

Information on navigational aspects of the channel between Haldia and Farakka

1. Least Available Depth (LAD) between Tribeni and Farakka:

The less depth in the channel is observed only during the months of March and April when water sharing between India and Bangladesh is in operation and India gets less water in a ten days cycle. Therefore to clarify the issue of LAD in this critical period further, the IWAI has conducted hydrographic survey of this stretch between 18.3.11 and 25.3.11. During this period water sharing was in force and the entire channel was surveyed twice; once when the water discharge was low on Indian side and when it was more on Indian side. It is observed in this survey that the minimum depth available is less than 2.5 m only at one place i.e at Baghmari siphon (at chainage 529) when the discharge towards Indian side was minimum. It is also observed that the depth at this place becomes less than 2.5 m only on those days when water discharge towards India is very low and therefore, the number of days when the depth over Baghmari siphon is less than 2.5 m is not likely to be more than 20 days in a year and that too may not happen every year but only during the worst water discharge years. The depths recorded at every kilometer during this survey are given in [Annexure-I](#). It may be noted that the approximate chainage downstream of Farakka lock is 544 and at Tribeni it is 193 while that of the site where the IWT terminal near Farakka power plant is to be located, the chainage is 540 km. Further, to indicate the depth at the Baghmari siphon, IWAI would put up poles with markings at 1 km upstream and 1 km downstream of the siphon which would help the Master of the vessel to know the exact LAD over Baghmari siphon and safely navigate barges over it.

2. Night navigation aids:

Navigation aids by way of combination of lighted buoys, lights on country boats, lighted posts on the banks are being maintained by IWAI to facilitate 24 hours navigation between Tribeni and Farakka. In the stretch between Diamond Harbour and Kolkata also, lights with buoys have been put.

3. DGPS connectivity:

The DGPS station at Bhagalpur has already been commissioned and the one at Swarupganj (chainage-280 km) is going to be commissioned soon. With this, the entire sector between Haldia and Farakka shall have DGPS connectivity. A detailed note on the DGPS system of IWAI and the system/methods/ equipment required on board vessels to use it in Haldia-Farakka stretch is at [Annexure-II](#).

ANNEXURE-I

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
TRIBENI- NABADWEEP (09/11 -18.03.11 TO 19.03.11)
& NABAWEEP - TRIBENI (10/11- 24.03.11 TO 25.03.11) CHAINAGE : 193 KM TO 280 KM**

CHAINAGE	MINIMUM LAD RECORDED (BETWEEN EACH KM)	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
193	3.9	5.8
194	7.1	5
195	5	5.4
196	5.5	6
197	5.1	6.8
198	4.3	6.7
199	5.3	4.5
200	6.6	6.5
201	6	6.8
202	4.4	4.7
203	4.9	3
204	12.6	4.2
205	12.6	4.4
206	12.5	4
207	12.4	4.2
208	11.3	4.2
209	4.4	4.4
210	5.2	5.6
211	6.5	7.3
212	7	7.2
213	7.6	4.8
214	9	4.5
215	8.5	5.1
216	4.1	4.3
217	4.6	4.4
218	4.4	4.7
219	4.9	5
220	6.2	5.1
221	7.3	4.6
222	5.7	4.2
223	4.3	3.3
224	4.5	4.4
225	5	4.4
226	7.6	7
227	4.3	5.9
228	4.4	4
229	4	3.5

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
TRIBENI-NABADWEEP (09/11 -18.03.11 TO 19.03.11)
& NABAWEEP - TRIBENI (10/11- 24.03.11 TO 25.03.11)**

CHAINAGE	MINIMUM LAD RECORDED WITH IN EACH KM RANGE	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
230	4.1	5.8
231	6.1	3.2
232	5.2	3.2
233	3.7	3.5
234	4.3	4.2
235	4.8	4.9
236	6.1	7.2
237	8.4	5.4
238	6.9	3.8
239	4.1	5.1
240	5	5.1
241	5	3.8
242	2.9	3.4
243	3.7	3.3
244	3.2	5.5
245	5	3.1
246	7.3	6.5
247	5.8	3.4
248	4.7	4.2
249	4.9	4.2
250	2.9	2.6
251	5.7	5.2
252	6.1	6.2
253	6.5	3.7
254	3.8	3.2
255	5	3
256	3.5	3
257	3.4	3
258	2.8	4.4
259	5.6	3.4
260	3.1	3.8
261	4.3	6.5
262	3.1	5
263	3.9	4.2
264	7.7	3.2
265	3.3	3.1
266	3.2	5.4
267	5.3	3.7
268	4.2	5.1

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
TRIBENI-NABADWEEP (09/11 -18.03.11 TO 19.03.11)
& NABAWEEP - TRIBENI (10/11- 24.03.11 TO 25.03.11)**

CHAINAGE	MINIMUM LAD RECORDED WITH IN EACH KM RANGE	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
269	6.6	4.1
270	11.8	4.7
271	2.6	3.3
272	3.2	2.9
273	2.9	4.4
274	3.7	6.6
275	5.6	4.6
276	4.1	3.5
277	2.9	3.6
278	4.2	3.3
279	2.8	3.2
280	3	3.6

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
NABADWEEP -BERAHMPORE (09/11 -19.03.11 TO 20.03.11)
BERAHMPORE - NABAWEEP (10/11- 23.03.011) CHAINAGE : 281 KM TO 421 KM**

CHAINAGE	MINIMUM LAD RECORDED (BETWEEN EACH KM)	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
281	3.4	4.2
282	5.8	4.5
283	3.7	3.7
284	3.9	3
285	2.7	3.2
286	3.4	4.3
287	3.7	4
288	3.8	4.3
289	4.1	4.5
290	3.9	6.2
291	5.6	3.4
292	3.3	4.8
293	4.1	7.2
294	7.3	6.3
295	3	4.6
296	4	6
297	4.7	3.5
298	2.7	3.9
299	2.9	3.2
300	2.7	4.7
301	2.9	4.7
302	4.5	3.9
303	3.5	4.9
304	4	5.6
305	5.4	5.4
306	4.7	4
307	3	3.5
308	3.1	4.5
309	4.5	4.7
310	3.4	6
311	4.1	7
312	7.7	7.3
313	6.1	5.8
314	5.5	3.5
315	5.6	3.2
316	2.7	4.7
317	5.1	4.2
318	4	6.3

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
NABADWEEP -BERAHMPORE (09/11 -19.03.11 TO 20.03.11)
BERAHMPORE -NABAWEEP (10/11- 23.03.011) CHAINAGE : 281 KM TO 421 KM**

CHAINAGE	MINIMUM LAD RECORDED (BETWEEN EACH KM)	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
319	6.2	4.6
320	4.7	5.5
321	4.6	4
322	3.3	3.4
323	4.1	3.5
324	3.1	4.2
325	3.1	4.9
326	3.5	4.3
327	4.8	4
328	3.4	3.7
329	4.6	4.1
330	3.1	3.6
331	4.9	5
332	7.9	4.6
333	5.5	3.8
334	2.7	3
335	2.8	3.7
336	2.7	3.1
337	3	3.7
338	3.2	5.1
339	4.5	3.3
340	2.7	4.2
341	3.2	3.8
342	3	4.1
343	3	4.8
344	4.1	3.9
345	3	4.7
346	3.7	4.7
347	3.1	3.5
348	3	3.1
349	2.7	3.5
350	3.1	3.8
351	3	4.2
352	4.8	5.8
353	7.4	4
354	3.9	3.6
355	3	4.3
356	3.4	4.6

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
NABADWEEP -BERAHMPORE (09/11 -19.03.11 TO 20.03.11)
BERAHMPORE TO NABAWEEP (10/11- 23.03.011) CHAINAGE : 281 KM TO 421 KM**

CHAINAGE	MINIMUM LAD RECORDED (BETWEEN EACH KM)	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
357	5.1	4.2
358	3.1	5
359	4.1	3.4
360	2.5	3
361	4.7	5.1
362	4.6	4.3
363	3.9	4.3
364	3.6	3.6
365	2.9	3.9
366	3.5	3.7
367	2.6	3.7
368	4.4	3.6
369	2.7	3.6
370	2.5	2.9
371	6.2	5.1
372	5.9	5.5
373	5.9	4.6
374	3.7	4.1
375	3.9	3.6
376	3.2	4
377	2.9	3.5
378	5.1	5.2
379	4.2	4.4
380	6	5
381	3.2	4
382	3.3	4.4
383	3.9	3.7
384	3.5	4.8
385	4.3	4.7
386	4.6	3.1
387	2.7	3.3
388	2.5	3.7
389	3.6	4.6
390	6.5	5.2
391	5.5	6.4
392	5.2	4.5
393	3.7	6.2

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
NABADWEEP -BERAHMPORE (09/11 -19.03.11 TO 20.03.11)
BERAHMPORE TO NABAWEEP (10/11- 23.03.011) CHAINAGE : 281 KM TO 421 KM**

CHAINAGE	MINIMUM LAD RECORDED (BETWEEN EACH KM)	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
394	3.3	4.4
395	5.6	4.4
396	3.1	4.5
397	3.8	4.5
398	4.5	3.4
399	3.1	3.8
400	3.4	3.6
401	6.4	4
402	3.8	5.7
403	4.6	6.7
404	5.9	7.7
405	5	8.9
406	6.4	6.4
407	4.5	7
408	7.3	4.8
409	5.1	4
410	3.1	4.4
411	3.2	3.9
412	5.3	3.8
413	2.6	3.5
414	4	5.3
415	4.7	4.6
416	3.1	4.8
417	3.2	4.6
418	4	5.7
419	3.2	5.8
420	4.3	4
421	4.2	3.9

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
BERAHMPORE TO FARAKKA (09/11 -20.03.11 TO 21.03.11)
FARAKKA TO BERAHMPORE (10/11- 22.03.11 TO 23.03.011) CHAINAGE : 422 KM TO 544KM**

CHAINAGE	MINIMUM LAD RECORDED (BETWEEN EACH KM)	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
422	4.3	5.5
423	4.2	5.4
424	4.3	5.9
425	4.1	5.1
426	2.9	3.5
427	2.7	3.4
428	2.9	3.8
429	3.3	4.2
430	4.3	4.9
431	5.3	6.5
432	5.8	5.9
433	5	5.6
434	5.7	6.9
435	3.9	4.6
436	4.6	4.4
437	4.9	5
438	5.8	6.5
439	4.4	4.7
440	5	5
441	4.7	4.8
442	6.4	9.4
443	2.7	3.6
444	2.5	3.3
445	2.8	3.6
446	3.2	4
447	4.2	4.9
448	5	5.5
449	4.3	4
450	3	3.9
451	7.2	6.8
452	6.1	6.3
453	5.1	5.8
454	5.9	4.5
455	4.3	3.7
456	3.3	3.9
457	4.2	5.4
458	5.3	6.3
459	5.3	7

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
BERAHMPORE TO FARAKKA (09/11 -20.03.11 TO 21.03.11)
FARAKKA TO BERAHMPORE (10/11- 22.03.11 TO 23.03.011) CHAINAGE : 422 KM TO 544KM**

CHAINAGE	MINIMUM LAD RECORDED (BETWEEN EACH KM)	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
460	6	4.5
461	3.9	7.2
462	5.8	6.3
463	7.5	5.2
464	6.7	3.6
465	2.8	3
466	2.7	3.3
467	3	3.5
468	3.2	4.1
469	3.6	4.3
470	4.5	3.8
471	3.9	4
472	3.3	3.7
473	3.9	3.8
474	4.4	5.6
475	3	3.5
476	3.1	7.2
477	6.9	5.1
478	6.4	6.1
479	5	4.1
480	5.4	6
481	3.9	5.4
482	3.3	3.7
483	3.7	4.5
484	4	4.7
485	5.6	6.1
486	5.9	4.2
487	4.5	5.7
488	4.5	4.2
489	4.7	4.4
490	3.6	3.8
491	3.6	4.6
492	5.1	5.6
493	3.7	4.2
494	3.3	3.6
495	4	5.3
496	6.3	5.4
497	5	5.1

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED OUT FROM
BERAHMPORE TO FARAKKA (09/11 -20.03.11 TO 21.03.11)
FARAKKA TO BERAHMPORE (10/11- 22.03.11 TO 23.03.011) CHAINAGE : 422 KM TO 544KM**

CHAINAGE	MINIMUM LAD RECORDED (BETWEEN EACH KM)	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
498	4.1	8.3
499	3.7	3.6
500	4.2	4.1
501	4.9	5.8
502	3.4	3.9
503	5.2	4.1
504	3.5	3.7
505	3.2	4.8
506	5.5	4
507	5.4	6.2
508	5.8	6.1
509	5.8	6.8
510	6.4	6.6
511	5.1	5.7
512	3.2	4.7
513	4.8	7.7
514	5.8	7.2
515	5.5	6.8
516	6.2	6.9
517	4.1	6.9
518	6.2	6.5
519	4.3	5.8
520	5.9	6
521	4.2	6.9
522	4.2	7.5
523	4.9	4.9
524	4.2	8.2
525	6.3	7.7
526	6.7	7.8
527	6.3	8.2
528	7.5	7
529	2	2.5
530	3.8	7.8
531	3.7	4.8
532	3.9	3.9
533	3	4.2
534	5.8	5.9
535	7.6	5.1

**DETAILS OF LAD RECORDED DURING HYDROGRAPHI SURVEY CARRIED FROM
 BERAHMPORE TO FARAKKA (09/11 -20.03.11 TO 21.03.11)
 FARAKKA TO BERAHMPORE (10/11- 22.03.11 TO 23.03.011) CHAINAGE : 422 KM TO 544KM**

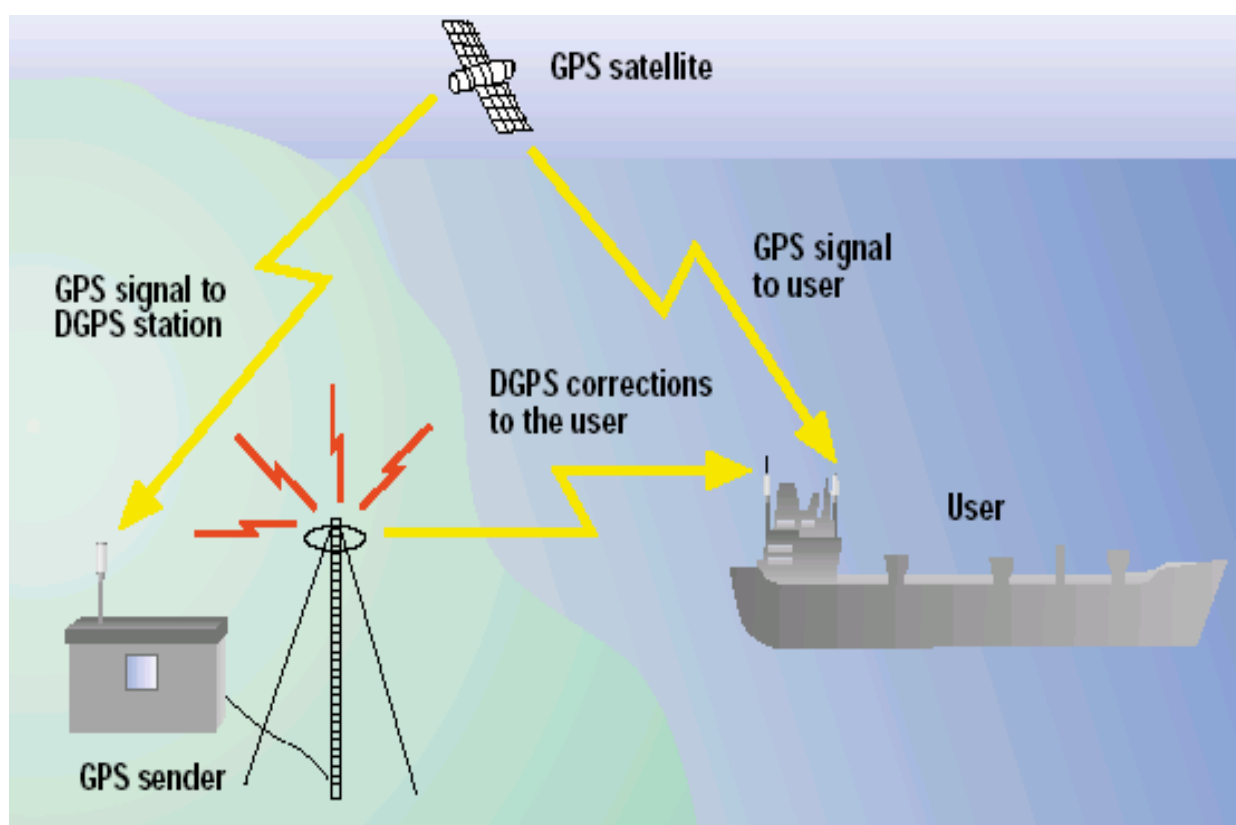
CHAINAGE	MINIMUM LAD RECORDED (BETWEEN EACH KM)	
	THALWEG SURVEY NO:09/11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS BANGLADESH SIDE 10.03.11 TO 21.03.11 (A.N)	THALWEG SURVEY NO:10 /11 (AS PER WATER SHARING TREATY MAXIMUM DISCHARGE TOWARDS INDIAN SIDE 21.03.11 TO 01.04.2011 (A.N)
536	3.6	5.1
537	3.6	4.9
538	5.1	4.9
539	4.7	4.4
540	3.7	4.9

Navigation with DGPS in Haldia- Farakka stretch of NW-1

Inland Waterways Authority of India (IWAI) has provided 24 hrs navigation aids from Tribeni to Farakka. In addition in order to provide satellite based navigation aid in Haldia- Farakka stretch, one Differential Global Positioning System (DGPS) Reference Stations has been commissioned at Bhagalpur while a similar station at Swarupganj is going to be commissioned by end April 2011. These two stations would enable DGPS connectivity in the entire Haldia- Farakka stretch.

Working principle of DGPS

The DGPS station receives signals from the satellites stationed in the geo-stationary orbit and calculates the correction in position with respect to its actual position. This correction factor is continuously transmitted by the DGPS station, which is received by the mobile DGPS receiver (normally called as Rover) fitted on board the vessel and that gives its accurate position during navigation on a real time basis. Hence, the mobile unit also gives sub-meter accuracy in position which enables the vessel to navigate along the exact route / track / channel.



Hardware requirement

The vessel is required to be fitted with a desktop computer/ Laptop (minimum P-IV configuration), one digital echo sounder, one DGPS receiver and the real-time navigational display software with pre-loaded digital charts of the respective waterway. IWAI has already developed real-time navigational display software with digital charts. With these, the vessel can navigate safely by following the latest navigational route already loaded

in the computer. The accuracy in this case is obtained as +/- 1 m within 150 - 200 km radial distance from the DGPS station.

The hardware required and their approximate cost is listed below:

Sl. No	Equipments	Quantity	Appx. Cost Rs. In Lakh
1	Computer / Laptop	1 No	0.40
2	Digital Echo Sounder	1 No	0.50
3	DGPS Receiver	1 No	2.50
4	NAV Display Navigation Software with digital Navigational Chart of (NW-1)- <i>from IWAI</i>	1 Set	0.95

Total Cost for NW-1 - Rs. 4.35 Lakh

Training needs

In addition, the Master of the vessel has to undergo training for familiarisation of using DGPS receiver and navigating the vessel through the pre-defined track (Tracks would be provided by IWAI after completion of latest Thalweg Surveys from time to time). Normally when new equipments are purchased the Equipment supplier will give training on the usage of the equipment free of cost. In addition IWAI can also provide training to the Masters of the Cargo vessels onboard and/or in NINI at Patna.
