOF for the year 1996-2000, for example people organization in fishery demarcation prevention and fishery development, amendment of fishery law, strengthening fishery inspection facilities, demarcation of inundated forest-fishing lots-fishing sanctuaries, aquaculture development, and etc. (Table F 1.7.1).

1.7.2 Development Constrains

There are numerous constrains in Cambodia's fishery sector, namely resource constrains, environmental constrains and institutional constrains. Each requires a number of concert efforts to remedy. For example, despite implementation plan in the DOF the target is still unknown.

Taking aquaculture development into consideration which itself has good potential in the longer term longer term for increasing fish production to meet the ever increasing food demand and could generate substantial income to the farmers, and with the plan to increase 5,000 MT in the next five years, or cumulative increment of 1,000 MT per year, DOF still does not have definite plan per se to meet the target.

To achieve that target, assuming that survival rate is 33%, and fish reaches consumable size at 3 pieces/kg, it may require increment of 9,000,000 seeds per year above the present production, or 45,000,000 in the next five years. That leads to the questions that from where it can be obtained ?, what physical development is required ? how many personnel is involving in production and extension ?, how to get private sector to invest ? and last but not least where to secure credit ?

a) Resource Constrains

As mention elsewhere earlier that the exploitation of freshwater fishery resources has reached it maximum yield with doubtful sustainability. Production can not therefore increased by fishing effort any longer.

b) Institutional Constrains

As mention elsewhere earlier, the DOF is encountering a problem of under staff both in quality and quantity and, moreover, limited facilities for staff development and training which may not able to provide the need for ever increasing demand of food from fishes. Furthermore the arrangement of internal organizations is for only controlling of fish capture which in turn leads to a weak policy formulation and strategic planning capacity.

Education and training facilities are very poor. Two institutions which produce human resources for the DOF and later may be to private sector are in extremely catastrophic positions that, not to mention about taking a leading role in fishery science development, just to produce a graduate and technicians of international standard in book knowledge is still impossible.

The legislation are extensive and detailed but there is a lack of consideration of social economic implications. The central conflict lies in a fishing lots. Figure F 1.7.1 shows the scheme of conflicts in resource uses resulted from the Fiat-law.

The law directs to unfair distribution of resources, resulting to competition in fishing ground, land, water and wood. For example the area such as colmatages, streams and villages were allocated to fishing lots much more than public fishing area or known as fishery domain protected.

For instance the fishing lots area in Prey Veng Province is 161,700 ha while public fishing area is allocated only 47,330 ha or about 4:1. The number of swamps, colmatages, streams and villages in the fishing lots are far out number of the public fishing area as 58:8, 46:6, and 117:42, respectively.

With the arrangement as such described above, majority of resources (4 parts) designated to benefit about 20 people plus 1,000-1,500 their employees and minority (1 part) to at least 50,000 people, the conflict is inevitable and furthermore will definitely widening the gap between the rich who have and the poor who have not in the country. This will bring about the competition for the resource and even becomes stronger when the resource becomes scarce. Finally it will be a cause of social instability.

Institutional credit is a major factor in enhancing the private sector to develop the industry. But there is not such thing available in the country. This will be a fundamental problem for time to come.

Fishermen cooperative or fishermen association has a potential for assisting small scale operators and offer an effective loan for the industry to develop. But again there is no such an institution in fisheries existing in the country.

c) Aquaculture Constrains

For aquaculture development the constrains lie on the lack of extension services, resulting from inadequate knowledge of extension officers. Lacking of sufficient supply of seed and feed also a major constrains. Furthermore most of the ponds are constructed without proper designs and methods, even some were constructed without any help by any machinery. The expansions, based on only cage and pen culture of high market value carnivorous fishes, cause non-rational resource uses. Taking a feed conversion ratio of those fishes 6:1, or in some case 10:1, to produce annually 6,000 MT of cage culture production into consideration, it needs 36,000-60,000 MT of fishes of third grade to meet the feed demand. If this fishes are converted for direct human consumption it can feed the Cambodians in addition between 3-6 kg per person per year.

The low input pond and paddy field fish cultures have improved the social economic of the grass root of many countries in Southeast Asia. But very little activities as such exist in Cambodia.

d) Environmental Constrains

High silting has occurred during the last two decades due to deforestation upstream of the Mekong and its tributaries and poor farming practice which both lead to soil erosion. The immediate impact of silting is that it may spoil the spawning and nursing ground of many species, particularly those that require clear water to hatch and larvae to develop, while the long term impact is yet unknown.

Inundated forest is a good spawning and nursing ground for fishes. This is proven by observation on the production of fishing lot no.2 in Kampong Thom Province. The lot has an area of only 758 ha, comprising inundated forest for two third. Total production in fishing season 1994-95 is amounting 353.4 MT or about 466 MT/ha, which is about 25 times higher than average normal lot production.

At present protection of inundated forest is very inadequate. Consequently cutting wood in inundated forest for construction of fish barrage, fuel, and other uses as well as clearing land for agriculture lead to mass destruction. This will definitely address negative impact to fish production in a functional time frame.

e) Resource Uses Constrains

The resource uses in many parts of the flood plain are free like no man's land and lack of optimum multi-resource uses guideline, thus the unlawful competition for resource and social conflict have arisen. The conflicts between fishermen and farmers as well as among the fishermen themselves are well addressed in the progress report I. Here it will be quoted in brief. The main factor causing conflict is the accessibility to the resources, - land, water, fishes and wood.

The disharmony resource uses mainly lie on the area proclaimed as fishing lots. The lot operator want to drain the water for catching fish while the farmers water to retain the water for farming. The lot operator want to reserve inundated forest in the lot while the farmers cut down the trees for clearing land and firewood. The family fishermen

encroach the lot during an opened season to catch fish for subsistence while the operator wants to obtain benefit from all fishes. Figure F 1.7.1 already shows the scheme of these conflict resource uses.

1.8 Proposal for Fishery Development Strategy

To accomplish the objectives and targets set up by the Ministry of Planning following strategy for fishery development is proposed.

1.8.1 Resource development

Philosophy of fishery resources management is to maintain a sustainable yield of a wide stock while its yield reaches maximum and meanwhile to increase the production through habitat enhancement & stocking and to promote aquaculture. As mentioned elsewhere in this report that freshwater fish production has reached its maximum yield, habitat enhancement & stocking are required for immediate action. At the same time aquaculture should be promoted urgently and consistently.

Concept of fishery development is shown on Figure F 1.8.1.

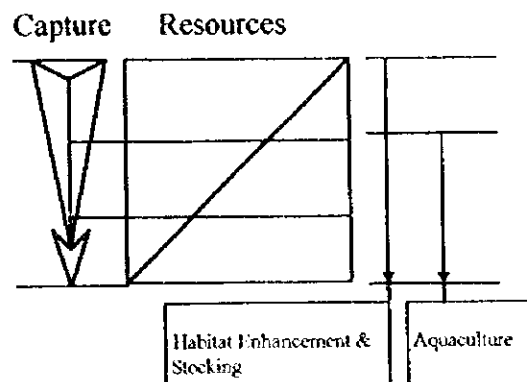


Figure F 1.8.1 Concept of Fisheries Development

Under this context an immediate strategy should be set up as following:

- habitat enhancement - swamp fishery management,
- protection of inundated forest,
- aquaculture development,
- Strengthening the DOF,
- amendment of fishery law
- improving of RUA and CA,
- make credit availability, and
- establishing a self-sustained fishermen association or cooperative,
- demarcation the preserved vegetation area in a fishing lot.

a) Habitat Enhancement - Swamp Fishery Management

Swamp rehabilitation can be considered as a first step of habitat enhancement and fishery management through stocking and regulated fishing.

For swamp fisheries development, the rehabilitation of permanent large swamp and demarcation of the fishing areas are proposed. However, it should base on the four criteria that first it must be technically possible, second it must be economically feasible, third it must be socially acceptable and last, but not least, it must be environmentally sound. *Harvesting alone, as practiced in the history, will inevitably lead to future exhaust in fish production, regardless how effective the control is.*

Experiences in Thailand has shown that the rehabilitation of large swamps, such as Bung Boraped (Central Thailand), Nong Han (Northeastern Thailand), and Kwan Phyao (Northern Thailand) has maintained a sustainable yield of about 12,500 kg/sq.km for a few decades, thus supporting livelihood of many ten thousands of people until now. Furthermore the swamps act as a preserved pool of many kind of fishes to complete their life cycle. They also generate the development of aquaculture down stream in some extent. The environmental conditions of those swamps are not different from Cambodian flood plain, i.e. they are back water lowland and act as flood retention of the main rivers during rainy season.

Apart from fishery purposes the water retained in a swamp after receding flood can be diverted for irrigation of agriculture in the surrounding area, even for cash crop production during the dry season.

Macrophytes that grow in the swamp can be harvested for animal feed or organic fertilizer production. Some can be used as direct human food such as lotus seed and root, water crest, water chestnut, and etc.

b) Protection of Inundated Forest

As mentioned earlier that inundated forest is very essential for fish production, it is proposed to protect it very urgently by clear demarcation and guarded from cutting down the trees for any purpose, even though for agriculture.

c) Aquaculture Development

Low input pond and paddy field aquaculture is recommended to be promoted as soon as possible. This will involve in seed production of indigenous species and some few exotic species by improving existing fishery station or establish a new one with proper design. Demonstration pond and paddy field should be selected and implemented and further development step to integrated farming should be studied.

For high market value fishes cultured in the cage/pen it is recommended to formulate the low cost efficient feed instead of operating on the expense of the third grade fishes which can be used or preserved for human consumption.

d) Strengthening the DOF

The DOF's internal organization should be regrouped and expanded if to meet the future development tasks. The proposed new organization chart is shown in Figure F 1.8.2.

The proposed array is to be compatible with the future strategic planning, shifting from harvesting alone to harvesting along with management (stocking and regulated fishing) as well as development of aquaculture.

The Director will be supported by two organizations, Secretariat and Fishery Economic & Planning, and three Vice-Directors for technical, supervision, and operation.

Vice-Director for technical will have a task to create the bodies of knowledge through the planned Research Institutions, namely Freshwater Fisheries Research Institute (FFRI), Wetland Research Institute (WRI), Marine Research Institute (MRI) and Coastal Research Institute (CRI). These Institutes will conduct the researches in all aspects of aquatic animal ecology and aquaculture.

For a qualification of a Vice-Director for technical, he/she should be a Ph.D. holder or M.Sc. holder with thorough experiences in research supervision and/or project management. Head of each institution should be also a Ph.D. holder with at least 3 M.Sc. and 16 B.Sc. under his supervision.

e) Amendment of Fishery Law

Amendment of existing law so that family fishing operation in a fishing lot with limited types and number of gears during an opened season become possible is strongly recommended. Rationale for this is to avoid further conflicts between the riches and the grass root which may, in the future, reverse back to social instability.

f) Improving RUA and CA

As human resource production is a key factor for future development of qualified staff of DOF, and may be also of private sector in the future, improving these two institutions is vital for fishery sector to develop. At least the faculty comprising 3 Ph.D., 9 M.Sc. and 6 B.Sc. should be considered as a minimum requirement of the Faculty of Fishery Sciences in RUA and 1 Ph.D., 3 M.Sc., 9 B.Sc. for CA.

Apart from upgrading the faculty qualifications, two laboratories-wet lab and dry lab, are required for each institute. Equipment may be specified for different objectives, teaching and research for RUA and practical work of technicians for CA. Great number of text books and journals should be supplied to both libraries. Providing of small hatcheries, feed mills and fish ponds, both for brood stock and nursery, with effective drainage system is very essential for the faculty and students, not just the book knowledge but also experiences.

g) Rural Banking

Rural Bank providing credit of soft loan not only for fisheries but also for other sectors of agriculture should be established. This will generate fishery development, particularly aquaculture, substantially.

h) Fishermen Association

In the future being developed swamp fisheries and aquaculture, participation of fishermen of every levels, large scale, middle scale and small scale, in operation and management is extremely important for achievement of the goal, fish production at sustainability or increment. Forming group of fishermen and to educate them through extension services in resource exploitation and management as well as aquaculture must be carried out as soon as an implementation of a project being started.

l) Demarcation of Preserved Vegetation Areas in a Fishing Lot

As the complicated land uses in the flood plain exist, the demarcation for the vegetation preserved area is essential for increment of fish production in a particular lot. Area of about 40% to be preserved in the pattern of small areas here and there, and with well demarcation, is strongly recommended.

2. Fisheries in the Project Area

2.1 The Study Area

The study area covers the flood plain of the Provinces of Kandal, Prey Veng, Kampong Cham and Takeo in total area of 12,245.42 sq. km. or 6.9% of the country. As general flooding the flood depths range from few ten centimeters to more than 3 meters. Table F 2.1.1 shows the flood depths, areas of flood, and flood duration.

Table F 2.1.1 Flood Conditions in the study Area (Dec., 1994)

Depths (m)	Areas (ha)	Percentage	Duration (month)
0.0-0.3	616,516	49.5	negligible
0.3-1.0	110,696	8.9	3-4
1.0-1.5	170,948	13.7	5-6
1.5-3.0	159,852	12.8	> 7
> 3.0	187,142	15.1	> 7

Source : LANDSAT imagery, Dec 1994 (Progress Rep. No.2)

The areas of different flood duration is shown on Figure F 2.1.1.