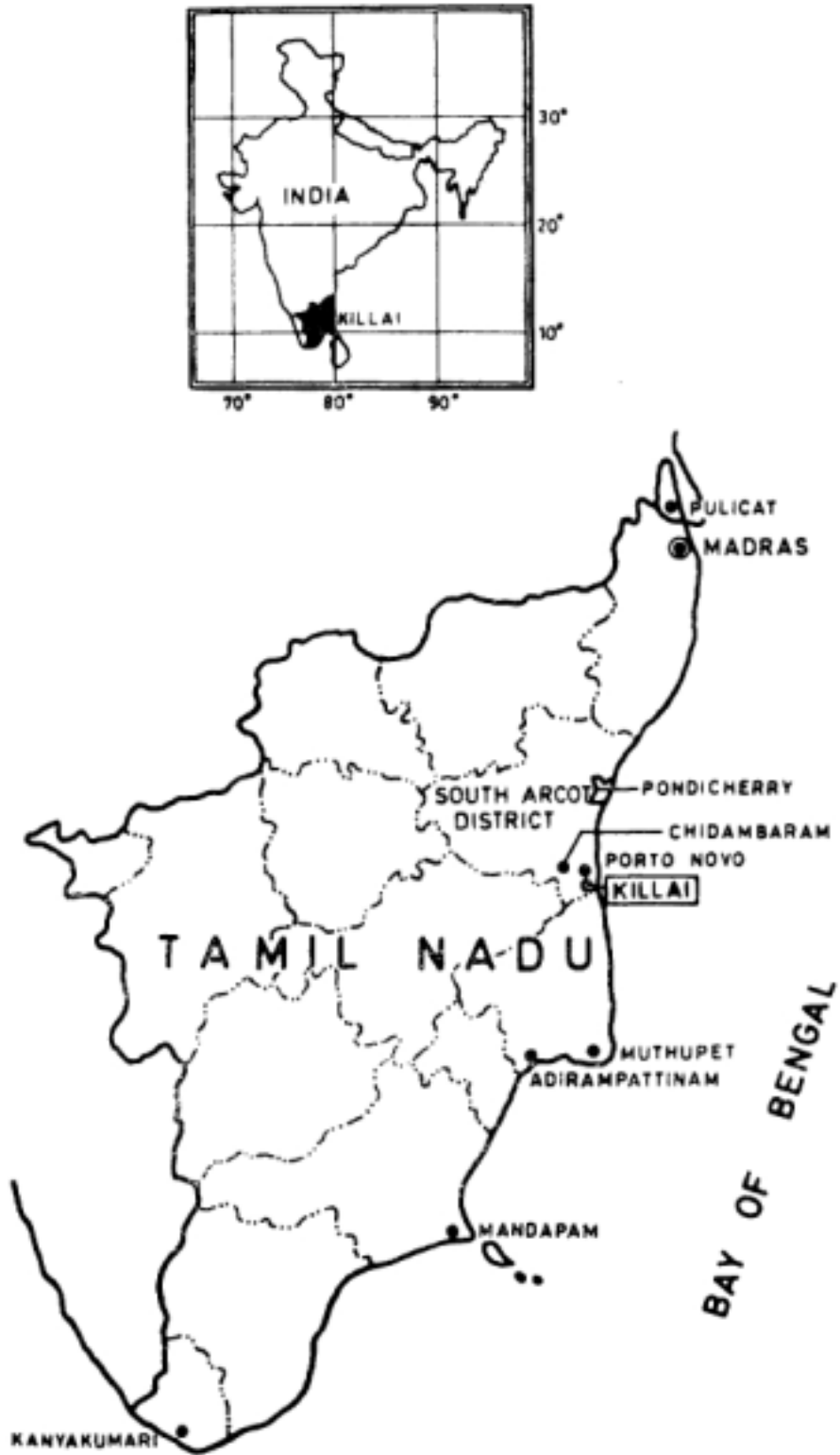


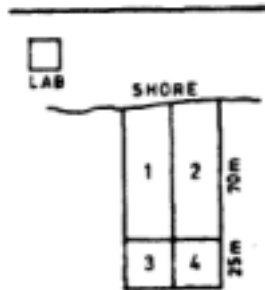
Appendix 1

APPROXIMATE LOCATION OF PROJECT SITE

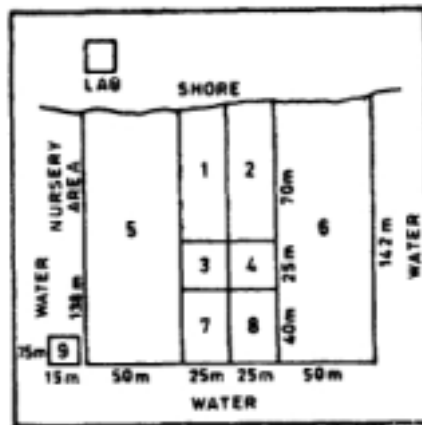


Appendix 2

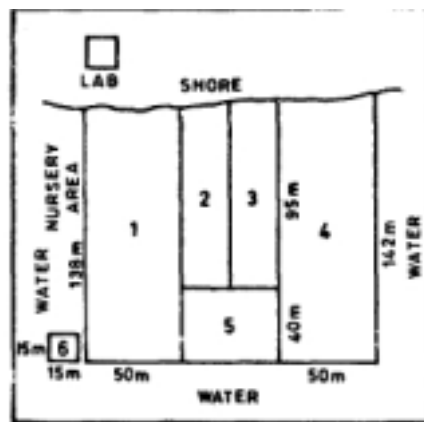
FARM LAYOUT COMPLEX (a, b, c,)



(a) Pen layout July 1982 – February 1983 (1st phase pen)
(I – II culture trial)



(b) Pen layout March 1983 – January 1984 (2nd phase pen)
(III – IV culture trial)



(c) Pen layout February – May 1984 (3rd phase pen)
(V culture trial)

Appendix 3

**SUMMARY OF PRODUCTION RESULTS
(July 1982—December 1983)**

Trials	Experiments	Effective Water Area (m ²)	Production (kg)			Harvest/ha (kg)		
			<i>P.ind/cus</i> <i>P.mono-</i> <i>don</i>	Misc. shrimp, fish	Total shrimp, fin- fish	<i>P.indicus</i> <i>P.mono-</i> <i>don</i>	Overall	
<i>1st</i> 10/7- 28/9 1982	Pen	1	1250	92	13	105	736	840
		2 ¹	1250	45	10	55	360	440
		3	625	37	09	46	592	736
		4 ¹	625	13	06	19	208	304
<i>2nd</i> 16/10 11/2 1982-83	Pen	1	1250	71	43	114	568	912
		2	1250	75	73	148	601	1184
		3	625	31	32	63	498	1008
		4	625	32	20	52	515	832
<i>3rd</i> 30/3 7/7 1983	Pen	1	1250	42	21	63	336	504
		2	1250	41	17	58	328	464
		3	625	18	10	28	292	448
		4	625	18	7	25	292	400
		5	5000	205	147	352	410	704
		6	5000	190	108	298	380	596
		7 ¹	1000	32	23	55	320	550
		8 ²	1000	40	15	55	400	550
		9	225	9	4	13	400	578
<i>4th</i> 7/9- 7/12 1983	Pen	1	1250	61	20	81	488	648
		2	—	—	—	—	—	—
		3	625	17	8	25	272	400
		4	625	16	7	23	256	368
		5	5000	247	64	311	494	622
		6	5000	205	40	245	410	490
		7	—	—	—	—	—	—
		8	—	—	—	—	—	—
		9	225	13	7	20	578	888
Total	26	36200	1550	704	2254	—	—	

- ¹ No feeding
- ² 5% feeding
- No experiment

Appendix 4
DETAILS OF THE FIRST FOUR CULTURE TRIALS
(1st and 2nd Culture Trials)

	1st culture trial 1982				2nd culture trial 1982-83				
	Pen 1	Pen 2	Pen 3	Pen 4	Pen 1	Pen 2	Pen 3	Pen 4	
1. Actual pen area (m ²)	1750	1750	625	625	1750	1750	625	625	
2. Effective water area (m ²)	1260	1250	625	625	1250	1250	625	625	
3. Stocking rate (pcs/ha)	45000	45000	31500	30000	48000	48000	40000	40000	
4. Period: From	10/7	11/7	19/7	21/7	16/10	16/10	16/10	16/10	
To	28/9	28/9	28/9	28/9	25/3	11/2	11/2	11/2	
5. Duration of culture (days)	80	79	72	70	160	118	118	118	
6. Initial av. wt (g)	<i>P.m.</i>	2.0	1.7	4.1	4.5		1.2		
	<i>P.i.</i>	2.0	0.6	0.4	0.6	4.0	4.0	2.0	4.2
7. Final av. wt. (g)	<i>P.m.</i>	23.3	11.8	28.1	14.6			26.0	
	<i>P.i.</i>	11.6	9.0	15.2	11.2	15.2	16.0	15.5	16.5
8. Production (kg)	<i>P.m.</i>	68.0	20.0	29.8	8.5	—	—	5.1	—
	<i>P.i.</i>	33.7	24.5	7.2	4.5	70.5	75.2	26.0	32.2
Total shrimp production, <i>P.m.+P.i.</i> (kg)	91.7	44.5	37.0	13.0	70.5	75.2	31.1	32.2	
Total shrimp production, <i>P.m.+P.i.</i> (kg/ha)	734	356	592	208	564	602	498	515	
Misc. shrimp (kg)	5.6	6.1	7.0	5.5	21.4	15.5	5.7	4.9	
Finfish (kg)	7.6	3.5	1.8	0.6	22.0	57.3	25.8	14.9	
Overall yield (kg)	104.9	54.1	45.8	19.1	113.9	148.0	62.6	52.0	
Overall yield (kg/ha)	832	433	733	306	911	1184	1002	832	

Note: *P.m.*—*P. monodon*

P.i.—*P. indicus*

Appendix 4 (Contd.)

3rd culture trial—1983

[25]

	Pen 1	Pen 2	Pen 3	Pen 4	Pen 5	Pen 6	Pen 7	Pen 8	Pen 9
1. Actual pen area (m ²)	1750	1750	625	625	6900	7100	1000	1000	225
2. Effective water area (m ²)	1250	1250	625	625	5000	5000	1000	1000	225
3. Stocking rate (pcs/ha)	50000	50000	50000	50000	68000+	68000+	40000	40000	40000
4. Period: From	30/3	19/2	19/2	19/2	2/3	12/3	11/5	11/5	11/5
To	7/7	23/5	23/5	23/5	7/7	13/7	14/9	15/9	16/8
5. Duration of culture (days)	97	94	94	94	127	123	126	127	128
6. Initial av. wt. (g) <i>P.m.</i>	—	—	—	—	4.0	4.0	—	—	—
<i>P.i.</i>	2.1	0.7	0.7	0.6	3.4	2.2	2.5	2.5	4.0
7. Final av. wt. (g) <i>P.m.</i>	—	—	—	—	27.0	27.0	—	—	—
<i>P.i.</i>	10.5	11.0	10.5	10.2	11.1	10.9	16.0	16.4	20.6
8. Production (kg) <i>P.m.</i>	—	—	—	—	15.0	11.0	—	—	—
<i>P.i.</i>	41.5	41.1	18.3	17.5	190.0	179.0	31.8	39.4	9.0
Total shrimp production, <i>P.m.+P.i.</i> (kg)	41.5	41.1	18.3	17.5	205.0	190.0	31.8	39.4	9.0
Total shrimp production, <i>P.m.+P.i.</i> (kg/ha)	332	328	292	279	410	380	318	394	400
Misc. shrimp (kg)	6.0	1.8	4.7	3.1	47.8	19.0	15.4	9.1	2.9
Finfish (kg)	15.0	15.0	5.0	4.0	99.0	89.0	8.0	6.0	1.0
Overall yield (kg)	62.5	57.9	28.0	24.6	351.8	298.0	55.2	54.6	129
Overall yield (kg/ha)	500	463	44	394	704	596	552	545	573

Appendix 4 (Contd.)

4th culture trial

	1983					1983-1984			
	Pen 1	Pen 3	Pen 4	Pen 5	Pen 6	Pen 2	Pen 7	Pen 8	Pen 9
1. Actual pen area (m')	1750	625	625	6900	7100	1750	1000	1000	225
2. Effective water area (m2)	1250	625	625	5000	5000	1250	1000	1000	225
3. Stocking rate (pcs/ha)	40000	40000	40000	42000+ 8000	42000f- 8000	40000	40000	40000	26700± 13300
4. Period: Frm	7/9	10/9	12/9	21/8	7/9	5/10	7/10	13/10	6/10
To	7/12	8/12	8/12	27/11	5/12	19/1	19/1	19/1	4/12
5. Duration of culture (days)	92	90	88	99	90	105	106	106	60
6. Initial av. wt. (g)	<i>P.m.</i>	—	—	4.0	2.7	—	—	—	2.1
	<i>P.1.</i>	2.3	2.3	2.5	2.3	2.3	2.3	2.3	2.2
7. Final av. wt. (g)	<i>P.m.</i>	—	—	20.0	22.0	—	*	*	21.4
	<i>P.1.</i>	13.3	12.0	12.0	12.6	13.0	*	—	15.4
8. Production (kg)	<i>P.m.</i>	—	—	46.0	33.0	—	—	—	4.2
	<i>P.1.</i>	60.6	16.9	15.9	201.0	172.0	—	—	8.4
Total shrimp production, <i>P.m.</i> + <i>P.1.</i> (kg)	60.6	16.9	15.9	247.0	205.0	—	—	—	12.6
Total shrimp production, <i>P.m.</i> + <i>P.1.</i> (kg/ha)	485	270	254	494	410	—	—	—	560
Misc. shrimp (kg)	9.7	5.9	4.2	31.6	17.4	—	—	—	2.8
Finfish (kg)	10.7	2.4	3.0	32.0	22.5	—	—	—	4.5
Overall yield (kg)	81.0	25.2	23.1	310.6	244.9	—	—	—	19.9
Overall yield (kg/ha)	648	403.2	369.6	621.2	489.8	—	—	—	884.4

* The stock disappeared/perished due to sudden drop in salinity.

Appendix 5

DETAILS OF THE FIFTH CULTURE TRIAL

	Pen 1	PenS	Pen6
1. Actual pen area (m ²)	6900	2000	226
2. Effective water area (m ²)	5000	2000	225
3. Stocking rate (pcs/ha)	50000	70000	40000
4. Period : From	16/6	14/4	10/4
To	17/8	3/8	3/8
5. Duration of culture (days)	67	111	115
6. Initial av. wt. (g)		3.8	—
<i>P.m.</i>			
<i>P.1.</i>	2.4	3.5	2.5
<i>Es.</i>	—	—	11.5
7. Final av. wt. (g)		14.0	—
<i>P.m.</i>	—		
<i>P.1.</i>	9.1	9.5	11.5
<i>Es.</i>		—	89.8
8. Production (kg)		9.8	
<i>P.m.</i>			
<i>P.j.</i>	169.3	72.6	6.1
<i>Es.</i>		—	17.7
Total shrimp production <i>P.m.</i> & <i>P.1.</i> (kg)	169.3	82.4	23.8
Total shrimp production <i>P.m.</i> & <i>P.1.</i> (kg/ha)	338.6	412.0	1057.7
Misc. shrimp (kg)	3.0	1.0	0.1
Finfish (kg)	60.0	7.0	1.0
Overall yield (kg)	232.3	90.4	24.9
Overall yield (kg/ha)	(464.6)	(452)	(1106.6)

Note

P.m.—*P. monodon*

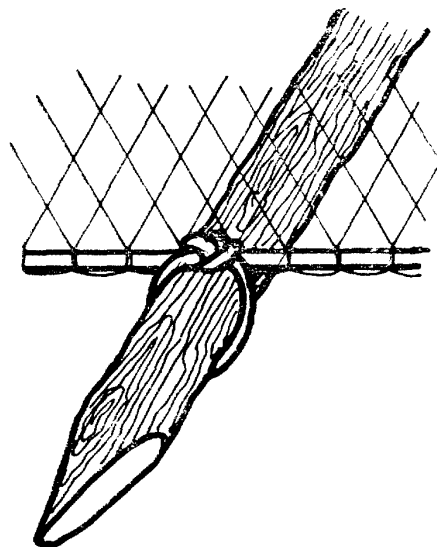
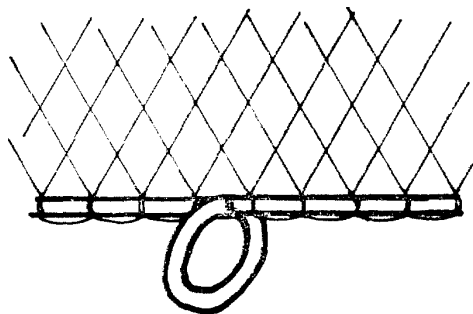
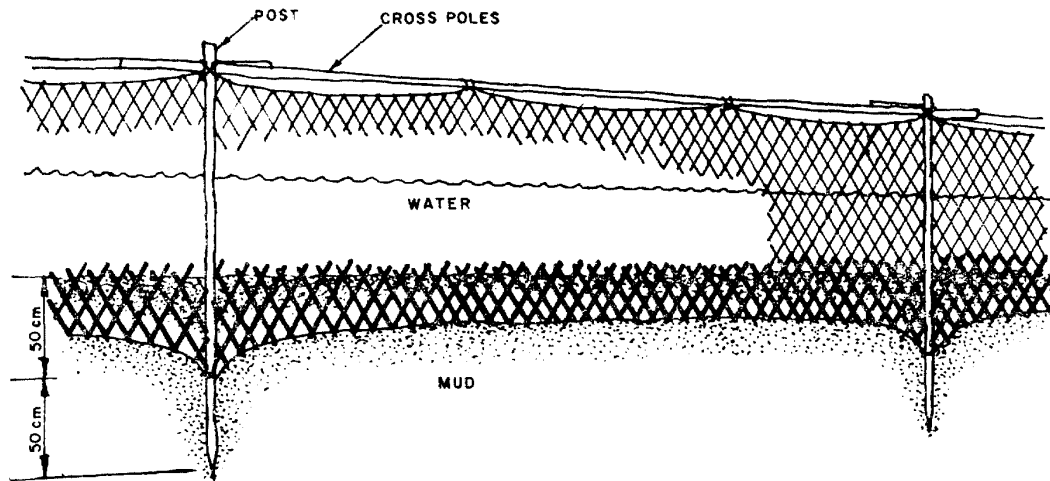
P.1.—*P. indicus*

Es.—*Eetroplus suretensis*

Most stocks in P1-4 during February-March perished because of salinity fluctuation; the results corresponding to that period are not reflected in this appendix.

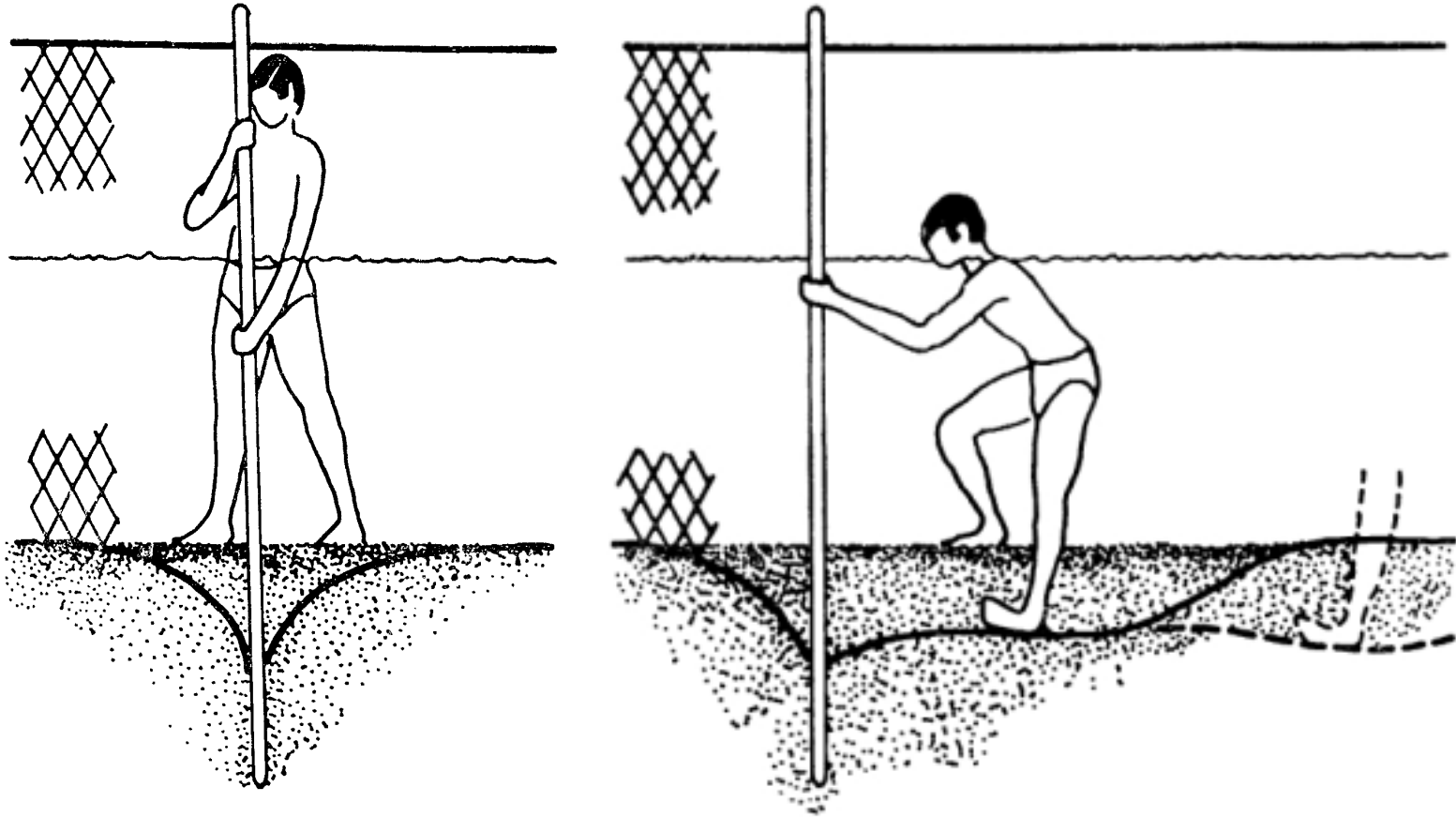
Appendix 6

PEN WALL AND ITS CONSTRUCTION



Appendix 7
PEN INSTALLATION PROCEDURES

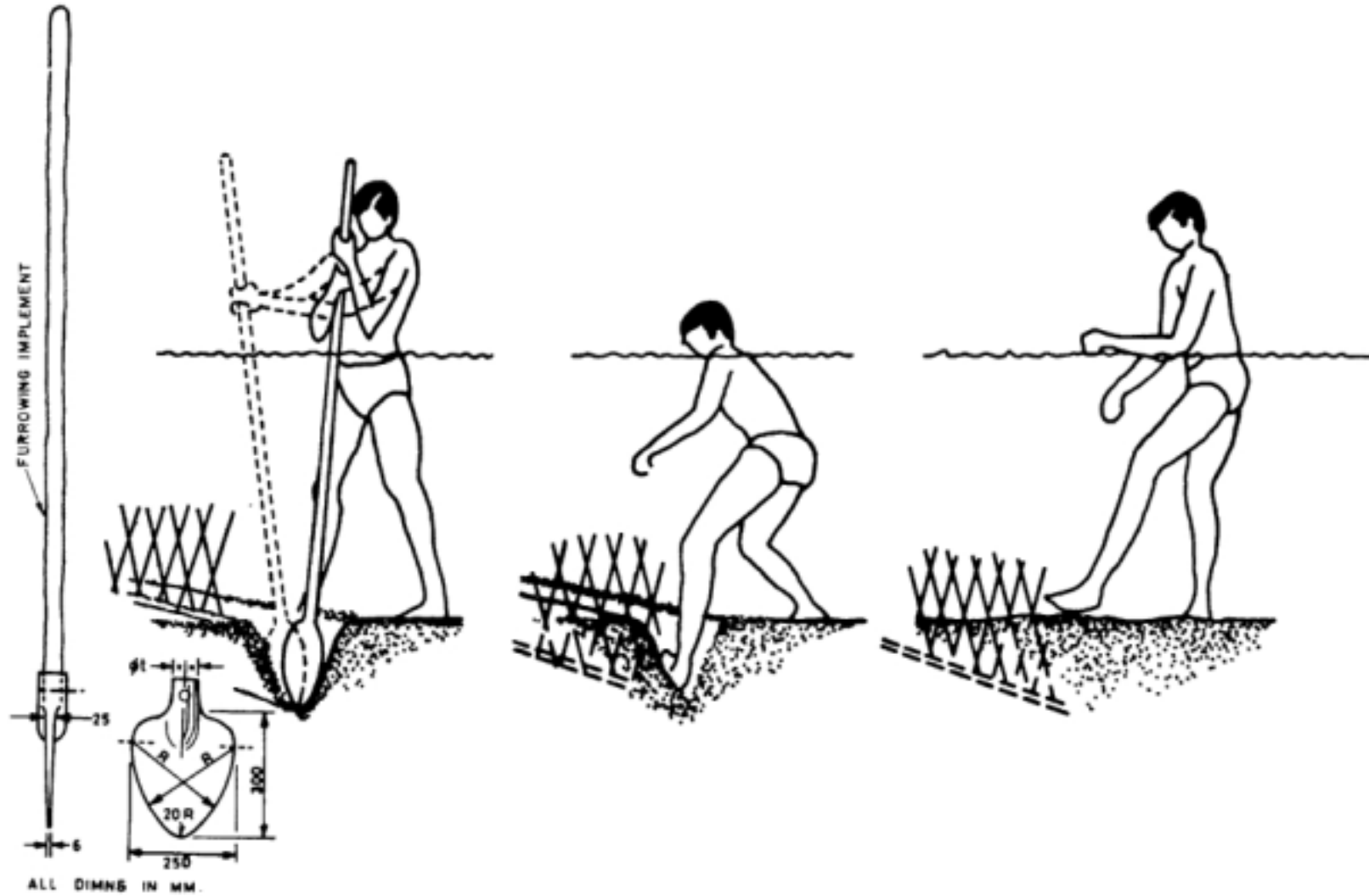
[29]



(a) Pen installation in soft muddy bottom

Appendix 7 (Contd.)
PEN INSTALLATION PROCEDURES

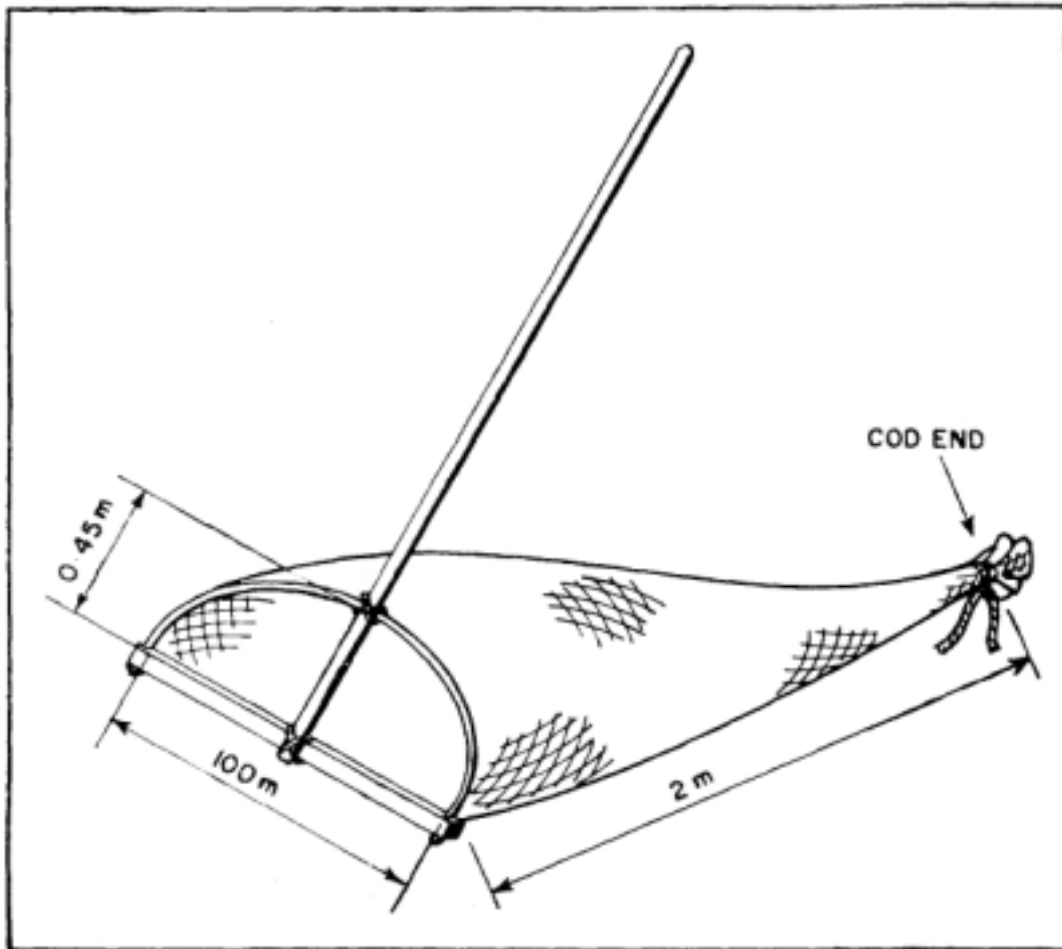
[30]



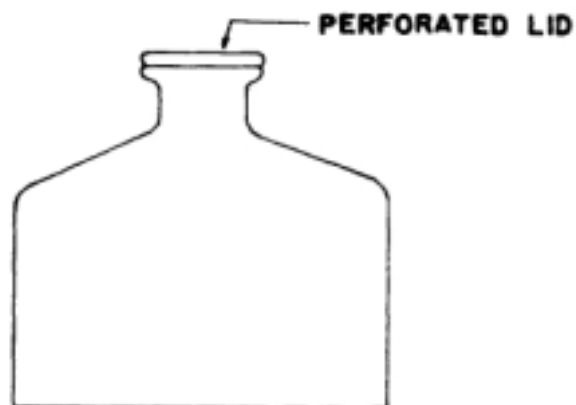
(b) Pen installation in firm bottom

Appendix 8

SEED COLLECTION AND FRY TRANSPORTATION EQUIPMENT



PUSHNET FOR SEED COLLECTION



SHRIMP SEED TRANSPORTATION CONTAINER

Appendix 9

RESULT OF NURSERY REARING OF *P. INDICUS* IN CAGES

Stocking and rearing data	Expt. 1	Expt. 2	Expt. 3	Expt. 4	Expt. 5	Expt. 6	Expt. 7	EXpt. 8
Sizeofthecage(m)	10 4 x 1.5	10 4 x 1.5	10 4 x 1.5	10 4 x 1.5	15x5x1.5	10 3 x	10 3 x	10 3 x
Stocking density (no/ha)	750,000	750,000	750,000	750,000	666,000	666,000	666,000	666,000
Total nos. stocked	3,000	3,000	3,000	3,000	5,000	2,000	2,000	2,000
Initial $\frac{\text{Av. length (mm)}}{\text{Av. weight (g)}}$	$\frac{33.5}{0.03}$	$\frac{33.5}{0.03}$	$\frac{33.5}{0.03}$	$\frac{33.5}{0.03}$	$\frac{33.5}{0.03}$	$\frac{33.5}{0.03}$	$\frac{33.5}{0.03}$	$\frac{33.5}{0.03}$
Final $\frac{\text{Av. length (mm)}}{\text{Av. weight (g)}}$	$\frac{75.2}{2.75}$	$\frac{75.2}{2.75}$	$\frac{75.2}{2.75}$	$\frac{75.2}{2.75}$	$\frac{71.0}{2.55}$	$\frac{70.2}{2.45}$	$\frac{70.2}{2.45}$	$\frac{70.2}{2.45}$
Rearing days	40	40	40	40	40	40	40	40
Total nos. recovered	2,450	2,330	2,275	2,345	4,315	1,425	1,375	1,450
Survival (%)	81.6	71.6	75.8	78.1	86.3	71.2	68.7	72.5

[32]

Appendix 10

RESULTS OF NURSERY REARING OF *P. INDICUS* IN PEN

Details of stocking & rearing			EXPT. I	EXPT. II
Nursery area (m ²)	..	..	950	950
Stocking density no./m ²	..	..	105	90
Total nos. stocked	..	..	1,00,000	85,500
Initial	<u>Ave. length (mm)</u>		<u>20</u>	<u>25</u>
	<u>Ave. weight (g)</u>		<u>0.02</u>	<u>0.03</u>
Final	<u>Ave. length (mm)</u>		<u>66.6</u>	<u>68</u>
	<u>Ave. weight (g)</u>		<u>2.5</u>	<u>2.6</u>
Duration of rearing	..	..	55 days	50 days
Total nos. recovered	..	..	35,100	48,600
Survival (%)	..	..	35	57

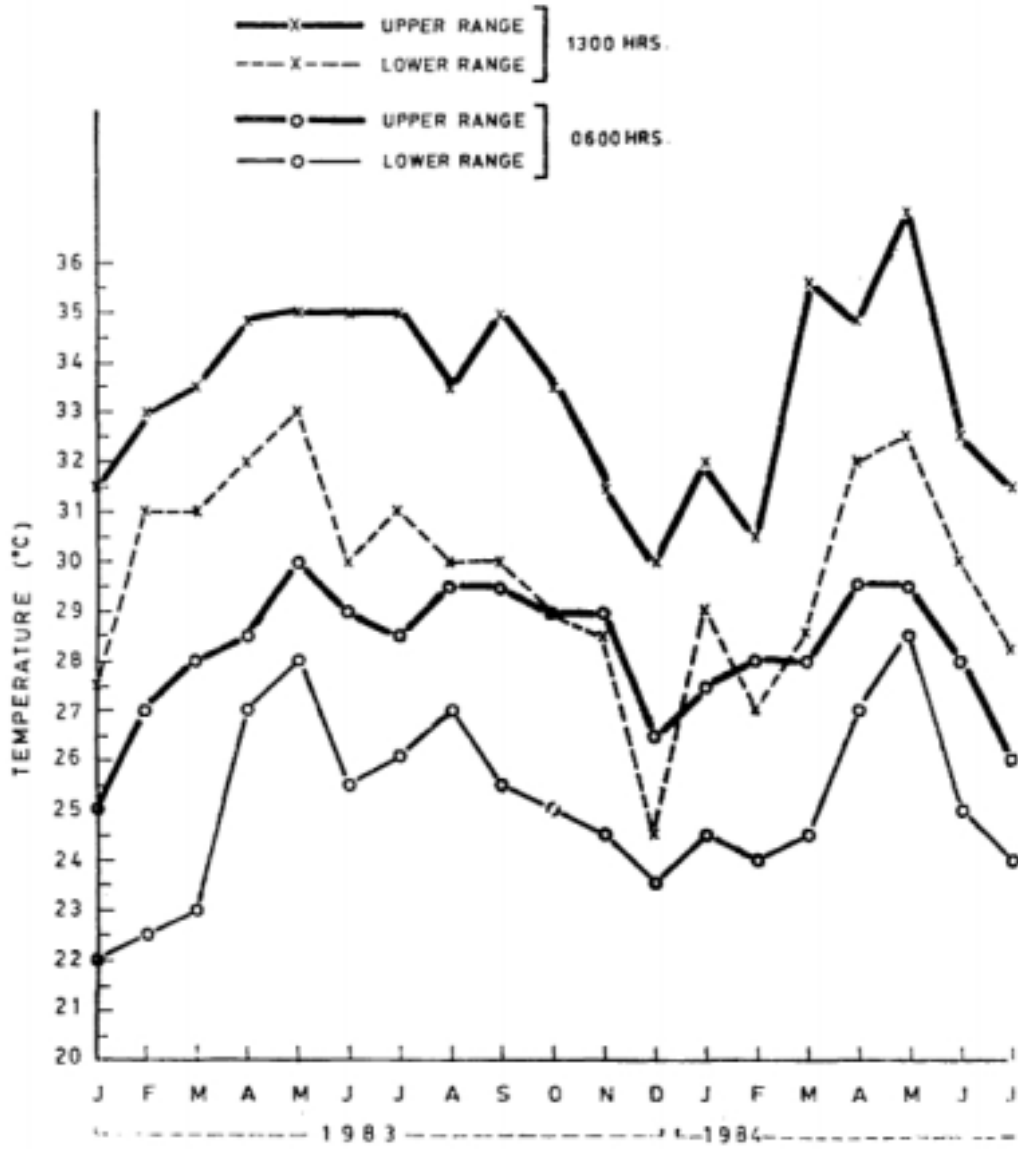
Appendix 11

TIDAL DATA

Year & month	Tidal amplitude range (cm)	Tide gauge reading (cm)	
		Highest	Lowest
1982			
September	10—29	63	29
October	8—33	94	38
November	7—33	100	31
December	11—34	82	38
1983			
January	11—26	70	30
February	5—32	70	26
March	5—24	72	31
April	4—23	66	32
May	9—30	78	30
June	11—28	80	32
July	6—28	72	32
August	7—27	72	32
September	6—22	72	32
October	8—26	95	37
November	7—25	124	77
December	3—45	148	42
1984			
January	9—53	93	34
February	9—55	110	30
March	11—58	96	28
April	12—58	93	25
May	14—61	90	24
June	20—62	95	23
July	14—58	90	23

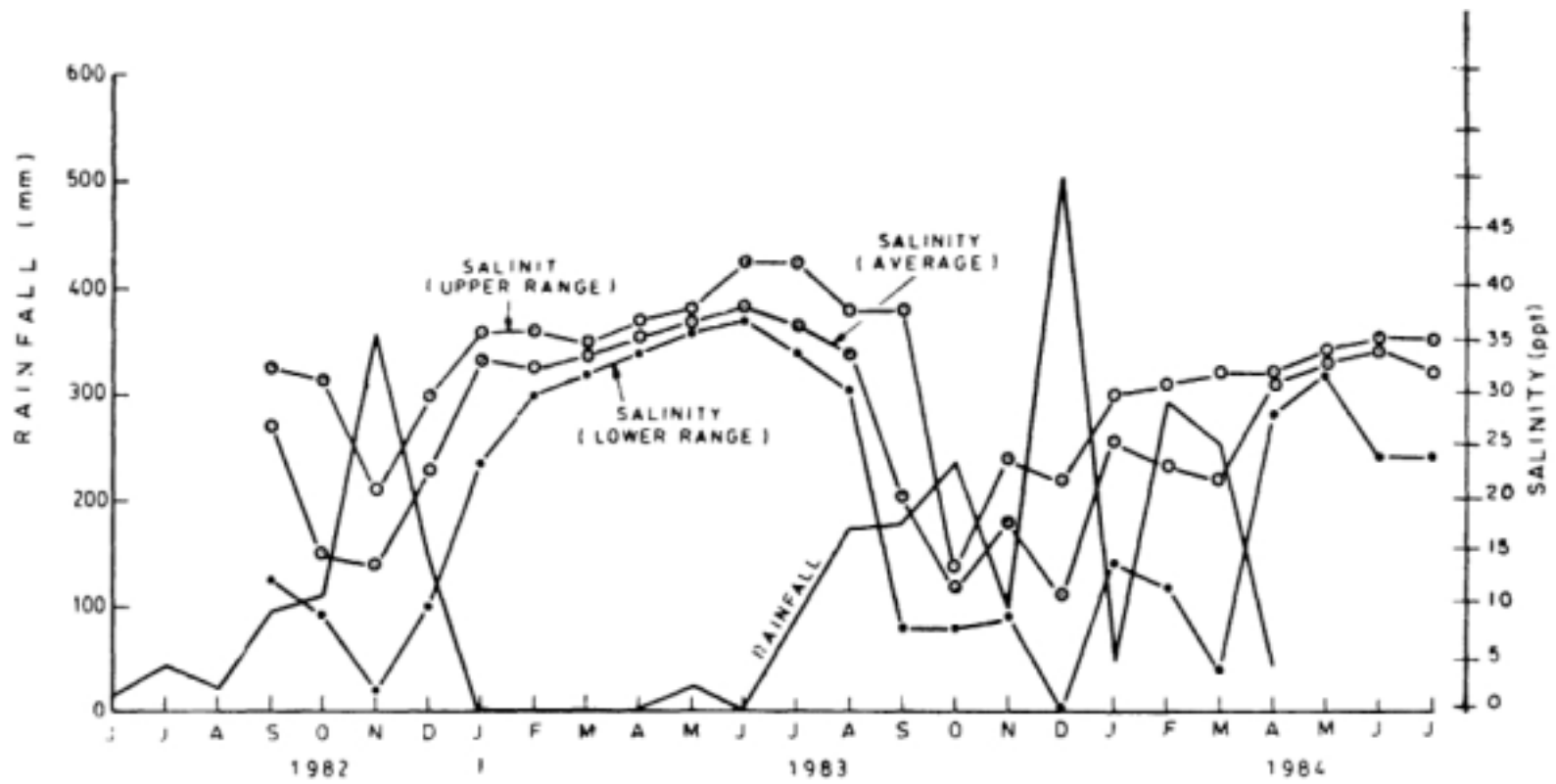
Appendix 12

MONTHLY WATER TEMPERATURE



Appendix 13
 RAINFALL AND WATER SALINITY DATA

[96]



Appendix 14

WATER AREAS SUITABLE FOR PEN CULTURE

S-No.	Location	Gross suitable area	Net area likely to be available	Mm. depth range during average lower low tide	Max. water depth during floods, over the average lower low water level
		(ha)	(ha)	(m)	(m)
1.	Vellar bridge – Porto Novo jetty	1.375	1.375	0.30–0.70	2.70
2.	Porto Novo jetty – fish landing centre	2.650	2.650	0.30–0.70	1.70
3.	Vellar bar mouth kuttai	2.050	2.050	0.30–0.80	1.70
4.	Muzhukkuthurai	20.200	10.100	0.30–0.80	1.60
5.	Water course leading to Chinna river bar mouth	33.500	3.500	0.30–0.80	1.60
6.	Chillankuttai	2.200	2.200	0.30–0.40	1.60
7.	Vadakukuttai	3.100	3.100	0.30–0.60	1.60
8.	Thakkidavu	19.400	19.400	0.30–0.70	1.60
9.	Chinnavaikkal to Pattaraiaidi	16.150	8.080	0.30–0.80	1.60
10.	Karithurai	4.450	2.230	0.30–0.60	1.60
11.	Karithurai jetty – Kuchipalayam	7.900	3.950	0.30–0.70	2.00
12.	Peria kidavu	2.400	2.400	0.30–0.50	1.60
13.	Sethukolliolam	38.500	19.250	0.30–0.60	1.70
14.	Adaincha Kuttai	1.450	1.450	0.20–0.30	1.70
15.	Kodiampalayam Oorkidavu	2.800	2.800	0.20–0.25	1.700

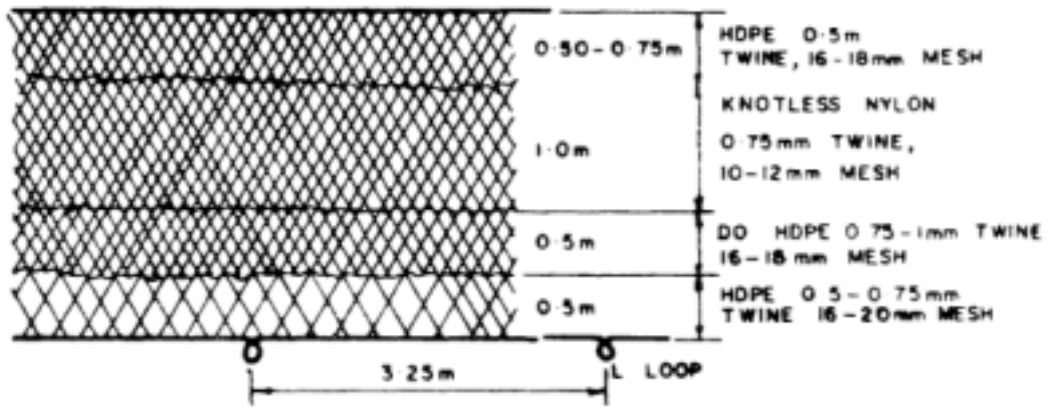
Appendix 15

BACKGROUND PAPERS FOR PEN CULTURE TRAINING COURSE

1. Brackishwater aquaculture potential in Tamil Nadu (BOBP/INF/5)
2. Brackishwater aquaculture activities in Tamil Nadu – on-going and planned (Rajendran)
3. Why attempts at pen culture are necessary in Tamil Nadu (*Bay of Bengal News*, July 1983)
4. Coastal aquaculture potential in Andhra Pradesh (BOBP/INF/4)
5. Note on pen culture potential in Andhra Pradesh
6. Site selection for pen culture of shrimp (Karim)
7. Water area survey methodology (Ramsingh)
8. Water analysis—method for determination of dissolved oxygen, salinity and pH (Bose)
9. **Tidal characteristics of Killai backwaters** (Ramsingh and Nalluchinappan)
10. Graphs :— Water temperature distribution by month at Killai
— Salinity distribution by month at Killai
11. Studies on the hydrobiology and benthic ecology of Lake Pulicat (Raman et. al.)
12. Shrimp seed resources for pen culture in Killai backwaters and Vellar estuary of Tamil Nadu (Rajappan)
13. Shrimp seed availability in and around Killai backwaters (Rajendran)
14. Common pest animals: their occurrence, abundance and removal (Nalluchinappan)
15. Some interesting observations on the crab cutting and preventive measures taken at Killal shrimp pen culture project (Rajappan and Nalluchinappan)
16. Pen construction and installation (Karim)
17. Cost of a 0.5 ha. pen (Bose)
18. Some management aspects of pen culture (Bose)
19. **Problems of feeding shrimp in pens** (Karim and Janssen)
20. Ecology of Killai-Porto Novo backwaters (Natarajan)
21. Socio-economic feasibility of pen culture (Roy)
22. The elements involved in an extension programme (Dorresteijn)

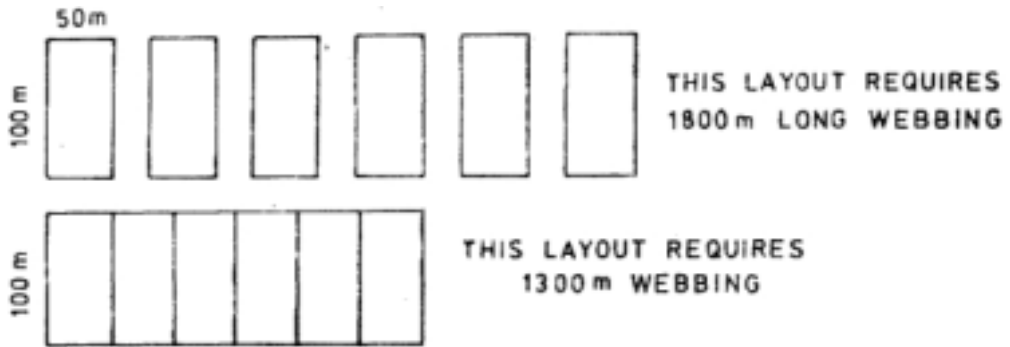
Appendix 16

DESIGN OF PEN WALL

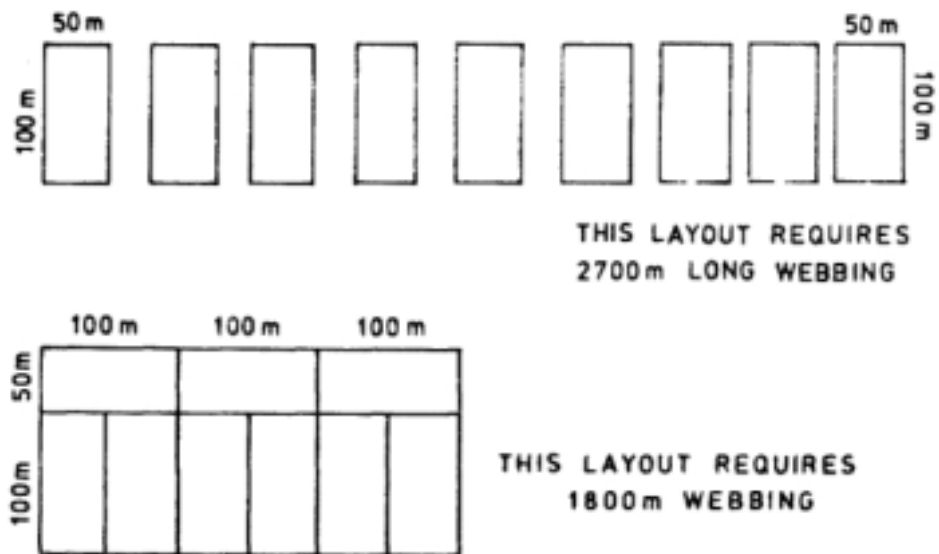


Appendix 17

DIFFERENT PEN LAYOUTS REQUIRING DIFFERENT LENGTHS OF MATERIAL

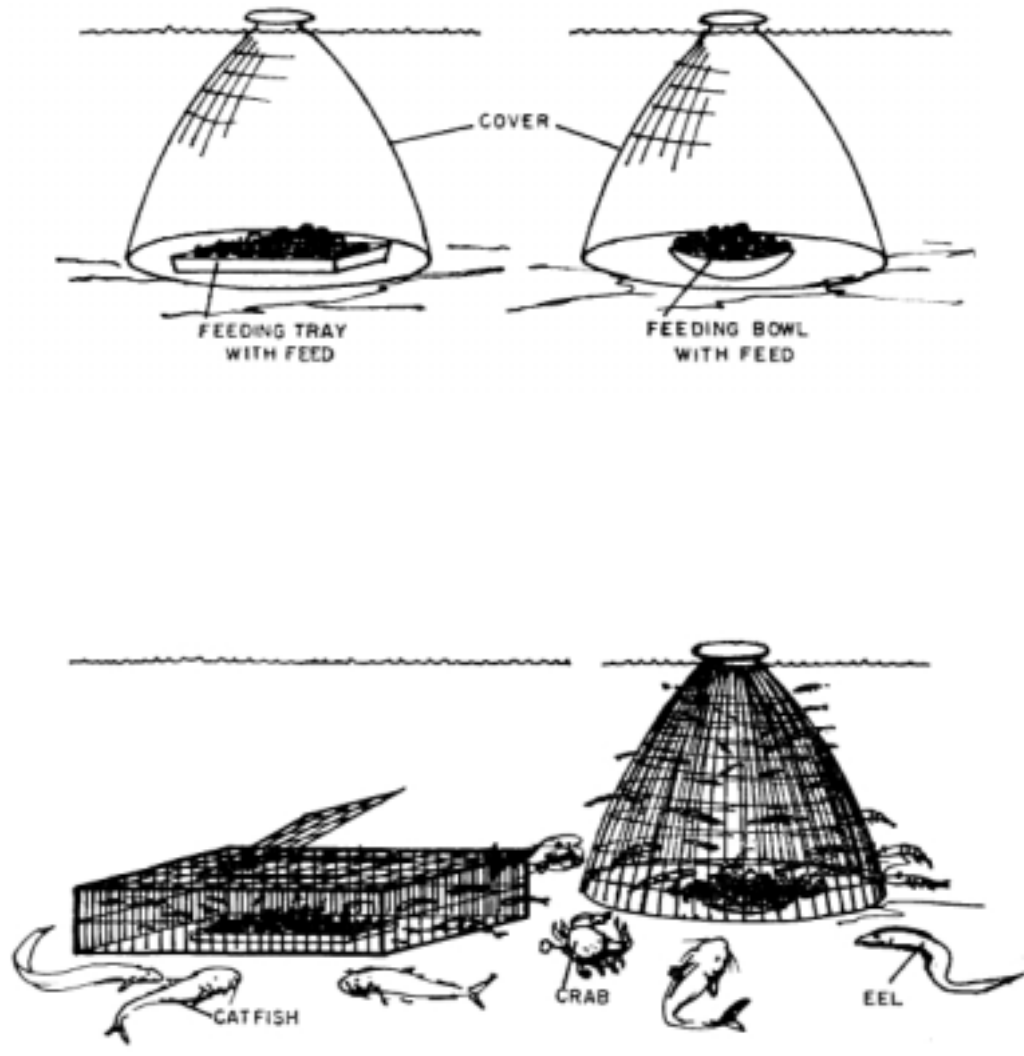


(a)



b)

Appendix 18
FEED COVERS



Appendix 19

FENCING OF FEEDING AREA

