BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

AT ITS PRINCIPAL BENCH AT NEW DELHI

(Application under Sections 18(1) read with section 15

of the National Green Tribunal Act, 2010)

APPLICATION NO. _____ OF 2014

IN THE MATTER OF:

1. **BIJAY KRISHNA SARKAR**

   H-47, B.P. Upanagari,

   Kolkata-700094

2. **ASHISH KUMAR THAKUR**

   Q-74, Baishnabghata Patuli Township

   Kolkata-70009

3. **DR. BHARAT JHUNJHUNWALA**

   Lakshmoli, P.O. Maletha, Kirti Nagar

   Uttarakhand- 249161

4. **TARUN SENGUPTA**

   Harmony Housing, 2nd Floor, Elite Corner

   English Bazar, Malda

   West Bengal- 732101

5. **DEBADITYO SINHA**

   943-A/8, III Floor, Govindpuri

   New Delhi-110019

6. **ANIL PRAKASH**

   Jaiprabha Nagar, Majhaulia Road,

   Muzzafarpur- 842001

7. **DEBASIS BANDYOPADHYAY**

   P.O. Raghunathganj, Dist. Murshidabad

West Bengal-742225

8. **OM DUTT SINGH**

   58 MG Marg, Allahabad

   Uttar Pradesh

9. **SURESH NISHAD**

   Village Beekar, Tehsil Bara

   District Allahabad

   Uttar Pradesh… … … … … …. ….. ….**APPLICANTS**

VERSUS

1. **INLAND WATERWAYS AUTHORITY OF INDIA**

   Through its Chairman

   Head Office, A-13, Sector -1, Noida,

   Uttar Pradesh- 201301

2. **KOLKATA PORT TRUST**

   Through its Chairperson

   Head Office 15, Strand Road,

   Kolkata - 700 001

3. **DEPARTMENT OF IRRIGATION**

   Through its Principal Secretary

   Government of Uttar Pradesh

   Sinchai Bhawan, Lucknow

4. **FARAKKA BARRAGE PROJECT**

   Through its General Manager

   PO Farakka Barrage Project

   Dist Murshidabad West Bengal 742212

5. **TEHRI HYDRO DEVELOPMENT CORPORATION INDIA LIMITED**

Through its Managing Director

Corporate Office, Rishikesh

Pragatipuram, By Pass road

Rishikesh -249201 (Uttarakhand)

6. **UTTARAKHAND JAL VIDYUT NIGAM LTD**

Through its Chairman

Maharani Bagh

G.M.S. Road,

Dehradun- 248006, Uttarakhand

7. **JAIPRAKASH VENTURES POWER LIMITED**

Through its Chairman

Sector-128, Noida

Uttar Pradesh-201304

8. **ALAKNANDA HYDRO POWER COMPANY LTD**

Through its Managing Director

Srikot, Srinagar, Dist Pauri,

Uttarakhand 246174…. …. ….. ….. ….. ….. **RESPONDENTS**

I. The address of the counsel for the Applicants is given below for the service of notices of this Application.

II. The addresses of the Respondents are given above for the service of notices of this Application.

III. That the present application is being filed before the Hon'ble Tribunal seeking relief and compensation for the irreparable damage caused to the National river Ganga by hydraulic structures at Uttarakhand, Uttar Pradesh, and West Bengal which have resulted into severe loss to the livelihood of fishermen owing to loss of fisheries, loss of land due to erosion, sedimentation and outflanking of river, irrecoverable loss to the biodiversity, destruction of land

and houses resulting into displacement of large number of people living along the banks of the river and deprivation of other non-use values and ecosystem services delivered by this holy river.

FACTS

1. The Ganges is one of the most important river systems in India. This 2525 km long river has a basin covering 861,404 square km. Currently, half a billion people, almost one-tenth of the world's population, live within the river basin. The major part of the country's population depends on the river for fulfillment of their direct and indirect benefits. The applicants submit that these benefits have been greatly hampered due to the construction of hydro engineering structures like dams, barrages and embankments. All these hydro engineering structures are allegedly made to serve the larger national interest. However, many costs have been imposed on large number of people residing in the Ganges Basin including pilgrims, poor people residing on banks of the Ganga and the fishermen communities. The projects which include engineering structures like Hydro Electric Projects (HEPs), Barrages, Reservoirs, activities taken for navigation of ships like dredging, and activities undertaken for abstracting water for irrigation through diversion structures etc. are all responsible for the damage incurred by the people and occurred to the river eco-systems.

2. That the applicant No. 1 is a resident of Kakdwip, West Bengal lying on the mouths of the Ganga. He is a retired school teacher and has been working with Bengal Fishermen and Fish Workers Union. Applicant No.2 is resident of Kolkata, West Bengal and is actively involved in organizing health camps among fishermen communities. Applicant No. 3 is former Assistant Professor of Indian Institute of Management, Bengaluru. He has been actively campaigning against the environmental impacts of hydropower projects in Uttarakhand. Applicant No 4 Tarun Sengupta is an Assistant Professor South Malda College, Malda, West Bengal. Applicant No 5 is an alumni of Banaras

Hindu University, Mirzapur Campus. He is a Masters in Environment Science and Technology and has been working extensively in the field of protection and conservation of environment. He has been involved with students at BHU South Campus in leading protests against indiscriminate abstraction of water from the Ganga. Applicant No. 6. is a resident of Muzaffarpur, Bihar. He has been active in organizing campaigns among fishermen communities for seeking their rights. Applicant No. 7 is an Assistant Professor, Department of Commerce, Dumkal College based in Basantpur, Murshidabad. He is involved in creating awareness among communities regarding conservation measures. The applicant No. 8 is a member of People's Union of Civil Liberties. He has been active in organizing awareness campaigns among the local communities. and has taken substantial efforts for protecting the rivers and forests in Vindhyanchal range. Applicant No 9 is a fisherman and sand mine worker and is also Vice President of All India Kisan Mazdoor Sabha.

3. That all the applicants are "person aggrieved" as mentioned under section 18 (1) (e) of the NGT, Act. It is submitted that the applicants are representing the cause of all such people who are affected by the environmental damage caused to the river Ganga. This Hon'ble Tribunal in the case of **Vimal Bhai & Ors. V/s Union of India & Ors.** decided on 14.12.2011 has considered the term "***person aggrieved***" while taking into account all the statutory provisions of the NGT Act i.e. the Preamble, Sections 14, 15, 18 and 20 of the NGT Act as well as the constitutional provisions i.e. Article 51-A and 48-A of the Constitution of India and clearly observed that the constitutional provisions require that the State shall endeavor to safeguard the environment and wildlife and also casts a fundamental duty on all the citizens to improve the natural environment including forest, lake, rivers etc. Once, the Constitution of India puts a fundamental duty on all the citizens for making an effort towards protection and improvement of the natural environment, any person can approach the tribunal and agitate his grievances as to protection and improvement of the natural environment. It was clarified by the Hon'ble

Tribunal that the term 'persons' as defined or the 'person aggrieved' as occurs under the NGT Act cannot be placed above every citizen as appears in Article 51-A of the Constitution of India and therefore, the Hon'ble Tribunal held that the term 'person aggrieved' in the environmental practice must be given liberal construction and needs to be flexible. In view of the said interpretation by the Hon'ble Tribunal itself, it is clear that the applicants are very much the person interested and aggrieved in the present case and therefore in pursuance of their rights are filing and pursuing the present application under Section 15 of the NGT Act.

4. That the Respondent No. 1 is the statutory authority in charge of the waterways in India. It is responsible for development and regulation and maintenance of the Inland waterways for shipping and navigation. It undertakes dredging that leads to damages to people and environment. Respondent No. 2 regulates the sea borne overseas/coastal trade and is responsible for conserving and maintaining the entire river regime within its jurisdiction. It is dredging the Lower Ganga and also making intrusive structures like underwater guide wall that obstruct the natural flow of the river and lead to damages to people and environment. Respondent No. 3 is responsible for making and regulating the irrigation barrages including the Lav Kush Barrage at Kanpur, Madhya Ganga Canal Project in Bijnor, Lower Ganga Canal Project in Narora, Upper Ganga and East Ganga Canal Project in Bhimgoda in Haridwar. These barrages are diverting water and sediments in large amounts leading to loss of fisheries and to coastal erosion due to sediment deprivation. Respondent No. 4 Farakka Barrage Project (FBP) located in Murshidabad has constructed the Farakka Barrage in the year 1975 for diverting water from Ganga to Hooghly river. This barrage has led to pondage upstream and release of water at high velocity downstream leading to erosion both upstream and downstream. The Farakka Barrage has also deprived the Hooghly of sediments leading to coastal erosion. The Feeder Canal made by FBP has created an obstruction to the flow of rivers coming

into the Hooghly from the west and led to flooding and waterlogging. Respondent No. 5 to 8 are hydropower companies which operates the following projects in Uttarakhand:

i. Tehri HEP and Koteshwar HEP on river Bhagirathi in District Tehri by Respondent No. 5.

ii. Maneri Bhali (Stage 1 and 2) on river Bhagirathi in Uttarkashi and Chilla HEP on river Ganga in Rishikesh by Respondent No. 6.

iii. Srinagar HEP on river Alaknanda in Garhwal district by Respondent No. 7

iv. Vishnu Prayag HEP project on river Alaknanda in Chamoli district by Respondent No. 8.

These projects have obstructed the migratory path of the fishes and led to loss of fisheries and to loss of biodiversity. The hydro engineering structures made by Respondents Nos 1 to 8 have all obstructed the free flow of River Ganga and deprived the people of the country, pilgrims in particular, of the non-use values of free flow of this river.

5. That the applicants herein through the present application are seeking compensation from the abovesaid respondents that are jointly and severally liable for the loss incurred by the fishermen, people living on the banks of the Ganga and the pilgrims and people of the country who have a non-use value for free flow of the Ganga River and destruction caused to the river ecology that has resulted in deterioration of its water quality. The applicants submit that all the respondents are legally responsible for the ecological, economic and environmental loss in accordance with the Polluter Pays Principle and are therefore liable to pay the compensation commensurate to the damage done.

6. That the applicants are highlighting the following reasons which are responsible for causing damage to the river ecosystem:

6.1 Loss to Fisheries

The river does not serve as a good habitat for fish at the present time which has also led to a great loss to the livelihood of the fishermen. It is submitted that in the last two decades there has been a substantial decrease of fisheries in the river. Among the species on the decline, one of the marked species is Hilsa in the lower reaches and Mahseer in the upper reaches. The applicants submit that major reason for the decrement of hilsa, prawns and other migratory species is the construction of the hydraulic structures on the river. These structures obstruct the migratory pathways of the fishes which result into their gradual reduction. The Farraka Barrage at West Bengal is responsible for the reduced migration of the hilsa. The dredgers and ships of the Inland Waterways Authority of India also cause disturbance to the fish habitats. Further, the abstraction of water by the barrages at Kanpur, Narora and Bijnor in Uttar Pradesh, the Pasulok Barrage and Bhimgoda barrage in Uttarakhand cause reduction in the water flow which disturbs the river continuity and leads to habitat destruction. The applicants are relying upon the following research findings to point out the negative impacts of the projects and navigational activities on the fisheries:

6.1.1 The report 'The Health of Inland Aquatic Resources and its Impact on Fisheries' published by CIFRI, February-2014, highlights the various impacts of hydro-engineering activities on fisheries as follows:

i) "…….The potential of the lower reaches of the river Ganga is estimated at 198.3 kg/ha/yr whereas the actual yield is 30 kg/ha/yr and thus only 15.2% of the production potential is harvested. This is because the rivers are degraded and do not serve as a good habitat for fish.

ii) …… Dams have become a major impediment in ensuring continuous freshwater flow in rivers. A significant portion of the

major, medium and minor rivers have been fragmented by dams several times impacting the river flow especially during the non-monsoon months. As a result the habitat requirements of fishes in the rivers for feeding, migration, spawning and growth have been irreparably altered impacting fishery.

iii) …….. Hilsa is a classic example of anadromous fishes being affected due to obstruction of their migratory pathways by dams. The natural migratory range of these fishes is 1500 km from the Hooghly estuary to Allahabad on the Ganga. The 1975 construction of the Farrakka barrage at the head of the Bhagirathi and Padma tributaries of the Ganga, some 470 km from the river mouth, has not affected the Hilsa fishing in the tidal stretch of the delta. However, the barrage has nearly eliminated the riverine fishery upstream of Farakka on the main stream of the Ganga, a fishery, which was based on runs of both Padma & Hooghly stocks.

iv) ……..River training and withdrawal of water (abstraction) also affect the flow regime of water in the rivers affecting the life habits of the organisms. The large scale abstraction alters the water quality by reducing the load bearing capacity of downstream water. Although, water abstracted for the various need are drained back into the water system, but it is contaminated by a variety of substances detrimental to aquatic life. The dams, barrages, rivers and other hydraulic structures constructed on riverine ecosystem disturb the river continuity. The discharge downstream is reduced leading to habitat destruction both downstream and upstream. The migratory pathways of fishes are obstructed.

v) ……Canal projects and flood control measures are the two major factors that are especially responsible for destruction of breeding habitat for major carps (Natarajan, 1989). The spawning grounds of Indian major carps are situated in the flood plains, which are inundated during the monsoon. ……..Breeding and recruitment are seriously hampered when the water level in the streams does not reach the spawning ground due to inadequate discharge rate."

Copy of the relevant extracts from the report titled as 'The Health of Inland Aquatic Resources and its Impact on Fisheries' published by CIFRI, February-2014 is marked and annexed as **Annexure A-1**.

6.1.2 That a study is undertaken by the World Fish Centre where the decreasing trend of fish catch at three selected centre (Allahabad, Patna and Bhagalpur) on River Ganga between years 1958 and 1997 is compared. It is observed that Major carp and hilsa has declined consistently through the periods at the three centers (Allahabad, Patna & Bhagalpur) while catfish landings have also declined consistently through the periods except for Bhagalpur. The table given below shows the decline of the fish species in the aforementioned periods as provided in the study.

Allahabad								
Fish	1958-59 to 1965-66	%	1973-74 to 1985-86	%	1989-90 to 1994-95	%	1996-97	%
M.Carps	91.35	44.5	40.44	28.7	11.04	11.5	4.94	8.3
Catfish	46.66	22.7	30.82	21.9	21.5	22.5	14.28	24.1
Hilsa	19.94	9.7	0.87	0.6	0.92	1	2.47	4.2
Misc	47.48	23.1	68.79	48.8	62.1	65	37.61	63.4
Total	**205.43**		**140.92**		**95.56**		**59.3**	

Patna			
	1986-89	1990-93	1996-97
Total	57.73	37.7	18

Bhagalpur						
Fish	1958-59 to 1965-66	%	1973-74 to 1983-84	%	1996-97	%
M.Carps	16.6	18.2	10.06	10.8	7.31	20.4
Catfish	19.43	21.4	25.21	27.1	14.91	41.7
Hilsa	4.08	4.5	0.87	0.9	0.38	1.1
Misc	50.82	55.9	56.96	61.2	13.2	36.8
Total	**90.95**		**93.9**		**35.7**	

Copy of the relevant extracts from the study undertaken by World Fish Centre is marked and annexed as **Annexure A-2**.

6.1.3 That similarly another study done by Central Inland Fisheries Research Institute, titled as 'The Environment and Fishery Status of the River Ganges' which is published in journal of Aquatic Ecosystem Health and Management, 2010 indicates that the estimated average catch per kilometer of the river at Allahabad, recorded by CIFRI, shows that in the 1950s the catch was 1344 kg/km, declining to 362 kg/km during the 2000s. The report states:

> “The catch of major carps declined drastically; Hilsa disappeared from the catch and exotic fishes (Tilapia and common carp) have started appearing in the 2000s. Hilsa, Tenualosa ilisha, formed a major fishery in Ganga until the 1960s (De, 2001). The Farakka barrage, commissioned during 1971 at Farakka obstructed the migration of hilsa, collapsing the fishery in the river above the barrage. The mean landing of hilsa along Allahabad, Buxar and Bhagalpur stretches, upstream of Farakka declined to negligible

levels (Figure 4), a glaring example of impact of river modifications. The fishery now thrives only downstream of the barrage. The estimated production potential of Ganges, in its lower reaches, has been estimated at 198 kg/ha/year, whereas the actual fish yield has been 30 kg/ha/year. Thus, only 15.2% of the potential has been available as fish (Sinha, 1999)."

Copy of the relevant extract of the study done by Central Inland Fisheries Research Institute, titled as 'The Environment and Fishery Status of the River Ganges' published in journal of Aquatic Ecosystem Health and Management, 2010 is marked and annexed as **Annexure A-3**.

6.1.4 That the Report of the Working Group on Fisheries and Aquaculture of the 12th Five Year plan acknowledges, "Water abstraction for irrigation and power generation is perhaps the biggest reason (for problems of inland fisheries), causing reduced or no flow in the main channel to support fisheries and other riverine fauna and flora."

Copy of the relevant extract from the Report of the Working Group on Fisheries and Aquaculture of the 12th Five Year plan is marked and annexed as **Annexure A-4**.

6.1.5 As per the Cumulative Impacts of Hydropower Dams on Alaknanda & Bhagirathi Rivers on Aquatic and Terrestrial Ecosystems, Wildlife Institute of India, 2012- dams on the Bhagirathi have already impacted migration of fish to a great extent. The report states:

"Dams serve as a physical barrier to movement of migratory species, notably fish. This prevents brood-stock from reaching their spawning grounds during the breeding season, resulting in massive failure of recruitment and eventual extinction of the stock above the dam (Berkamp et al.,2000). Many river adapted

> fish and other aquatic species cannot survive in artificial lakes; changes in downriver flow patterns adversely affect many species and water quality deterioration in or below reservoirs can kill fish and damage aquatic habitats. Freshwater molluscs, crustaceans, and other benthic organisms are even more sensitive to these changes than most fish species, due to their limited mobility."

Copy of the relevant extracts from the report titled as "Cumulative Impacts of Hydropower Dams on Alaknanda & Bhagirathi Rivers on Aquatic and Terrestrial Ecosystems, Wildlife Institute of India, 2012 are marked and annexed as **Annexure A-5.**

6.1.6 That as per the report published by South Asia Network for Dams, Rivers and People on 'Dolphins of the Ganga: Few fading, fewer frolicking', December 2011 it is specifically stated that:

> "….in the northern Ganges tributaries at least three of six subpopulations that were isolated by barrages have recently disappeared.
>
> Many individuals swim downstream through barrage gates during the wet season, but are unable to return in the dry season due to strong downstream hydraulic forces at the gates. Further declines are expected as more barrages are planned and are under construction throughout the species' range. The large number of hydropower projects under construction and planned in various tributaries of the Ganga also threaten the species.

Copy of the relevant extracts from the report published by South Asia Network for Dams, Rivers and People on 'Dolphins of the Ganga: Few fading, fewer frolicking', December 2011 is marked and annexed as **Annexure A-6.**

6.1.7 A US army Corps of Engineers article on the barrages on the Mississippi says that “in the late 1980s large beds of underwater plants, such as wild celery, all but disappeared in much of the Upper Mississippi. While some plant beds have partially recovered, they may never return to their previous state, taking with them thousands of acres of habitat for young fish and the small animals that fish and other wildlife eat”. The growth of Water Hyacinth upstream of Farakka indicates similar impact in India.

Photographs showing prolific growth of Water Hyacinths upstream of Farakka is marked and annexed as **Annexure A-7** and the article of US army Corps of Engineers on the barrages on the Mississippi is marked and annexed as **Annexure A-8**.

Considering the abovementioned reports, the applicants submit that the dams and barrages have not only obstructed the movement of aquatic animals, but has also led to extinctions in some stretches. There are instances where exotic invasive species are making way to the native species of Ganga. In Uttarakhand and Uttar Pradesh huge amount of water is being diverted at Upper Ganga and East Ganga Canal Project in Bhimgoda (534 m^3/s), Madhya Ganga Canal Project in Bijnor (234 m^3/s), Lower Ganga Canal Project in Narora (157m^3/s) and Pashulok barrage (560 m^3/s in Rishikesh. These projects on the river Ganga are responsible for breaking continuity of river, deprive the river from its natural waters and affect habitat, migration and spawning of fishes. The applicants submit that the fishermen community is one of the largest affected community from the hydro-engineering activities being done on the river. It is submitted that the dams and barrages have led to increased impoundment of water and reduced velocity of flow in the river causing destruction to fisheries. Further, the ships and dredgers of the Inland Waterways Authority of India are also responsible for

creating noise and unsettling the river bed causing disturbance to the fish habitats.

Copy of the relevant extracts from Status Paper of River Ganga published by Ministry of Environment and Forests, August 2009 and the relevant extract downloaded from the website http://www.uttarakhandjalvidyut.com/cms_ujvnl/chilla.php, with respect to abstraction of water by the abovesaid barrages is marked and annexed as **Annexure A-9 (Colly).**

6.1.8 Quantification of loss caused to Fisheries:

As per the paper “Trade and commerce of shell fishes and their role in economy of the people of Kosi river basin of North Bihar” published in the International Biaanual Journal of Environmental Sciences, there are around 20,000 primary, 8,000 secondary and 4,000 tertiary fishermen per district on the main stem of Ganga in Bihar. The said publication is marked and annexed herewith as **Annexure A-10**.

Based on the data provided, the applicant No. 3, who is a trained economist, has quantified the same as equivalent to about 25,000 primary fishermen. The daily earning of a fishermen is by Applicant No 6, who has been working for rights of the fishermen for last 20 years, as Rupees 400 per day for 240 days in a year. Thus, the decrease in earnings has been quantified as follows:

i. West Bengal and Jharkhand – Total No of affected fishermen in District Malda and Sultanganj is about 25,000 each. The reduced migration of hilsa and prawns due to Farakka Barrage leads to decrease of Rupees 200 per day as quantified by Applicant No 6. Thus, the total loss amounts to: 25,000 fishermen x Rs.200/day x 240 days/year = Rs. 120 crores/ year. This loss is mainly due to Farakka Barrage. Since the dredgers and ships of

IWAI are also creating disturbance to fish habitat by creating noise and unsettling of the riverbed, the loss in this area is apportioned in ratio of 90 percent to Farakka Barrage and 10 percent to IWAI. Thus, the loss claimed is Rs. 108 crores/year from Farakka Barrage Project and Rs. 12 crores/year from Inland Waterways Authority of India.

ii. Bihar (damage caused in 10 districts i.e Buxar to Bhagalpur) – Considering 25,000 fishermen for each district, the total number of affected fishermen equals to 2,50,000. In these areas the reduced migration of Hilsa and Prawns due to Farakka leads to decrease but the impact is less than West Bengal due to more distance. On the other hand, the loss due to less flows due to abstraction of water by irrigation barrages at Kanpur, Narora, Bijnor and Bhimgoda developed by Department of Irrigation, UP is more. The decrease in income from both sources is quantified at Rupees 200 per day by Applicant No 6. Thus, the total loss amounts to:

2,50,000 fishermen x Rs.200/day x 240 days/year = Rs. 1,200 crore/year. This loss is apportioned as follows:

a) Loss due to prevention of migration of Hilsa and other migratory fishes due to Farakka Barrage Project = 20% or Rupees 240 crores/year.
b) Loss due to disturbance of fish habitat by IWAI dredgers and ships = 10% or Rupees 120 crores/year.
c) Loss due to reduced flow of water and sediments due to abstraction by barrages at Kanpur, Narora, Bijnor and Bhimgoda developed by Department of Irrigation, Uttar Pradesh= 70% or Rupees 840 crores/year.

iii. Uttar Pradesh (Downstream): Between Allahabad and Ballia (7 districts including Allahabad, Bhadohi, Mirzapur, Chandauli,

Varanasi, Ghazipur, Ballia)- Considering 25,000 fishermen for each district, the total number of affected fishermen equals to 1,75,000 fishermen. There is reduced migration of Hilsa due to Farakka in this stretch leading to decrease in income but the impact is less than Bihar. On the other hand, the loss due to less flows due to abstraction of water by irrigation barrages of UP is more. The decrease in income from both sources is quantified at Rs. 200 per day. Thus the total loss amounts to:

175,000 fishermen x Rs.200/day x 240 days/year = Rs.840 crore/year. This loss is apportioned as follows:

a) Loss due to prevention of migration of Hilsa and other migratory fishes due to Farakka Barrage project= 20% or Rupees 240 crores/year.

b) Loss due to disturbance of fish habitat by IWAI dredgers and ships by creating noise and unsettling the riverbed which is the habitat for fishes = 10% or Rupees 120 crores/year.

c) Loss due to reduced flow of water and sediments due to abstraction by barrages at Kanpur, Narora, Bijnor and Bhimgoda developed by Department of Irrigation, Uttar Pradesh= 70% or Rupees 840 crores/year.

iv. Uttar Pradesh (Upstream): Between Haridwar and Allahabad (covering 19 districts approximately)- Considering 25,000 fishermen for each district, the total number of affected fishermen equals to 2,37,500. There is much less water in the river due to abstraction of water by the barrages made by Department of Irrigation, UP at Kanpur, Narora, Bijnor, Haridwar and Rishikesh. The reduced income is assessed as Rs.150 per day. Thus, the total loss amounts to: 2,37,500 fishermen x 150/day x 240 days/year = Rupees 854.4 crores/year. This loss is claimed from Department of Irrigation, UP.

v. Uttarakhand: Total number of affected fishermen in district Haridwar is quantified at about 5,000 by Applicant No 3 who is a resident of that State. The reduced income is assessed at Rupees 100 per day by Applicant No 3. Thus the total loss amounts to: 5,000 fishermen x Rs.100/day x 240 days/year = Rupees 12 crore/year. This loss is mainly due to the abstraction of water at Bhimgoda Barrage made by Department of Irrigation, Uttar Pradesh and Pasulok Barrage made by Uttarakhand Jal Vidyut Nigam Ltd, Respondent No. 6 herein. Therefore the loss is claimed by both the respondents in 50:50 ratio which is calculated as 6 crores each.

6.2 Loss to the Biodiversity

The Ganga River supports a rich fauna and flora, including the endangered Gangetic Dolphin, the national aquatic animal and several other protected species of aquatic animals. The riparian zone supports many plant species that are of both ecological and economic importance. Some play an important role in nutrient and water conservation and in controlling soil erosion, while many also possess important medicinal properties. The estuarine delta at Sundarbans, a UNESCO World Heritage Site, supports a wide variety of animal species including the single largest population of tiger, number of threatened aquatic mammals, endangered turtles and some 78 species of mangroves making it the richest mangrove forest in the world.

It is submitted that the Bhimgoda Barrage at Haridwar (water diverted to Upper Ganga Canal), Bijnor (Madhya Ganga Canal) and Narora (Lower Ganga Canal), Ganga Barage at Kanpur, the barrage at Farakka, and the hydropower projects on Upper Ganga divert large quantity of water throughout the year which adversely affects the biodiversity of the river Ganga.

6.2.1 That a study conducted by Shafi Noor Islam And Albrecht Gnauck, Bradenburg Brandenburg University of Technology, Cottbus, Germany, 2009 titled as “The Coastal Mangrove Wetland Ecosystems in the Ganges Delta: A Case Study on the Sundarbans in Bangladesh” states:

> “The Ganges water has reduced due to the construction of the Farakka Barrage in 1975 by India; salinity level has increased which is a high threat for mangrove wetland ecosystems.

It further points out:

> “The reduction of Ganges fresh water in the upstream area is the main reason of salinity intrusion in the southwestern part of Bangladesh. Therefore the result of increase salinity and alkalinity has damaged vegetation, agricultural cropping systems and changing the cultural landscapes in the Sundarbans region. The impact of soil starts with the destruction of surface organic matter and of soil fertility for mangrove plants production. The changes alter basic soil characteristics related to aerations, temperature, moisture and the organisms that live in the soil. The core elements of ecosystem such as soil, water, vegetation and wildlife are strongly affected due to fresh water shortage and human influences.”

Copy of the study “The Coastal Mangrove Wetland Ecosystems in the Ganges Delta: A Case Study on the Sundarbans in Bangladesh” is marked and annexed herewith as **Annexure A-11**.

6.2.2 That another study undertaken by the same authors titled as “Threats to the Sundarbans Mangrove Wetland Ecosystems from Transboundary Water Allocation in the Ganges Basin: A Preliminary Problem Analysis, M. Shafi N. Islam and Albrecht Gnauck, Department

of Ecosystems and Environmental Informatics, Brandenburg University of Technology at Cottbus, Germany, it has been specifically stated:

> “The Sundarbans ecosystem depends on the availability of adequate fresh water. However, the landscapes began to change during the early 19th century when part of the Sundarbans began to lose the saline fresh water balance. Salinity levels increased in the Sundarbans when intake-mouths of the Mathabhanga, Kobadak and other rivers that used to bring fresh water from the Ganges to the south were silted up and thus lost their connection with the Ganges. As a result, the regeneration of Sundari, the dominant timber species in the forest was reduced in the southwestern part of the Sundarbans. The already degraded environment became further imbalanced when India constructed the Farakka Barrage on the Ganges which is 17km upstream of Bangladesh border. The placement of the dam resulted in the diversion of more than half of the Ganges discharge to the Hooghly River via a feeder canal to improve navigation to the port city of Calcutta. With the commissioning of Farakka Barrage, the downstream discharge was drastically reduced;

The study further states:

> “The Ganges fresh water withdrawal in the upstream area in India resulted in three types of negative impacts in the downstream catchment. The problems are fresh water reduction, increase of salinity and disturbance of growth and habitat have been identified. As a result, the major environmental agents are affected which are rearranged in the structure (Fig. 5).After field investigation and from observations, it can be concluded that a deteriorating environment in the downstream including the

Sundarbans region of the coastal mangrove wetland ecosystems are being threatened."

Copy of the study titled as "Threats to the Sundarbans Mangrove Wetland Ecosystemsfrom Transboundary Water Allocation in the Ganges Basin: A Preliminary Problem Analysis, M. Shafi N. Islam and Albrecht Gnauck, Department of Ecosystems and Environmental Informatics, Brandenburg University of Technology at Cottbus, Germany is marked and annexed herewith as **Annexure A-12**.

6.2.3 A study supervised by U.K Choudhary and a professor of civil engineering R C Vaishya of Motilal Nehru National Institute of Technology (MNNIT), Allahabad in 2014 on diversion of water at Bhimgoda Barrage points out that Bhimgoda Barrage is diverting large quantity of the water throughout the year, to the extent of more than 95% during some of the period of the year, into Upper Ganga canals. Thus, meagre quantity of water is allowed to flow in the mainstream. The heavy diversion of water from a place continuously throughout the year has not been co-related with the environment management in the basin. Heavy diversion of water causes sudden decrease in dilution factor in the downstream that adversely affects natural self-purification process of the river. The sudden decrease in discharge also causes instantaneous fall in the level downstream of the barrage. This leads to loss in momentum and energy of the flow. With the diversion of more and more water from Ganga, groundwater level falls deeper in downstream. This may result into increase in the depth of dry soil zone in the basin. The increase in sedimentation and erosion with the decrease in discharge, indicates environmental problems in terms of rise in river bed, heavy sedimentation in flood plain, dissipation of kinetic energy and its proportionate enhancement in potential energy, causing floods/inundation even without much of rainfall.

Thus, the river diversion ultimately causes adverse impacts on the river biodiversity.

Copy of the newspaper report published in the Times of India dated June, 2014 highlighting the said study is marked and annexed as **Annexure A-13**.

6.2.4 That a 2014 study conducted by Jadavpur University's School of Oceanographic Studies and IIT Roorkee, as a part of IUCN's Ecosystem for life: A Bangladesh India Initiative it has been highlighted:

> "The present flow of freshwater in the Sunderbans is insufficient to maintain its unique ecosystem, with additional supply required to save the archipelago from degradation…

It is submitted that salinity intrusion has been increased gradually after post-diversion period by the upstream Farakka barrage. This situation has further aggravated by the decreasing upstream fresh water flow and siltation in the major channels meeting the estuary. Thus, salinity severely affects the biodiversity in this area.

Copy of the newspaper report published in The Hindu, dated 23rd November, 2014 highlighting the said study is annexed as **Annexure A-14**.

6.2.5 According to a study 'Freshwater fish biodiversity in the River Ganga (India): changing pattern, threats and conservation perspectives' published in journal 'Reviews in Fish Biology and Fisheries of Springer, May, 2011 it is stated that:

> "First time, a total of 10 exotic fishes, including Pterygoplichthys anisitsi, which has never been reported from India found in the Ganges. Alterations of the hydrological pattern due to various types of hydro projects was seem to be the largest threat to fishes of Ganges."

Copy of the relevant journal “Reviews in Fish Biology and Fisheries of Springer, May, 2011” is annexed herewith as **Annexure A-15**.

6.2.6 That the applicants submit that flow is a major determinant of physical habitat in streams, which in turn is a major determinant of biotic composition. Aquatic species have evolved life history strategies primarily in direct response to the natural flow regimes. Maintenance of longitudinal and lateral connectivity is essential to the maintenance of viability of populations of many riverine species. The invasion of exotic and introduced species in rivers is facilitated by the alteration of flow regimes. A research article published by Griffith University, Australia titled ‘Basic Principles and Ecological Consequences of Altered Flow Regimes for Aquatic Biodiversity’ in journal Environmental Management Vol. 30, of Springer-Verlag in 2002 gives a comprehensive establishments of the impacts due to the alteration to flow regimes on biodiversity citing more than 150 different internationally published research papers. The responses of biotic community to different alterations as discussed in the research paper are summarized as below:

Flow variables affected	**Biotic responses**
Increased stability of baseflow and reduction of flow variability	Excessive growths of aquatic macrophytes; Proliferation of nuisance larval Blackflies; Reduction in fish populations; Increased standing crop and reduced diversity of macroinvertebrates Favor populations of exotic fish species (carp, mosquitofish)

Erratic (diurnal) patterns in flow below hydroelectric dams	Reduction in species richness of benthic macroinvertebrates; Reduction in standing crop of benthic invertebrates, Stranding of macroinvertebrates, Stranding of fish
Conversion of lotic habitat to lentic	Decline of populations of riverine crayfish and snails, Elimination of salmonids and pelagic spawning fishes and dominance of generalist fish species; Loss of fisheries adapted to turbid river habitats; Loss of fisheries due to inundaton of spawning grounds. Proliferation of exotic fish species.
Rates of water level fluctuation	Aquatic macrophyte growth rates and seeding survival
Timing of spates	Reduced survivorship of arval atyid shrimps following early summer spates; Stable low flows required for spawning and recruitment of riverine fish
Reduced seasonality	Reduced synchrony of breeding in gammarid shrimps
Timing of rising flows	Loss of cues for fish spawning and migration
Short-term fluctuations in flows	Adverse effect on species of stoneflies with long larval development times

Modified temperature regimes below dams	Delayed spawning in fish; Disrupted insect emergence patterns; Reduced benthic standing crop; Elimination of temperature-specific species of fish
Water abstraction	Reduction in migrating shrimp larvae
Presence of in-stream barriers	Increased predation on juvenile migrating shrimp, Loss of migratory fish species
Reduced frequency, duration and area of inundation of floodplain wetlands	Reduced spawning areas and/or recruitment success of lowland river fish; Decline in waterbird species richness and abundance; Decline in wetland vegetation
Loss of wet-dry cycles and increased stability of water levels	Reduced growth ad survival of native aquatic macrophytes and increased invasion of exotics
Interbasin transfer of water	Transfer of shistomiasis; translocation of fish species

Copy of the research article published by Griffith University, Australia titled 'Basic Principles and Ecological Consequences of Altered Flow Regimes for Aquatic Biodiversity' in journal Environmental Management Vol. 30, of Springer-Verlag in 2002 is annexed herewith as **Annexure A-16.**

It is submitted that the operation of the Farakka Barrage has decreased the supply of freshwater to the southern regions of the Ganga and to the Sundarbans, allowing salinity intrusion several hundred miles upstream during the dry season. The Sundari tree, after which the

Sundarban is named, is one of many species to be adversely affected by this change. It is submitted that the impact from increase in salinity due to sea water ingress on biodiversity is seen to be severe due to the fragile ecosystem of Sunderban delta complex. As per the paper “Comparative Assessment of Environmental Flow Based on Salinity Intrusion and Fish Habitat Considerations published in the Department of Water Resources Engineering Bangladesh University of Engineering and Tech (BUET) Dhaka the allowable salinity for Sundari tree is 10-15 ppt. The same is marked and annexed as **Annexure A-17**.

However, the average salinity is increasing to 20 ppt and even 30 ppt in winters when water flow from Hooghly is less. As a result, the Sundari is not naturally regenerating in the Mangroves. Natural regeneration is natural growing of new young plants to replace the old plants that die a natural death. It is submitted that apart from disturbing the natural flora and fauna of the river, the groundwater salinity and conversion of fertile agricultural land on the river bank is now a major problem for the people.

6.2.7 Quantification of loss caused to Biodiversity

The stretch from the Hooghly estuary to Gangotri and Badrinath covers about 2325 km of river covering deltaic, middle and hilly regions. Since it is difficult to assess the loss to biodiversity in terms of money, the applicant No. 3 has quantified the same as Rupees 500 crores/year. The loss is apportioned to the following respondents:

i. Loss caused by the Farakka barrage project due to conversion of free flowing river into a reservoir upstream of Farakka and growth of water hyacinth and similar predatory flora and fauna. This loss is calculated as 10% of the total damage caused which amounts to Rs. 50 crores/year.

ii. Loss caused due to reduction in the water flow and trapping of sediments in Ganga Barrage at Kanpur, Madhya Ganga Canal Project in Bijnor and Lower Ganga Canal Project in Narora, Upper Ganga and East Ganga Canal Project in Bhimgoda in Haridwar. This loss is calculated as 50% of the total damage caused which amounts to Rs. 250 crores/year.

iii. Loss caused due to reduction in the water flow and changes in sediment flow regime and obstruction of migratory path of Mahseer by HEPs in Uttarakhand. This loss is calculated as 30% of the total damage caused which amounts to Rs. 150 crores/year. This is further apportioned to Respondents Nos 5 to 8 as follows:

Respondent No 5, THDC 50% of damage due to HEPs of Rs 150 crores = Rs 75 crores/year.

Respondent No 6, UJVNL: 20% of damage due to HEPs of Rs 150 crores = Rs 30 crores/year.

Respondent No 7, JVPL: 10% of damage due to HEPs of Rs 150 crores = Rs 15 crores/year.

Respondent No 8, UJVNL: 20% of damage due to HEPs of Rs 150 crores = Rs 30 crores/year.

iv. Loss due to disturbance of flow regime due to dredging by the Inland Waterways Authority of India. This loss is calculated as 10% of the total damage caused which amounts to Rs. 50 crores/year.

6.3 Damages from Erosion

6.3.1 **In Farakka area**

The Farakka barrage has resulted into massive devastation in Malda in the upstream and Murshidabad in the downstream in West Bengal. Huge sedimentation, increasing flood intensity and increasing tendency of bank failure are some of its impacts. Erosion has swept away large areas of these two districts causing large scale population displacement. It is submitted that the sediments are arrested in the reservoir behind the barrage and because of which the water level in the river has risen upstream the Barrage as the river is flowing above the deposited sediments. The water flowing at the elevated height is leading to the erosion of banks of the river. The applicants are relying on the following studies to explain the damages caused on account of erosion due to the Farakka Barrage project.

6.3.1.1 The performance audit report on “Maintenance of Farakka Barrage and its ancillaries for the period 2006-07 to 2011-12.” by the Indian Audit and Accounts Department, Kolkata mentions that FBP has trapped “substantial sediment load in the barrage pond compelling river to change its course continuously. The FBP is leading to “a back-flow of water, leading to accelerated erosion on the left bank upstream.” Siltation in Barrage Pond has increased, leading to rise in height of the river bed and consequent necessity of the river to compensate for the reduction in its cross section by expanding sideways.

Copy of the performance audit report on “Maintenance of Farakka Barrage and its ancillaries for the period 2006-07 to 2011-12.” by the Indian Audit and Accounts Department, Kolkata is annexed herewith as **Annexure A-18**.

6.3.1.2 As per an Occasional Paper published by Institute of Development Studies, Kolkata in July, 2011, the average

maximum level in 1979-83 was 24.2 m. It has increased to 24.7 m in 1994-98. Average yearly land loss in same period has increased from 116 ha to 201 ha. It is submitted that this rise in water level is taking place despite increased abstraction upstream and reduced flow in the Ganga. The problem of sedimentation is so great that water level is rising despite reduced flows.

Copy of the Occasional paper titled as: No voice, no choice: Riverine changes and human vulnerability in the 'chars' of Malda and Murshidabad by Jenia Mukherjee of Institute of Development Studies Kolkata published in 2011 is marked and annexed as **Annexure A- 19.**

6.3.1.3 That erosion of land is also taking place in downstream of Farakka Barrage because of sudden release of water in high velocity from the barrage at a particular gate to pull the sediments and flush them downstream. The Report of Planning Commission on Flood Management for XII plan, October 2011 recognizes that there is "problem of erosion of the banks of rivers and on the left and right banks of Ganga upstream and downstream respectively of Farakka Barrage"

Copy of the relevant part of the report titled as Report of Planning Commission on Flood Management for XII plan, October 2011 is annexed herewith as **Annexure A-20**.

Further, as per a scientific study done by Centre for Himalayan Studies, North Bengal University, West Bengal titled "Flood and Erosion Induced Population Displacements: A Socio-economic Case Study in the Gangetic Riverine Tract at Malda District, West Bengal, India" in 2010 and published in Journal of Human Ecology, it is stated that:

> “Such erosion activities are again aggravated by frequent changes in formation of bed channels and spell channels because of variation of quantum of discharge during different times of the year. Unplanned land use activities, deforestation, development of irrigation in the upper valleys, reduced base flow/lean flow and increased the flood discharge has resulted in wide variation of flow from lean period to monsoon. Variation of discharge being about 1,800 cusec during January to maximum of 79,450 cusec during monsoon months.
>
> ...There is a general tendency of the Ganga to shift towards left bank above Farakka, and towards right bank below Farakka. This is aggravated by frequent changes in bed channels and spill channels because of large variation of discharge and human intervention and increased the flood discharge has resulted in wide variation of flow from lean period to monsoon. Variation of discharge being about 1,800 cusec during January to maximum of 79,450 cusec during monsoon months.”

Copy of the relevant extracts from the study done by Centre for Himalayan Studies, North Bengal University, West Bengal titled ‘Flood and Erosion Induced Population Displacements: A Socio-economic Case Study in the Gangetic Riverine Tract at Malda District, West Bengal, India in 2010 are annexed herewith as **Annexure A-21**.

6.3.1.4 That the Inland Waterways Authority of India also dredges the Ganga at its deepest point to increase the depth of the channel. The deepest flow is on the right bank upstream of Farakka. This dredging has the effect of pulling more water into

the channel that is already carrying most water. The further increase in velocity and turbulence is leading to increase in bank erosion. As per the Government of West Bengal report dated 29th September, 2011, 2077 ha + 150 ha + 880 ha of land has been engulfed in last 8 years. The dredging also disturbs the habitat of aquatic flora and fauna and leads to loss of biodiversity and reduction in fishing.

Copy of the Government of West Bengal report dated 29th September, 2011 is annexed herewith as **Annexure A-22** and the photos showing the erosion upstream and downstream of Farakka Barrage are annexed herewith as **Annexure A-23**.

6.3.1.5 That the applicants further submit that the ever-increasing erosion has led to demands for more bank protection and anti-erosion works. The FBP was asked by Government of India (GOI) to undertake these works. A report dated June, 2004 was made by the CWC seeking restructuring of the FBP Authority to enable it take up these works. The Report claimed that “large areas… would be relatively free of large scale erosion…” after these anti-erosion works would be undertaken. This report also mentions that four Committees were made to examine the problems of erosion due to FBP: Pritam Singh (1978), G R Keskar (1996), G N Murthy (1999) and C B Vasistha (2003). It is further submitted that the number of items in minutes of Technical Advisory Committee (TAC) of FBP regarding anti-erosion works shows a steep increasing trend. Only four items find mention in the minutes of 21.2.2003 whereas the number of items in minutes of 23.11.2011 is 21, in 8.3.2013 is 15 and in minutes of 12.12.2013, the same has increased to 21. This shows that the problem continues to become worse.

Copies of Reports of the TAC are not appended since they are voluminous. The applicants seeks leave of the Hon'ble Tribunal to produce the same at later stage in case the necessity arises.

6.3.1.6 That as per the Occasional paper titled as: No voice, no choice: Riverine changes and human vulnerability in the 'chars' of Malda and Murshidabad by Jenia Mukherjee of Institute of Development Studies Kolkata published in 2011, due to the construction of Farakka Barrage in 1975 the entire process of erosion/sedimentation has augmented leading to the rise of 'existing' and 'running chars.' in the area. The paper states:

> "There is an obvious relationship between Farakka Barrage construction and river-bank erosion in Malda and Murshidabad. The direction of the river flow has been altered and it is no longer co-axial to the barrage due to the reduction of the cross-sectional area and gradual meander formation between Rajmahal hills and Farakka. Being oblique, the flow concentrates more towards the right side of the barrage causing swelling of water during the peak of the monsoon.
>
> ….In Malda the total eroded land between 1979 and 2004 had been 4247 hectares. More than 200 sq. km. of fertile land had been swept away till 2004. The dimension of loss of livelihoods can be seen in the loss of 61.10 sq. km agricultural lands, 25 sq. km orchards, 85 sq. km settled land, 7 sq. km wetlands and 13 sq.km other lands totalling 191.10 sq. km in the last one decade. In 2001 itself, 2, 500 (approx) families in Malda were displaced. Since the last three to four decades five community development blocks are being more or less affected by erosion:

Manikchak,Kaliachak 1, Kaliachak 2, Kaliachak 3 and Ratua. According to the report of the Committee set up by Planning Commission (1996) nearly 4.5 lakhs of people have lost their homes due to left bank erosion and 22 mouzas have gone in the river of Manickchak, Kaliachak 1 and Kaliachak 2. Over the last three decades 500 sq. km of land and about 2 million people, from about 40 village panchayats in Manickchak, Kaliachak 1 and Kaliachak 2 and English bazaar block have been affected by flood and erosion."

Copy of the Occasional paper is already marked and annexed as Annexure A- 19**.**

6.3.1.7 That the performance audit report on "Maintenance of Farakka Barrage and its ancillaries for the period 2006-07 to 2011-12." by the Indian Audit and Accounts Department, Kolkata has highlighted the displacement of people in Malda and Murshidabd on account of loss of land due to erosion. The report states:

"Since Ganga has altered its course in Malda, about 64 mouzas (revenue villages) have been wiped out and an extensive char covering more than 200 square kilometres have emerged on the opposite bank, along the mainland of Jharkhand. Though the territorial boundary of the state is fixed and has no relation with the changing course of the river, the Government of West Bengal does not acknowledge the newly emerged settlements as revenue villages. These erosion victims or environmental refugees are denied the minimum means of livelihood. The people living on the chars that emerged on the opposite side of

the river at Malda are suffering from an identity crisis, as the state of West Bengal nor Jharkhand acknowledge their franchise. In Murshidabad during 1988 to 1994, on an average 26.66 kilometers square area was eroded annually and 2034 families with projected population of 11313 displaced."

Copy of the said report is already marked and annexed as Annexure A-18.

6.3.1.8 Quantification of loss caused in Malda and Murshidabad in West Bengal on account of erosion by the Farakka Barrage:

Loss of lands due to erosion: To quantify the damages caused, the applicant No. 3 has relied upon the data available at Malda Jila Parishad as obtained by Applicant No 4 who is a resident of the area. The same states that on 32 square km was eroded in the last 10 years in Malda located upstream of the Farakka barrage. The applicant No. 3 has assumed the similar impact for Murshidabad district located downstream of the barrage. Thus, the total land lost due to erosion in the last 10 years in both the districts is 64 square km or 6.4 square km/year or 640 ha/year. The eroded land consisted of 80% cultivable very fertile land, 15 % dwelling places (including Schools, Hospitals, Post offices, Banks, Markets), and 5% barren land as quantified by Applicant No 4. The lands lost due to erosion is quantified as Rupees 272 crores/year which is explained as follows:

a) Cultivable Land, 80% of total 640 ha = 512 ha/year valued at Rs 8 lacs/ha = Rs 40.96 crores/year.

b) Habited land, 15% of total 640 ha = 96 ha/year valued at Rs 120 lacs/ha = Rs 115.3 crores/year. The value of buildings on

this land is taken to be equal to the value of land. Thus add Rs 115.2 crores for buildings. Total = Rs 230.4 crores/year.

c) Barren Land, 5% of total 640 ha = 32 ha/year valued at Rs 2 lacs/ha = Rs 0.64 crores/year.

Total of above is worked out at Rs 272 crores/year.

Loss to households due to displacement on account of erosion: According to a study by Institute of Development Studies, Kolkata annexed as Annexure A-19 in the application. 14236 families were displaced in a period of 7 years from 1988 to 1994 in District Murshidabad. This is equal to 2034 families per year in the Farakka Upstream region. Similar displacement is assumed on the downstream. Thus, the total displacement of households in Malda and Murshidabad is 4068 households per year. People have moved between four to 16 times in last 15 years in some of the newly developed 'chars' according to above study. The applicants have assumed that an average family would have moved three times in the last 10 years. The human cost to the families is accordingly quantified as follows.

a) Loss of house and belongings: Value of house taken at Rs 2 lacs and belongings at Rs 1 lac, total Rs 3 lacs. These have been lost 3 times in last 10 years. Thus loss in last 10 years is calculated at Rs 9 lacs per family; or Rs 90,000 per year per family.

b) Loss of income: Displacement involves a huge human cost. People are uprooted from their existing sources of income such as fishing or shop keeping. They have to establish a new source of income afresh. This takes a long time. Applicant No 3 has quantified that it may take 25 years for a

person to come back to his earlier income trajectory. Taking a 50 percent loss of income in these 25 years adjustment period, the loss of income for a family displaced even once is quantified as follows. The number of days lost is calculated at 50 percent of 300 days per year for 25 years or 3750 days. Taking Rs 300 per day as earning, this is calculated at Rs 11,25,000 per family that is displaced during the year.

c) Total loss per family is 90,000 for house and belongings and Rs 11,25,000 for loss of income or total Rs 12,15,000 per family per year.

d) Amount lost for 4068 families that are displaced every year is quantified at Rs 494 crores per year.

The total loss due to erosion is calculated at Rs 272 crores for land; and Rs 494 crores for house, belongings and loss of income. Total Rs 766 crores per year.

It is submitted that this erosion is mainly due to the pond created by Farakka Barrage Project. However, dredgers of Inland Waterways Authority of India are deepening the channel on the right bank upstream and adding to the erosion.

Thus 90% of the total amount (Rs. 690 Crores per year) is claimed from FBP and 10% of the total amount (Rs. 76 Crores per year) is claimed from IWAI.

6.3.2 **In Sunderban delta complex**

Due to the alteration of water and sediment delivery to the sea, coastal erosion is aggravated and the Sunderban delta is facing great threat as never before. The irrigation barrages including the Ganga Barrage at Kanpur, Madhya Ganga Canal Project in Bijnor and Lower Ganga Canal Project in Narora, Upper Ganga

and East Ganga Canal Project in Bhimgoda in Haridwar, Farakka Barrage and the hydropower projects including the Tehri HEP and Koteshwar HEP by Respondent No. 5, the Maneri Bhali (Stage 1 and 2) in Rishikesh by Respondent No. 6, the Srinagar HEP by Respondent No. 7 and the Vishnu Prayag HEP project by Respondent No. 8 located upstream of Sunderbans have created massive trapping and alteration to sediment flows in the river which has lead to high erosion rate of the Sunderban delta compared to the average regional rate and problems like salt water intrusion is also creating serious problem to the natural ecosystem of the Sunderban delta complex. Similar erosion is also seen in the deltas of Mekong, Mississipi and Godavari-Krishna rivers. The research papers mentioned below highlight the said facts:

6.3.2.1 A research paper titled 'Impacts of sediment retention by dams on delta shoreline recession: evidences from the Krishna and Godavari deltas, India' published in international journal 'Earth Surface Processes and Landforms', Published February, 2010 in Wiley Interscience by Department of Geo-Engineering, Andhra University and Space Applications Centre, Ahmedabad established the link between sediment trapping in dams and reservoirs as the main reason for coastal subsidence for the Krishna-Godavari delta which drains into Bay of Bengal. The relevant para from the research papers is as follows:

> ..... However, the main reason for relative sea-level rise by land subsidence along deltas is the retention of sediment in the reservoirs behind dams that, in turn, affects the deltas by depriving them of the most fundamental riverine input into the delta-building process. An analysis of sediment load and runoff of 145 rivers from

different parts of the world revealed declining trends in land–ocean sediment fluxes in a number of cases mainly due to construction of dams (Walling and Fang, 2003; Walling, 2006). Estimates showed that reservoirs behind dams, although primarily meant for irrigation and/or hydropower generation, trap about 26% of the global sediment flux into the coastal ocean (Syvitski et al., 2005; Syvitski and Milliman, 2007) crippling in turn the delta building activity. Deltas, which are subsidence prone areas (Shi et al., 2007; Tornqvist et al., 2008), sustained only when the coastal subsidence that occurs due to subsurface fluid withdrawals and oxidation of drained soils is balanced by the continued vertical accretion of the riverine sediment (Day et al., 1995). Therefore reduction in sediment supply not only diminishes the delta growth but also leads to coastal erosion and shoreline recession as is the case with many deltas around the world like, for instance, the Mississippi, Rhone and Ebro deltas (Day et al., 1995), Nile delta (Stanley and Warne, 1998), Volga delta (Anthony and Blivi, 1999), and Chao Phraya, Huanghe, Mekong and Song Hong deltas (Saito et al., 2007; Saito, 2008).

..... The study revealed that the Krishna–Godavari front shoreline has shifted significantly during the past seven decades. In the initial ~35 years under study, between the 1930s and 1965, the shoreline advanced into the sea by a net accretion of 48.7 km2 area, which is a normal feature of any prograding river delta under pristine conditions. However, the trend reversed resulting in a net loss of 76 km2 of land during the subsequent 43-year period

between 1965 and 2008. The increasing number of dams built in the Krishna and Godavari River basins during the corresponding period has significantly arrested the riverine inputs from reaching the sea, as evident from the phenomenal decrease in the suspended sediment loads through the downstream sections of the Krishna and Godavari Rivers.

..... The annual average loads through the Krishna decreased from 9 million tons during 1966–1969 to a mere 0·4 million tons during 2000–2005 (Figure 7g). Similarly, the sediment flux in the Godavari showed a three-fold reduction during the past three decades from an average annual load of 150.2 million tons during 1970–1979 to about 57.2 million tons during the recent period of 2000–2006.

Copy of the research paper in Earth Surface Processes and Landforms, Published February, 2010 in Wiley Interscience is attached as **Annexure A-24**.

The applicants wish to highlight that though global warming and eastward tectonic shift is partly responsible factor for such impacts, but the decreased water and sediment delivery is one of the major contributing factors which have accelerated the process. A similar reason is also quoted in the IPCC 4th Assessment Report which says,

"..in Ganga-Brahmaputra delta more than 1 million people will be directly affected by 2050 from risk through coastal erosion and land loss, primarily as a result of the decreased sediment delivery by the rivers, but also through the accentuated rates of sea-level rise."

Copy of the factsheet published by WWF on IPCC 4th Assessment Report is annexed herewith as **Annexure-25**.

6.3.2.2 That in the IUCN study 'Situation Analysis on Biodiversity Conservation-Ecosystems for Life: A Bangladesh-India Initiative', 2012, the following statement reflects the importance of sediment deposition in prevention from coastal erosion:

> ".....The Sundarban, some 10,000 sq km of land and water, is part of the world's largest delta—80,000 sq km—formed from sediments deposited by the Ganga, the Brahmaputra and the Meghna, all converging on the Bengal basin (Seidensticker and Hai, 1983). The Sundarban is classified as a wetland of international importance under the Ramsar convention. The land is moulded by tidal action, resulting in a distinctive physiography. Rivers tend to be long and straight as a consequence of the strong tidal forces as well as the clay and silt deposits that resist erosion
>
> .....Discharging waste into the river and water flow controlled by various barrages and dams have had severe adverse impacts on the habitat of aquatic animals like the Gangetic dolphin, the gharial and fish biodiversity in general.

Copy of the relevant extracts from the IUCN study 'Situation Analysis on Biodiversity Conservation-Ecosystems for Life: A Bangladesh-India Initiative', 2012, is annexed herewith as **Annexure A-26**.

The sediment budget of the Ganga, published in journal "Current Science" in 2003 shows that of the 794 million tons of sediments provided by the Himalayas, 328 mt flows to the Hooghly. This

establishes that trapping of sediments in reservoirs in Uttarakhand will deprive the Estuary of sediments. As this estimate is based as per data available till 2003, the applicants anticipate the amount of sediment flowing to Hooghly at present will be much less due to several other alterations in the last decades and reduced flow. A copy of the said publication is annexed herewith as **Annexure A-27**.

Similarly, in the factsheet published by International Rivers Network, 2002, the reservoir of Tehri Project is reported to get filled with sediments in 62 years and as per the EIA of Srinagar Project of AHPCL, the reservoir will be filled up with sediments in 9.184 years. Hence, the arresting of sediment at upper stretches by such hydro engineering structures is clearly evident. This lead to deprivation of sediments in lower Ganga resulting to more coastal erosion. Copy of the factsheet on Tehri Dam and the relevant portion from EIA report of the Srinagar Project of AHPCL is annexed herewith as **Annexure A-28** and **Annexure A-29** respectively.

6.3.2.3 That the Kolkata Port Trust has made an underwater guide wall near Haldia port. This guide wall is also changing the flow regime in the area and leading to erosion.

The Farakka Barrage Project is releasing water discontinuously with high flows in 10 days followed by low flow in 10 days to India. The flows to Bangladesh are less in the 10 days when high flows are released to the Hooghly and flows to Bangladesh are more in the 10 days when high flows are released to the Hooghly. This discontinuous flow is made so that high flows are ensured for 10-day periods and these high flows flush the sediments into the sea. This flushing is required to enable

movement of large ships. However, this discontinuous flow is having a huge negative impact on the salinity of the ground water. The less flow in the Hooghly during the lean 10-days leads to more sea water entering the Estuary and the groundwater is becoming saline. People are not able to obtain sweet drinking water.

6.3.2.4 That the applicants further submit that smaller rivers like Piyali in the Hooghly Estuary are getting silted in the upstream near their emergence from the Hooghly, partly due to encroachments. The Piyali, for example, was used as waterway for launches in 1980s. Now it has dried up. These small rivers are not getting water from the Hooghly. This is leading to ground water becoming saline. Now, in 85% of areas only single monsoon crop is being cultivated. Groundwater is being diluted by harvested rainwater to make it potable imposing a huge social cost upon the people living in the Estuary. It is submitted that Kolkata Port Trust wants more water to flow to Haldia. Sediment is not being removed from the upper reaches of these rivers and encroachment is also not being removed since this leads to more water flow at Haldia. The gain to Haldia is flip side of loss to people living on the smaller rivers. These submissions are on the basis of the field visit to the area undertaken by the appellant No.3 in the month of October 2014.

It is pertinent to mention here that Farakka Barrage project has diverted more water flow to the estuaries but simultaneously led to reduction of sediment delivery. Sediments trapped in the reservoir are flushed out to the river Padma in more quantities and relatively ‘less sediment laden water’ is abstracted through the feeder canal which reaches the estuary. This reduction in supply of sediments continues in the monsoons as the river

Padma below Farakka Barrage has become incised and is carrying more sediment-loaded monsoon waters. Therefore, Bhagirathi is carrying less sediments in the monsoons. The applicants further submit that the more supply of water and less supply of sediments has had a beneficial impact on the Bhagirathi-Hooghly system as there is less need for flushing the sediment to the sea and increased water supply is helping in flushing. But, the impact on the estuary is fundamentally different because of the land morphology dominated by tidal system. The high tide has higher velocity and brings in large amounts of sediments. These sediments are, in part, scoured from the islands in the lower estuary leading to their erosion. The low tide has lower velocity and is not able to carry the inward sediments back to the sea. As a result huge amounts of sediments are deposited in the Upper Estuary where the low tide is especially weak. This has led to an increased requirement of dredging in the Upper Estuary.

6.3.2.5 That the tendency of the high tide to deposit sediments in upper reaches was combated by the sediment-loaded waters of the Hooghly earlier. The “empty” (carrying less sediment) water presently reaching the Estuary has fundamentally different characteristics than the natural sediment-loaded waters. The sediment-loaded river water has higher density and different composition, in particular, of the bed load. The tidal ingress is resisted by these sediment-loaded river waters and is not resisted by the “empty” river waters. “Empty” water activates the sediment hunger of the sea and this leads to erosion of the islands of the Lower Estuary. It is submitted that Lohachara island has disappeared and Ghodamara island is more than one-half disappeared due to this scouring. The amount of sediment

being brought by the river in the lean season is less hence the amount by which the Estuary is deprived of the sediments due to construction of the engineering structures is also less in comparison to the loss in monsoon season. However, even this small difference in sediment load in lean season is having a huge impact on the tidal sediment dynamics in the lean season.

6.3.2.6 That the estuaries are a result of natural creation of land by the river through the process of aggradation. The phenomenon of reversal of the aggradation into degradation can be explained by sediment deprivation by dams and barrages upstream of Ganga as well as the obstruction of flows from tributaries joining the Hooghly River from the west. The latter obstruction has been caused by construction of the Feeder Canal to carry water from Farakka Barrage to the Hooghly River. It is submitted that due to the cumulative effect of these anthropogenic activities, the delta is starved of sediments. As a consequence, the marine forces had been dominating over the fluvial processes, thereby causing recession in the deltaic shoreline.

6.3.2.7 Quantification of the loss caused to the Sunderbans on account of erosion:

That as per Professor Sugata Hazra, an oceanographer at Jadavpur University, during the last 30 years, roughly 80 square kilometers, of the Sundarbans have disappeared. This works out to 2.67 square km per year. The news report published in Telegraph news daily dated 10th February, 2010 highlighting the said facts is attached as **Annexure A-30**.

In another news report published in First Post, December, 2013 it has been stated that more than 7,000 people are displaced in

Sundarbans in last 30 years due to erosion. Copy of the news report is attached as Annexure A-31. (Parul: Let us keep these here and also refer to in quantification)

Considering the abovementioned reports the damages due to land, building, belonging and income on 6.4 km^2 land in Malda and Murshidabad is reckoned at Rs. 766 crores per year or Rs 120 crores per km^2 per year above in this application. Value of land in the estuary would be less since it is not as densely inhabited. On the other hand, the value of trees is much more in the Sunderbans. The value of this land in managing storms and cyclones is very large. Thus we assume the value of loss assessed at Malda and Murshidabad of Rs 120 crores/km^2/year to be applicable to the Sunderbans. For 2.67 km^2 this is valued at Rs. 320 crores/year.

Sunderbans is an unparalleled biodiversity hotspot and is declared as a World Heritage site by UNESCO. It is difficult to put a monetary value on biodiversity hence we take a cost of Rs. 500 crores/yr. The total cost in the Estuary is reckoned at Rs. 820 Crores/year. This cost is apportioned as follows. Part of this cost is due to natural causes such as eastward tectonic shift of the delta and rise of sea level due to global warming. These natural causes are estimated to contribute 30% to or Rs 246 crores/year. This amount is not claimed. The balance 70 percent is apportioned as follows:

1. Due to discontinuous discharge from FBP at 10-day intervals = 10% or Rs 82 crores/year. This is claimed from Kolkata Port Trust.
2. Due to trapping of sediments in FBP = 20% or Rs 164

crores/year. This is claimed from FBP.

3. Due to trapping of sediments in irrigation barrages at Kanpur, Narora, Bijnor and Bhimgoda = 20% or Rs 164 crores/year. This is claimed from Department of Irrigation, UP.

4. Due to trapping of sediments in dams and barrages of hydropower projects in Uttarakhand = 20% or Rs 164 crores/year. This is further bifurcated in following four hydropower companies:

a. Due to trapping of sediments in Tehri and Koteshwar Reservoirs = 15% or Rs 123 crores/year. This is claimed from Tehri Hydro Development Corporation.

b. Due to disturbance in sediment flow regime caused by Maneri Bhali 1, Maneri Bhali 2 and Pasulok Barrages = 2% or Rs 16.4 crores/year. This is claimed from Uttarakhand Jal Vidyut Nigam Ltd.

c. Due to trapping of sediments and due to disturbance in sediment flow regime caused by Srinagar Reservoir = 2% or Rs 16.4 crores/year. This is claimed from Alaknanda Hydro Power Co Ltd.

d. Due to disturbance in sediment flow regime caused by Vishnu Prayag project = 1% or Rs 8.2 crores/year. This is claimed from Jaiprakash Power Ventures Ltd.

6.4 Loss due to Flood Congestion

6.4.1 That the applicants submit that the Feeder canal and other attendant structures made by the Farakka Barrage Project and the Farakka Super Thermal Power Station have obstructed the flow from western tributaries to the Bhagirathi leading to floods and waterlogging.

Many tributaries coming from the west are confluencing with the Bhagirathi. The path of these tributaries has been blocked by the Feeder Canal made by Farakka Barrage Project and other structures made by Farakka Super Thermal Power Station. The water is not able to pass to Bhagirathi and is held back to the west of the canal leading to waterlogging and floods in that area. The Central Water Commission reported that water of River Gumani and Kanloi Rivers was passing through rivulets to the Ganga before making of the Feeder Canal. This flow has got obstructed by the Feeder Canal. This was further aggravated after making of the Farakka Super Thermal Power Station of NTPC which reduced the space for detention of the over land flows. Copy of a Note prepared by WAPCOS dated 20.02.2003 highlighting the facts is annexed herewith as **Annexure A-32**.

According to the report of Indian Audit and Accounts Department, Kolkata, 2012, the drainage of Bagmari River has been blocked by the Feeder Canal. Though drainage channel has been provided but capacity has been inadequate leading to submergence of fields and huge loss of crops, houses, roads, etc. Dykes made by NTPC have further blocked the drainage basin. Vast areas to the west remain waterlogged for days together every year. The Report further states that FBP has led to raising of water level in Bhagirathi below Jangipur and does not allow Bansloi and Pagla Rivers to join Bhagirathi leading to drainage congestion and creation of a vast wetland which submerges fertile land. Copy of the report has already been annexed as Annexure A-18 to this application.

6.4.2 That the research paper “Types and Sources of Flood in Murshidabad, West Bengal”, published in February, 2013, explains in the detail the reason of flood congestion owing to the construction of the feeder canal of the Farakka barrage. It states:

> “The feeder canal constructed across the flow of these rivers, impede the evacuation of the floodwaters of this area. The catchments of the rivers Gumani, Trimohini and Kanloi are small but being flashy used to bring flows into the Ganga rather fast. When there is unusually high rainfall with corresponding high discharge, the floodwater spread in the surrounding areas. The obstructions created by the ash ponds of the Farakka Super Thermal Power Plant and the railway embankment cause spreading of floodwater along the toe of the right embankment of the Feeder Canal causing flood in the Suti-I. The discharges of the Trimohini and Kanloi are designed to flow into the Feeder Canal through inlet. Whenever the discharges of these rivers exceed the design capacity of inlets, the excess floodwater also deposit along the toe of the right embankment of the Feeder Canal. The discharge of the river Bagmari designed to flow in the Ganga along its course through a syphone across the Feeder Canal. This syphone is choked by silt in recent years. Thus, with the outlet to the Ganga being choked, the flood discharge of the Bagmari gets stagnated and spills to the basins of the river Pagla and Bansloi, creating a vast sheet of water amounting 100 sq.km.”

Copy of the research paper “Types and Sources of Flood in Murshidabad, West Bengal”, published in February, 2013 is marked and annexed as **Annexure A-33**.

It is amply clear that the flood congestion and water logging caused by the feeder canal has ultimately resulted into immense loss to crops, property, human lives and lines of communication.

6.4.3 Quantification of loss caused in Malda and Murshidabad in West Bengal on account of flood congestion caused by Feeder Canal of the Farakka Barrage Project:

The applicants have previously in this application quantified that people have incurred a loss of Rs 766 crores for erosion of 6.4 square km land and the human costs thereon every year in Malda and Murshidabad Districts or Rs 120 Crores per square km. The applicants have calculated the damage to land and human cost imposed by flood congestion and water logging is 10 percent of the permanent loss or Rs 12 crores per square km. Accordingly the loss for 100 square km are affected by flood congestion and water logging is quantified at Rs 1200 crores per year. This loss is wholly due to the Feeder Canal and claimed from FBP.

6.5 Non use Values

6.5.1 That the non-use values of free-flow of the river refer to those benefits which one derives indirectly from the river by knowing that the river is flowing freely. It signifies those benefits attained by all people of the country including those who are not living along the banks of the river but feel a sense of happiness and satisfaction in the knowledge that the river is flowing freely and are willing to pay an amount to keep it in the free-flowing condition or to restore the free flow. In the paper titled as 'Cost Benefit Analysis of Cleaning Ganges: Some Emerging Environmental and Development Issues', Environment and Development Economics, Vol. 9, pp. 61–81 by A. Markandya and M.N. Murty, the non use values of the river has been explained as follows:

> "There are benefits accruing to people who stay near the river or visit the river for pilgrimages or tourism. These will be in the form of recreation and health benefits and are called user benefits. The other category of benefits are those accruing to the people

> who are not staying near the river but enjoy benefits by knowing the river is clean. This category of people can be both Indians and foreigners. These are called non-user benefits arising out of people's preferences for the bio-diversity or the aquatic life that the Ganges supports and the religious significance of the river."

It further states:

> "The non-user benefits of Ganges arise out of motives people have to bequeath the bio-diversity the river supports to the future generation (bequest motive), for getting reassured about the conservation of Ganges with the knowledge that the river is kept clean and the aquatic life is protected (existence motive), and to protect the people living in the river basin from water-borne deceases (altruistic motive)."

Copy of the paper titled as 'Cost Benefit Analysis of Cleaning Ganges: Some Emerging Environmental and Development Issues', Environment and Development Economics, Vol. 9, pp. 61–81 by A. Markandya and M.N. Murty is annexed herewith as **Annexure A-34**.

It is clarified that the above comments are made by the authors of the study in relation to the study of non-use values for pollution control but the conceptual basis for non-use values for free flow is the same as explained in the para mentioned below.

6.5.2 That the nonuse values are also termed as passive use values. In a paper published in the Journal of Contemporary Water research and Education, 2006 titled as "Importance of Including Use and Passive Use Values of River and Lake Restoration" by John Loomis, the role of nonuse value in assessing the damages caused to the natural resources has been highlighted:

> “The Total Economic Value (TEV) associated with restoration is made up of the obvious on-site use value, as well as the not so obvious (at least to some) off-site passive use values. The on-site use values of river restoration include a wide variety of ecosystem services such as recreation, fish habitat, water quality, stormwater management and aesthetics. However, restoration also provides widespread benefits to people who obtain satisfaction or utility from knowing that native species exist in their natural habitat (i.e., existence value) or from knowing that restoration today provides native species and their natural habitats to future generations (i.e. a bequest value). These existence and bequest values have been termed passive use values since they were upheld by the U.S. Court of Appeals for use in natural resource damage assessment.”

Copy of the paper published in the Journal of Contemporary Water research and Education, 2006 titled as “Importance of Including Use and Passive Use Values of River and Lake Restoration” by John Loomis is marked and annexed as **Annexure A-35.**

The applicants submit that the hydro engineering structures built by the respondents i.e., the FBP, irrigation barrages and HEPs obstruct the free flow of the Ganga River and lead to the loss of the non-use values of free flow to the people of the country. Every citizen of the country is residing anywhere in the country subjected to this loss.

6.5.3 Quantification of Non-use values:

That the applicant No. 3 has calculated a non-use value of free flow of river at Rs 140 per year per household in 2009 as per the analysis provided in his book “Economics of Hydropower.” This value has to be increased in parallel to the increase in the Consumer Price Index. The Index was 145 in 2008-0. It would be around 250 in 2014-15.

Accordingly the non-use value at present would be Rs 250 per household.

Number of households in the country is quantified on the basis of 4.5 persons per household. For 120 crores population the number of households is worked at 26.7 crore households. Each of these households incur a loss of non-use value of Rs 250 per year. Accordingly the loss of non-use value for the country is quantified at Rs Rs 6675 crores per year. This loss is apportioned as follows:

1. Due to construction of Farakka Barrage = 8% or Rs 534 crores/year. This is claimed from FBP.
2. Due to construction of underwater guide wall at Haldia Port = 2% or Rs 134 crores/year. This is claimed from Kolkata Port Trust.
3. Due to construction of barrages at Kanpur, Narora, Bijnor and Bhimgoda = 30% or Rs 2003 crores/year. This is claimed from Department of Irrigation, UP.
4. Due to construction of dams and barrages by hydropower projects in Uttarakhand = 60% or Rs 4005 crores/year. This is further bifurcated in following four hydropower companies:

a. Due to construction of Tehri and Koteshwar Reservoirs = 25% or Rs 1669 crores/year. This is claimed from Tehri Hydro Development Corporation.

b. Due to construction of Maneri Bhali 1, Maneri Bhali 2 and Pasulok Barrages = 10% or Rs 667 crores/year. This is claimed from Uttarakhand Jal Vidyut Nigam Ltd.

c. Due to construction of Srinagar Reservoir = 20% or Rs 1335 crores/year. This is claimed from Alaknanda Hydro Power Co Ltd.

d. Due to construction of Vishnu Prayag project = 5% or Rs 333 crores/year. This is claimed from Jaiprakash Power Ventures Ltd.

Copy of the relevant extracts from the book “Economics of Hydropower” are annexed herewith as **Annexure A-36**.

7. That the summary of claims is given below. All figures are in Rs crore per year:

a) From IWAI: For fisheries in West Bengal Rs 12 cores; Fisheries in Bihar Rs 120 crores; Fisheries in UP Downstream Allahabad Rs 120 crores; Total Rs 378 cores per year.

b) From KPT: Erosion and Biodiversity in Estuary Rs 82 crores; Non-use values Rs 134 crores; Total Rs 216 crores per year.

c) From Irrigation Department, UP: Fisheries in Bihar Rs 840 crores; Fisheries in UP Downstream Allahabad Rs 840 crores; Fisheries upstream Allahabad Rs 854 crores; Fisheries Uttarakhand Rs 6 crores; Biodiversity Ganga Rs 250 crores; Erosion and Biodiversity in Estuary Rs 164 crores; and Non-use values Rs 2003 crores; Total Rs 4957 crores per year.

d) From FBP: Fisheries in West Bengal Rs 108 crores; Fisheries in Bihar Rs 240 crores; Fisheries in UP Downstream Allahabad Rs 240 crores; Biodiversity Ganga Rs 50 crores; Erosion in West Bengal Rs 690 crores; Erosion and Biodiversity in Estuary Rs 164 crores; Flood congestion and water logging in West Bengal Rs 1200 crores; and Non-use values Rs 534 crores; Total Rs 3226 crores per year.

e) From THDC: Biodiversity Ganga Rs 75 crores; Erosion and Biodiversity in Estuary Rs 123 crores; and Non-use values Rs 1669 crores; Total Rs 1867 crores per year.

f) From UJVNL: Fisheries in Uttarakhand Rs 6 crores; Biodiversity Ganga Rs 30 crores; Erosion and Biodiversity in

Estuary Rs 16.4 crores; and Non-use values Rs 667 crores; Total Rs 719.4 crores per year.

g) From JVPL: Biodiversity Ganga Rs 15 crores; Erosion and Biodiversity in Estuary Rs 8.2 crores; and Non-use values Rs 333 crores; Total Rs 356.2 crores per year.

h) From AHPCL: Biodiversity Ganga Rs 30 crores; Erosion and Biodiversity in Estuary Rs 16.4 crores; and Non-use values Rs 1335 crores; Total Rs 1381.4 crores per year.

i) Total claim Rs 13,101 crores per year.

8. That the applicants are filing the present application on following amongst other grounds which the applicants may take at the time of hearing after craving leave of the Hon'ble Tribunal:

GROUNDS

A. Because the construction of series of hydraulic structures on river ganga have led to severe loss to the livelihood of the rural poor especially the fishermen community and millions of people engaged in fishing, aquaculture and ancillary activities. It is submitted that the fish production in the river in these years have largely deteriorated due to establishment of dams, reservoirs and barrages which are responsible for disturbing the river continuity resulting into habitat destruction both in the upstream and downstream. The continuous reduction in the river flows has been identified as one of the primary threats to the population of dolphins, Mahseer, crocodiles, turtles and fishes and has led to degradation of the aquatic biodiversity in the entire stretch of river Ganga.

B. Because the applicants are aggrieved by the consequent damages caused by the hydraulic structures which has ultimately resulted into deterioration of the

river quality and are therefore, entitled to invoke the jurisdiction of this Hon'ble Tribunal under section 15 of the NGT Act.

C. Because the respondents herein have derived financial benefits from these structures at the cost of the livelihoods of thousands and millions of people depending on the river. The economic and ecological losses occurring every year have not been compensated.

D. Because the applicants are "person aggrieved" in terms of the provisions of section 18 (2) (e) which provides for filing of an application for grant of relief or compensation by any person aggrieved including any representative body or organization.

E. Because the damages caused to the river ecology has infringed upon the rights of the fishermen community and all those who attain direct and indirect benefits from the river Ganga. The dams, barrages and reservoirs have gravely affected the livelihood and has done damage to the environment and aquatic life. In **Subhash Kumar vs. State of Bihar & Ors.** [(1991) 1 SCC 598], the Hon'ble Supreme Court has held that: "Right to live is a fundamental right under Article 21 of Constitution and it includes the right of enjoyment of pollution-free water and air for full enjoyment of life."

F. Because, as per the NGT Act, the person responsible for causing an adverse impact to the environment is liable to pay relief/compensation for the damage. Therefore, in case of loss of fisheries, floral and aquatic biodiversity, human habitations, lands and buildings, flood congestion and water logging and loss of non-use values the concerned person/ department will be liable to pay compensation in accordance with the polluter pays principle.

G. Because this Hon'ble Tribunal has got jurisdiction to pass an order for payment of compensation under the NGT Act, 2010. This Hon'ble Tribunal in Wilfred J. & Anr versus Ministry of Environment and Forests & Ors has held that section 15 empowers the Tribunal to exercise special jurisdiction in the matters of environment. It has held:

"The third kind of special jurisdiction that is vested in the Tribunal emerges from the provisions of Section 15 of the NGT Act. This Section empowers the Tribunal to order relief and compensation to victims of pollution and other environmental damage arising under the enactments specified in the Schedule I, for restitution of property damaged and for restitution of the environment in such area/areas, as the Tribunal may think fit. The liability that would accrue upon a person from the orders of the Tribunal in exercise of its powers under Section 15 of the NGT Act would be in addition to the liability that may accrue or had accrued under the Public Liability Insurance Act, 1991.

The Hon'ble Tribunal has further observed:

"From the Statement of Objects and Reasons as well as the Preamble of the NGT Act, it is clear that the framers of the law intended to give a very wide and unrestricted jurisdiction to the Tribunal in the matters of environment. Be it original, appellate or special jurisdiction, the dimensions and areas of exercise of jurisdiction of the Tribunal are very wide. The various provisions of the NGT Act do not, by use of specific language or by necessary implication mention any restriction on the exercise of jurisdiction by the Tribunal so far it relates to a substantial question of environment and any or all of the Acts specified in Schedule I. Sections 15 and 16 of the Act do not enumerate any restriction as to the scope of jurisdiction that the Tribunal may exercise. There is no indication in the entire NGT Act that the legislature intended to divest the Tribunal of the power of judicial review. It is the settled cannon of statutory interpretation that such exclusion has to be specific or absolutely implied from the language of the provisions governing the jurisdiction of the Tribunal."

H. Because, the polluters are liable for providing compensation for the environmental damage in accordance with Section 15 (1) (a), (b) and (c) of the

NGT Act. In **M.C. Mehta v. Kamal Nath and others (2000) 6 SCC 213,** the Hon'ble Supreme Court observed as under: "…pollution is a civil wrong. By its very nature, it is a tort committed against the community as a whole. A person, therefore, who is guilty of causing pollution, has to pay damages (compensation) for restoration of the environment and ecology. He has also to pay damages to those who have suffered loss on account of the act of the offender. The powers of this court under Article 32 are not restricted and it can award damages in a PIL or a Writ Petition as has been held in a series of decisions. In addition to damages aforesaid, the person guilty of causing pollution can also be held liable to pay exemplary damages so that it may act as a deterrent for others not to cause pollution in any manner."

I. Because in Dr**. B.L. Wadehra vs. Union of India, (1996) 2 SCC 594**, the Hon'ble Apex Court held that :

> "It is no doubt correct that rapid industrial development urbanisation and regular flow of persons from rural to urban areas have made major contribution towards environmental degradation but at the same time the Authorities -entrusted with the work of pollution control - cannot be permitted to sit back with folded hands on the pretext that they have no financial or other means to control pollution and protect the environment. Apart from Article 21 of the Constitution of India, which guarantees 'right to life', Articles 48A and 51A(g) of the Constitution are as under :
>
> 48A. Protection and improvement of environment and safeguarding of forests and wild life. The State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country.
>
> 51(g)-to protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures."

J. Because the Hon'ble Supreme Court in the matter of **M.C.Mehta vs. Union of India & Ors. [(2004) 12 SCC 118]** has held that "…..by 42nd Constitutional Amendment. Article 48A was inserted in the Constitution in Part IV stipulating that the State shall endeavour to protect and improve the environment and to safeguard the forest and wildlife of the country. Article 51A, inter alia, provides that it shall be the duty of every citizen of India to protect and improve the natural environment including forest, lakes, rivers and wildlife and to have compassion for living creatures. Article 47 which provides that it shall be the duty of the State to raise the level of nutrition and the standard of living and to improve public health is also relevant in this connection. The most vital necessities, namely, air, water and soil, having regard to right of life under Article 21 cannot be permitted to be misused and polluted so as to reduce the quality of life of others."

K. Because according to Section 20 of the National Green Tribunal Act 2010, this Hon'ble Tribunal may apply the principles of sustainable development, the precautionary principle and the polluter pays principle. It is submitted that as the respondents are responsible for the severe loss to the livelihood of fishermen owing to loss of fisheries, loss of land due to erosion, sedimentation and outflanking of river, irrecoverable loss to the biodiversity, destruction of land and houses resulting into displacement of large number of people living along the banks of the river and deprivation of other non-use values of the river, they are liable under the polluter pays principle which has been held to be part of the Indian law by the Hon'ble Supreme Court of India in a catena of cases including Indian Council For Enviro-Legal Action & Others v. Union of India (1996) 3 SCC 212 where it has been held that 'the responsibility for repairing the damage is that of the offending industry'

L. Because, as per Section 17(1) of the NGT Act, the person responsible for causing an adverse impact to the environment is liable to pay relief/compensation for the damage. Therefore, in case where major damage to the river ecosystem has been caused, the respondents which have derived

financial benefits from the hydraulic structures on the Ganga are liable to pay compensation in accordance with the polluter pays principle.

9. The applicants are not claiming restitution of the environment because they do not have the competence to suggest ways of restitution. The applicants state that it is for the Respondents to come up with a plan for restitution of the environment. The applicants would welcome such a plan. The applicants claim that the damages as calculated by them may be paid by the Respondents till restitution is done.

10. The total amount of damages caused due to loss of fisheries, loss of lands and households due to erosion and flood congestion, loss of biodiversity and non use values as explained in the foregoing paras has been quantified as 13,101 crores for the year 2014-2015. The Applicants claim this amount on ongoing basis from 2014-15 onwards till the compensation is paid.

11. The appellants propose that the abovementioned compensation may be paid in the following manner:

    i. Compensation for the damages on account of erosion and flood congestion which have mainly occurred in the districts of Malda and Murshidabad and Sunderban area of West Bengal may be given directly to the victims of the environmental damage. For this purpose, the Hon’ble Tribunal may direct the State Government of West Bengal to undertake a survey in consultation with the district authorities for identification and distribution of the said amount.

    ii. Compensation for the damage caused to the fishermen community due to loss of fisheries in the State of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal may be credited to the Environment Relief Fund. This is due to the fact that though there are records of contractors involved in fishing, the records of larger section of the fishing community directly dependent on rivers may not be available in the government records. Since they are unidentifiable the appellant

requests that the compensation amount credited to the said fund may be used for the purposes of improvement of fisheries and livelihood of the fishermen communities.

iii. Compensation for the loss of biodiversity and non use values may be credited to the Environment Relief Fund which could be utilized for the improvement of the river ecology.

LIMITATION

The applicants have undergone various field visits and have done extensive research to assess the damages caused to the river ecosystem. The applicant No. 3 also undertook file inspections with the Central Water Commission in October, 2014.

It is further submitted that the cause of action is ongoing as these projects from which compensation has been sought are still in operation and causing serious ongoing environmental damages as mentioned above. Thus, the present application is filed within five years and is in accordance with Section 15(3) of the NGT Act, 2010.

PRAYER

In view of the above facts and circumstances it is most respectfully prayed that this Hon'ble Tribunal may be pleased to:

a) Direct for the compensation of the economical and ecological loss amounting to Rupees 13,101 by the respondents as mentioned below:

   i. Damages amounting to Rupees 378 crores per year by the Inland Waterways Authority of India, Respondent No. 1 herein.

   ii. Damages amounting to Rupees 1 Rupees 216 crores per year by the Kolkata Port Trust, Respondent No. 2 herein.

iii. Damages amounting to Rupees 4957 crores per year by the Department of Irrigation, Government of Uttar Pradesh, Respondent No. 3 herein.

iv. Damages amounting to Rupees 3226 crores per year by the Farakka Barrage Project, Respondent No. 4 herein.

v. Damages amounting to Rupees 1867 crores per year by the Tehri Hydro development Corporation India Ltd, Respondent No. 5 herein.

vi. Damages amounting to Rupees 719.4 crores per year by the Uttarakhand Jal Vidyut Nigam Ltd, Respondent No. 6 herein.

vii. Damages amounting to Rupees 356.2 crores per year by JaiPrakash Ventures Power Limited, Respondent No. 7 herein

viii. Damages amounting to Rupees 1381.4 crores per year by Alaknanda Hydro Power Company Limited, Respondent No. 8 herein.

b) Pass such order/s as this Hon’ble Tribunal may feel fit and proper in the facts and circumstance of the case.