Plan and Implementation Support for Commercialization of NW-1

Summary of 15th Pilot Movement

Varanasi to Kolkata

IFFCO, PepsiCo, Dabur

22nd January 2019

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1 Introduction

During recent years, the National Government of India and the Inland Waterways Authority of India (IWAI) as the authority in charge of the nation's inland waterways have undertaken significant efforts to enhance the navigability on India's national inland waterways and to foster sustainable freight movements by inland waterway barge. The actions taken aim at the implementation of the National Government's policy objective to increase the use of inland waterway transport (IWT) and make use of the potential benefits that this mode of transport offers for the country's growing economy.

Given the country's economic growth, existing transport networks are overloaded in many places and transportation of cargo and passengers by road and rail often suffers from heavy congestion as well as the presence of infrastructural bottlenecks. Environmental pollution and pursued sustainability goals moreover require a coordinated approach to an integrated national transportation policy. Given the existing network of rivers, canals and backwaters and recognizing IWT's mode-specific advantages, the Indian Government thus intends to make transport by inland barge an integral part of the country's transport system.

Covering the Ganga-Bhagirathi-Hooghly river system, National Waterway-1 (NW-1) has the potential to open up large markets in the northeastern states of India for IWT. In order to ensure a sustainable and commercially viable development of IWT in these parts of the country, the competent authorities have invited external expertise for the project on Plan and Implementation Support for the Commercialization of NW-1. The given project thereby aims to facilitate actual business development and to foster the development of cargo movements on India's longest National Waterway from Haldia, West Bengal to Allahabad, Uttar Pradesh.

As the commissioned consultants, a Joint Venture of HPC Hamburg Port Consulting GmbH, UNICONSULT Universal Transport Consulting GmbH and its local Partner La Mer Maritime (P) Ltd. have put together a team of experts with comprehensive knowledge of the Indian inland waterway shipping sector and international IWT markets. In the course of the ongoing project work, the Consultants constantly engage into direct interaction with relevant market stakeholders as well as the competent public authorities, primarily aiming at the conduct of pilot movements and the closing of actual working contracts.

This summary of the 15th pilot movement conducted within the scope of the current project provides a documentation of the practical experiences made during the second movement of containerized cargo on NW-1. Building upon the insights gained from the given pilot transport, the findings from current field work and the Consultants' knowledge of the regional freight market in the northeastern parts of India, the given summary report provides implementation-oriented recommendations for the development of the infrastructural conditions and processes for a successful and sustainable development of IWT on NW-1.

In the following, Chapter 2 provides an overview on the background of the container pilot movement form from Varanasi, Uttar Pradesh to Kolkata, West Bengal and the efforts undertaken to initiate it. Chapter 3 presents financial issues while Chapter 4 provides details on the operational aspects. Chapter 5 summarizes relevant findings and experiences while Chapter 6 gives recommendations on further needs for action.

2 Preparation of Pilot Movement

Following the 14th pilot movement on the transport of containerized cargo from Kolkata, West Bengal to Varanasi, Uttar Pradesh, the 15th pilot transport covered the return transport of the containers from Varanasi to Kolkata. For this purpose the Consultants were able to secure return cargo in form of a consolidated shipment with freight coming from three different shippers, namely the companies IFFCO, PepsiCo India and Dabur.

Since the early stages of the current project on Commercialization of NW-1, the Consultants' local team has repeatedly been in discussions with the Indian fertilizer company IFFCO. In the course of these talks, various options for the conduct of pilot movements have been discussed. With the option of a containerized cargo movement, it was possible to reach an agreement on a pilot transport of fertilizer products from IFFCO's plant in Phulpur, Uttar Pradesh to Kolkata, West Bengal. In total, the IFFCO shipment consisted for approximately 120 metric tons of bagged urea fertilizer stuffed into eight twenty-foot equivalent unit (TEU) containers.

Having already participated in the preceeding upstream pilot movement from Kolkata, West Bengal to Varanasi, Uttar Pradesh, the snack, food and beverage company PepsiCo India agreed to also to provide cargo for a downstream transport from Varanasi to Kolkata. The corresponding cargo thereby originated from the company's soft drink plant in Kanpur Dehat, Uttar Pradesh and was destined for the greater Kolkata, West Bengal region. In total, PepsiCo India's return shipment comprised cargo stuffed into six TEU containers.

As a third shipper and following several discussions with the Consultants' local team, the Indian healthcare company Dabur agreed to participate in a pilot cargo movement and provided cargo for the same. The corresponding freight originated from the town of Shivdaspur in the Varanasi, Uttar Pradesh area and was destined for the greater Kolkata, West Bengal market. Dabur's freight filled two TEU containers.

As to the freight rate, IFFCO, PepsiCo and Dabur agreed on a lump-sum rate of INR 450,000 for barge transport from Varanasi, Uttar Pradesh to Kolkata, West Bengal. The costs were shared propotiantly between the three companies. According to the approval, costs for first and last mile transport as well as statutory charges, loading and unloading charges and vessel costs were to be borne by IWAI. Handling cost for loading and unloading were thereby initially paid by La Mer Maritime (P) Ltd. and later invoiced to IWAI.

Following the approval by the competent authorities, the pilot movement was initialized and all preparatory actions were taken, including the redistribution of the containers to the different loading sites. Having also been used for the previous upstream movement from Kolkata, West Bengal to Varanasi, Uttar Pradesh, inland waterway vessel MV Rabindra Nath Tagore was available at Varansi without the need for reallocation. Loading of the containers at the new Multimodal Terminal (MMT) took place on 17th November 2018 and the vessel departed later on the same day.

3 Financial Aspects

Under the coordination of the Consultants' local experts, IFFCO, PepsiCo India and Dabur as the shippers and IWAI as the barge operator reached and agreement on the conduct of a return container pilot movement on the transport of 16 TEU on NW-1 from Varanasi, Uttar Pradesh to Kolkata, West Bengal.

The three companies and IWAI thereby agreed upon a lump-sum freight rate of INR 450,000 for barge transport of the 16 TEU containers from Varanasi MMT to Kolkata GR Jetty. Corresponding costs were shared propotiantly between IFFCO, PepsiCo and Dabur and were paid directly to IWAI. Loading and unloading was arranged and paid for by IWAI (loading at Varanasi MMT) respectively the Consultant La Mer Maritime (P) Ltd (unloading at Kolkata GR Jetty).

First mile transportation from the different origins to the loading site at Varanasi MMT, Uttar Pradesh as well as last mile transport from the unloading site at Kolkata GR Jetty, West Bengal to the shipments' final destinations were arranged by the Consultants. Corresponding costs were paid directly to the corresponding trucking and trailer companies.

As to the financial viability of the agreed freight costs it must be noted that IWAI acted as barge operator. However from the shippers' perspectives, it can be assumed that a given total lump-sum freight rate of INR 450,000 excluding additional costs for first and last mile transport constitutes an economically efficient alternative to land based transportation.

Table 1 below shows the major cost items of the 15th pilot movement.

Table 1: Freight and Transport Charges

Position (Cost Item)	Charges (excl. Service Tax)
First mile transport to Varanasi MMT, Uttar Pradesh	IFFCO: INR 96,600 PepsiCo: INR 108,000 Dabur: INR 4,600
Loading at Varanasi MMT, Uttar Pradesh	NA
Vessel transport freight charges	INR 450,000 (lump sum)
Discharging at Kolkata GR Jetty, West Bengal	INR 59,000
Last mile transport from Kolkata GR Jetty, West Bengal	IFFCO: INR 80,000 PepsiCo: INR 48,000 Dabur: INR 16,000

Source: The Consultants 2019

4 Operational Aspects

The 15th pilot movement covered the transport of 16 twenty-foot containers loaded with bagged urea fertiliter as well as bagged food products on the 1,168 kilometers stretch from Varanasi, Uttar Pradesh to Kolkata GR Jetty, West Bengal. The given transport is thereby the first movement of consolidated freight from different shippers conducted within the scope of the current project on Commercialization of NW-1. Moreover, by providing return cargo, it directly ties in with the previous 14th pilot transport, thus ensuring an optimal utilization of the employed inland vessel.

The overall duration of the pilot movement including time for loading and unloading as well as the corresponding first and last mile transports amounted to 10 days. Throughout all stages of the transport the movement was closely monitored by the Consultants' local teamin order to ensure early detection of potential hurdles and bottlenecks and to prevent major organizational or operational delays.

The containers used for the 15th pilot movement were the same that were used during the preceeding upstream transport (14th pilot movement). Following the unloading of the cargo at PepsiCo's Varanasi warehouse, the then empty containers were therefore redistributed to the different loading locations at Phulpur, Uttar Pradesh (IFFCO, eight containers), Kanpur Dehat, Uttar Pradesh (PepsiCo, six containers) and Shivdaspur, Uttar Pradesh (Dabur, two containers) for loading of the return cargo. On 16th October 2017 the packed containers were then trucked to the Varanasi MMT for loading onto IWT barge MV Rabindra Nath Tagore. Approximate first mile distances amounted to 130 kilometers (IFFCO), 380 kilometers (PepsiCo) and 15 kilometers (Dabur).

Official documentation issued for the pilot movement included a cargo manifest that had been signed by the master as evidence for the cargo quantity on board. Moreover, a survey on the condition of the containers and a loading supervision survey on cargo and containers safety were conducted.

Table 2 below presents a summary of information on the movement.

Table 2: Pilot Movement at a Glance

Route	Varanasi MMT – Kolkata GR Jetty
Shipper	IFFCO, PepsiCo India, Dabur
Vessel Operator	IWAI
Vessel Name	MV Rabindra Nath Tagore
Commodity	Containerized cargo
Cargo Quantity	16 TEU (approx. 160 metric tons net)
Distance on NW-1	1,168 km
Loading at Varanasi MMT, Uttar Pradesh	17|11|2018 – 17|11|2018
Departure at Varanasi MMT, Uttar Pradesh	17|11|2018
Arrival at GR Jetty, West Bengal	24|11|2018
Unloading at GR Jetty, West Bengal	25|11|2018 – 25|11|2018

Source: The Consultants 2019

4.1 Loading Procedure

Following first mile transportation over a distances between 15 kilometers and 380 kilometers, loading operations at the Varanasi MMT started at 04:30 am in the early morning hours of 17th November 2018 and were completed within one hour. Loading thereby involved the use of the terminal's new shore-mounted cranes that are equipped with spreader equipment for safe and fast handling of containers. On board of MV Rabindra Nath Tagore, the containers were stacked in two layers of eight containers each.

Figure 1 below shows the site of the loading location at the Varanasi MMT, Uttar Pradesh.

Figure 1: Loading Location

Source: The Consultants 2019, based on Google Earth

Figure 2 below provides illustrations of the loaded inland vessel MV Rabindra Nath Tagore while en route from Varanasi MMT to Kolkata, West Bengal.

Figure 2: Loading operations

Source: The Consultants 2019

4.2 In-transit Procedure

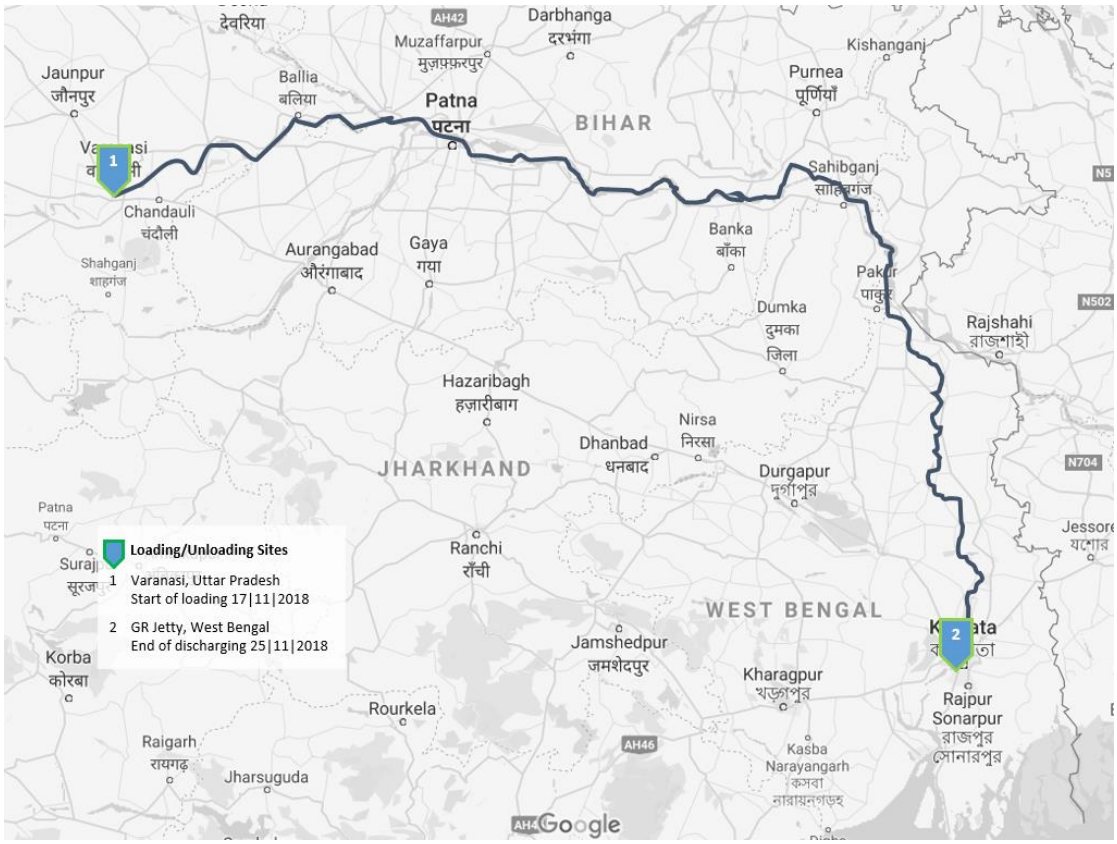
Loaded with 16 TEU containers of cargo, inland waterway vessel MV Rabindra Nath Tagore departed Varanasi MMT, Uttar Pradesh for Kolkata, West Bengal on the morning of 17th November 2018 at 08:55 hours.

Due to good navigational conditions and sufficient water levels on all relevant sectors of the Ganga River, the pilot movement was able to operate without significant restrictions. After passing Farraka Lock, MV Rabindra Nath Tagore continued its journey on NW-1's southern Hooghly River part until reaching the movement's final destination at Kolkatta GR Jetty, West Bengal. Throughout the journey no en route groundings or other sever disturbances occurred and the movement generally operated within the planned time schedule. Due to missing night navigation infrastructure, barge operations were however restricted to day light hours only.

After arrival at Kolkata GR Jetty on 24th November 2018 at 17:30 hours, unloading was delayed due to temporal unavailability of the berth.

Figure 3 below provides a map of the IWT movement plan covered by this pilot transport from Varanasi, Uttar Pradesh to Kolkata, West Bengal.

Figure 3: Movement Plan



Source: The Consultants 2019, based on Google Maps

Figure 4 below shows MV Rabindra Nath Tagore during unloading at Kolkata GR Jetty, West Bengal after arrival from Varanasi, Uttar Pradesh.

Figure 4: Cargo Vessel MV Rabindra Nath Tagore

Source: The Consultants 2019

4.3 Unloading Procedure

Following the pilot movement's arrival at Kolkata GR Jetty, West Bengal on 24th November 2018, unloading of the containers started on 25th November 2018 at 14:15 hours and was completed by 18:20 hours.

Handling operations involved the use of a shore mounted mobile crane. Unlike to the new and permanently available cranes at Varanasi MMT, no spreader equipment was available for unloading of the containers. Steel cables thus had to be used to secure the containers to the mobile crane. Once unloaded from inland vessel MV Rabindra Nath Tagore the containers were directly loaded onto trucks for last mile transport to the individual shipments' final destinations in the Kolkata metropolitan area. In the case of the IFFCO containers last mile transport covered a total distance of 55 kilometers compared to transport distances of approximately 40 kilometers each for both the PepsiCo and the Dabur shipments. All containers reached their final destination within the evening of 25th November 2018.

Figure 5 below shows the unloading site of the 15th pilot movement at Kolkata GR Jetty, West Bengal.

Figure 5: Unloading Location

Source: The Consultants 2019, based on Google Earth

Figure 6 below provides illustrations of the handling operation at Kolkata GR Jetty, West Bengal. The containers were loaded directly onto waiting trailers for last mile transport.

Figure 6: Unloading Operations

Source: The Consultants 2019

5 Experiences and Findings

During the 15th pilot movement several issues have been documented by the Consultants' local team. These include in particular:

- Empty containers were picked up from PepsiCo warehouse at Varanasi and brought to Phulpur, Uttar Pradesh (IFFCO), Kanpur Dehat, Uttar Pradesh (PepsiCo) and Shivdaspur, Uttar Pradesh (Dabur) for stuffing of return cargo.
- Stuffed containers were then moved from the respective loading sites to Varanasi MMT, Uttar Pradesh. Containers got loaded from trailers onto inland vessel MV Rabindra Nath Tagore using IWAI's new cranes with spreader equipment.
- Vessel moved from Varanasi MMT, Uttar Pradesh to Kolkata GR Jetty, West Bengal. Unloading was delayed as vessel Rabindra Nath Tagore could not get alongside due to temporary unavailability of suitable jetty at destination Kolkata GR Jetty.
- At Kolkata GR Jetty containers were unloaded from inland vessel onto trailers. Trailers were then moved to PepsiCo Kolkata, IFFCO Howrah and Dabur Kolkata for stripping of cargo.
- No night navigation throughout channel from Varanasi, Uttar Pradesh to Kolkata, West Bengal on NW-1.
- Vessel was safe i.e. no grounding from Varanasi, Uttar Pradesh to Kolkata, West Bengal on NW-1.
- Vessel maintained average speed of more than 7 knots and reached on time at Kolkata GR Jetty.
- No gap funding required for this containerized pilot movement.
- Suitable crane and loading arrangement required at Kolkata GR Jetty for faster and smooth operation for container handling.

6 Recommendations

Based on the findings of the 15th pilot movement on the transport of containerized cargo from Varanasi, Uttar Pradesh to Kolkata, West Bengal, the following actions are recommended:

- Take measures to improve handling of containers at Kolkata GR Jetty, West Bengal.
    - Suggestion: Ensure permanent availability of adequate crane equipment and spreader for fast and safe container handling.

- Ensure technical and operational feasibility of night time navigation on NW-1.
    - Suggestion: Improve navigational aid infrastructure (inter alia navigation lights) on all stretches of NW-1.

- Pre-coordinate availability of berths at major IWT terminals.
    - Suggestion: Constantly monitor progress of movements and pre-coordinate availability of berths, e.g. by slowing down movements en route if planned berth at destination is occupied by another vessel or temporarily unavailible.

7 Conclusion

The given summary report provides insight into the operational proceedings of the 15th pilot movement conducted within the scope of the current project on Commercialization of NW-1, the efforts undertaken to initiate it and the insight gained from the transport. As the second transport of containerized freight, the given pilot movement from Varanasi, Uttar Pradesh to Kokata, West Bengal comprised a total of three individual shipments and involved well-known shippers such as IFFCO, PepsiCo and Dabur. By consolidating a number of smaller freight lots into one vessel departure, the given pilot movement thus demonstrates the specific advantages that containerized transports offer for the utilization of vessel capacity.

Providing direct return cargo to a previous upstream container movement from Kolkata, West Bengal to Varanasi, Uttar Pradesh (see summary report on the 14th pilot movement), the given transport ensured an optimal utilization of inland vessel MV Rabindra Nath Tagore and the employed containers, inter alia by making a repositioning of an empty vessel superfluous. Smoothly operating within the anticipated time schedule and without severe disturbances, the 15th pilot movement moreover demonstrated both the technical and operational capabilities that IWT on NW-1 offers under the good environmental conditions prevailing at the time of the transport.

Despite a generally fast and smooth operation, the given transport nevertheless highlights some fields of action that may be addressed in order to safeguard the future sustainable development of IWT. By operational nature and due to the geographic course of NW-1, IWT movements will generally require longer transport times than land based alternatives. As to the given shipments of IFFCO, PepsiCo and Dabur, direct transportation by road or rail would e.g. have taken approximately 35 hours to 48 hours compared to ten days by IWT. Reliable infrastructural conditions en route and in the terminals as well as the availability of suitable equipment for an efficient and fast cargo handling are thus of particular importance in order to improve IWT's overall competitiveness.

Whereas earlier pilot movements on the transport of bagged or bulk cargo often involved time intensive manual loading and unloading, the use of containers in combination with modern crane equipment allowes for notably faster and more efficient handling operations. However, whereas the new and permanently available cranes at the Varanasi MMT are equipped with spreader equipment for fast and efficient handling of containerized cargo, no such equipment is currently available at Kolkata GR Jetty. Ensuring the availability of adequate cranes with spreader equipment at all major IWT loading sites would help to improve both the safety and efficiency of container handling and promote the transport of containerized cargo by IWT.

In order to mitigate waiting times and reduce en route fuel burn, a centralized pre-coordination of vessel movements on NW-1 and handling times at the waterway's main terminals may be considered if IWT traffic further increases in the coming future. In the case of the given pilot transport, temporal unavailability of the berth at Kolkata GR Jetty, West Bengal resulted in a delayed unloading of cargo. Early notification and live updates on berth availability ahead of arrival at a specific terminal would thereby allow for interim reductions in vessel speed, thus averting waiting times of vessels and reducing fuel burn.