F. No. 8-49/2016-FC

Sub : Diversion of 6017.00 ha. of forest land in favour of Rashtriya Jal Vikas Abhikaran for development of Ken-Betwa Link Project from Distt. Chattarpur, Panna and Tikamgarh, Madhya Pradesh – reg.

The Committee discussed the above proposal of diversion of 6017.00 ha of forest land in favour of Rashtriya Jal Vikas Abhikaran for development of Ken-Betwa Link Project. The Committee noted as under:

1. State Government of Madhya Pradesh vide their letter No. F-3/50/2015/10-11/2182 dated 07.10.2016 submitted the above proposal for seeking prior approval under Section 2 of Forest (Conservation) Act, 1980.
2. The said proposal was earlier placed before Forest Advisory Committee (FAC) in its meeting held on 9th & 10th November, 2016.
3. Legal Status of the Land -
   Chhatarpur (T) - 337.55 ha (PF); Tikamgarh (T) - 91.18 ha (RF) ; Tikamgarh (T) - 9.34 ha (PF) ; Panna National Park - 4757.06 ha (PF) ; Panna National Park - 821.86 ha. (RF) ; Panna North (T) - 0 ha. (PF)
   Total = 6016.99 ha.
4. The forest proposed for diversion with vegetation density is as follows:
   Chhatarpur – Density: 05, Eco-Class: 3,
   Panna National Park - Density: 02 to 0.7, Eco-Class: 3,
   Tikamgarh - Density : 0.2 & 0.5, Eco- Class : 3.
5. This proposal was placed before 39th Meeting of Standing Committee of NBWL held on 23.08.2016 under the chairmanship of MEF&CC and after discussions, the Standing Committee agreed to recommend the proposal with the conditions prescribed by the Site Inspection team and NTCA, as agreed by MoWR and that the resultant reservoir area shall be retained as core area with minimum activities for management purpose under close consultation with the Tiger Reserve Management. The landscape based plan for the area will be finalized with NTCA in lead, assisted by WII, State Forest Department and project proponents. The effort to integrate the said three wildlife sanctuaries within the PTR will be undertaken simultaneously and the management objective of these areas will be in context of treatment of the area as a part of tiger landscape.
6. The total number of trees to be felled/affected at FRL under this project has been estimated – 1804962 Nos.
7. The forest land proposed for submergence area of project is attached to buffer line of Panna Tiger Reserve.

   The Submergence area of the Tiger Reserve proposed for diversion is- (a) Core Zone-4206.50 ha. and (b) Buffer zone- 1372.42 ha.; the forest land proposed for Canal is almost 11 Km. away from the buffer line of Panna Tiger Reserve.

Details of land use under this project under consideration are as follows-

Component wise breakup			
S.no	**Component**	**Forest Land (ha.)**	**Non-Forest Land (ha.)**
1.	Submergence Area	5761	3239
2.	Spillway	30	0
3.	Power House-1	7	0
4.	Power House-2	4	0

5.	Upper level tunnel	1.15	0
6.	Lower level tunnel	0.55	0
7.	Plant area	5	0
8.	Road Bhusor gate to Dam Axis	10	0
9.	Approach road for PH-2	2	0
10.	Road from plant area to abutment	0.8	0
11.	Land of switch yard, transformer yard etc.	5	0
12.	Canal	190.5	2097
13.	Canal LBC	0	63

8. There are several rare endangered species of flora and fauna found in the area.

9. Environment Clearance for this project has not been obtained as yet.

10. Compensatory Afforestation identified by state government over the degraded forest land covering of 12034 ha. (double the area under forest diversion) is spread over in 239 patches.

11. The certificates on Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 FRA along with documentary evidences have been received .

12. The total estimated cost of the Project is Rs. 939300/=.Lakhs

13. Forest Advisory Committee (FAC) in its meeting held on 9th & 10th November, 2016 observed that –

(i) The project is involving submergence of part core zone and part buffer zone of Panna National Park besides Forest Area in Chhatarpur and Tikamgarh Forest Division and it appears to be in its pristine form.

(ii) Out of 6017.00 hectares forest area, photocopy of FRA Certificate is available only for 5258 Hectares, original documents are required to be submitted. For remaining area FRA Certificate has not been received.

(iii) Further to have correct assessment of various issues involved, a Committee consisting of Additional Director General of Forest (Forest Conservation), Dr. Deepak Apte, Dr. Sanjay V. Deshmukh, Shri Rajesh Kaushal, APCCF, Regional Office, Bhopal, IG (Forest Conservation), AIGF shall inspect the site, verify the relevant document/reports and furnish its report to MoEF&CC, which would be placed before FAC. Before the site visit Committee advised to provide all necessary documents to the committee members such as EIA report, NTCA site visit report etc. for further scrutiny.

14. In view of recommendation of FAC in its meeting held on 9th & 10th November, 2016, the State Govt. of Madhya Pradesh was requested vide this Ministry's letter dated 22.12.2016 to provide the information as sought by FAC and also constitute a committee to inspect the site, verify the relevant document/reports and furnish its report to MoEF&CC for further consideration.

15. The State Government of Madhya Pradesh vide their letter No. F-3/50/2015/10-11/2182 dated 07.10.2016 has submitted their response which is placed in file**.** The point-wise reply given is as under:

Point: (i):The project is involving submergence of part core zone and part buffer zone of Panna National Park besides Forest Area in Chhatarpur and Tikamgarh Forest Division and it appears to be in its pristine form.

Reply: In this regard, the State Govt. reported that the detailed reply is given by the project proponent vide their letter dated 16.01.2017 and the same is agreeable.

It is informed by the project proponent that the area of the project involving submergence and other components are as per table given below:

S. No.	Particular	Area in Ha.
1.	**Submergence Area**	
	Panna Tiger Reserve	4141.00
	Panna Tiger Reserve Buffer (811.4+503)	1314.40
	Other Forest in Chhatarpur (T)	305.60
2.	**Total in Submergence**	**5761.00**
3.	**Other Components**	
	Panna Tiger Reserve	65.50
	Panna Tiger Reserve Canal Area	58.02
	Forest in Chhatarpur (T) Canal Area	31.96
	Forest in Tikamgarh (T) Canal Area	100.52
	Total canal & other components	256.00
	Grand Total of Forest in Project Area	**6017.00**

As per details given above the total submergence area in the PTR is 4141 ha which 7.18 % of the total area of PTR for Daudhan dam and the submergence is in one corner of the PTR area. As per nomenclature in Wildlife department whole National Park area is known as core area but the dam is not in the center of the park area but it is situated at South-West corner of the PTR area. More than 90% of PTR area is in the Right side of Ken-River and only 979 ha of this area is going to be submerged and surrounded by villages.

There are four big villages namely Daudhan, Kharyani, Palkoha and Sukhwaha adjacent to left side of the Ken River. While going through the attached map with this letter it is very clear that left side of the Ken River is badly disturbed by the village activities. So, the said pristine area of the PTR is surrounded by big villages. Once the dam is constructed these villages will be relocated on project cost and will result in to the best area for Wild life undisturbed by human activity and get converted in pristine area in real sense.

Due to heavy release of Water from the dam for irrigation down below 40 % of the submergence area i.e. 3600 ha will be opened in month of December and 60% of the submergence area i.e. 5400 ha. will be opened in month of February and so on, and available as very good pasture land for herbivores.

Apart from this 49 Sq. km area of PTR in Chhatarpur district, near Sukwaha, Palkoha is in the left bank of Ken River and which is surrounded by the above stated villages and the area is badly degraded and with very low prey base population. Only one tigress is said to be inhibiting in this area which is totally dependent upon the cattle for food

If all the villages are relocated from the submergence area, then the whole area will actually become pristine area for wild life:

Point (ii): Out of 6017.00 hectares forest area, photocopy of FRA Certificate is available only for 5258 Hectares; original documents are required to be submitted. For remaining area FRA Certificate has not been received.

Reply: The **original FRA certificate of 6017** ha and related documents are enclosed herewith as desired in separate volume.

16. As per the recommendation of Forest Advisory Committee (FAC) in its meeting held on 9-10 November 2016, a Sub-Committee of Forest Advisory Committee (FAC) committee was constituted on 22.12.2016 to inspect the site, verify the relevant document/reports and furnish its report to MoEF&CC to be placed before FAC for further consideration.

17. The recommendation/ observation of the Sub-Committee of Forest Advisory Committee (FAC), constituted on 22.12.2016 to inspect the site, verify the relevant document/reports, are furnished as under:

18. The sub-committee of FAC submitted its report which is reproduced as under:

Background of the project

Water being most critical resource for all life forms and basis of peoples' livelihood are dependent on the manner in which the water resources are harnessed and managed. India supports nearly 17% of the world's population; the available waters constitute only 4% of the global water resources. The distribution of water and related development indicators are biased towards certain regions. There is continuous demand for water for various purposes across the country. The National Water Policy (2002) suggested linking of rivers for appropriate water management strategy, but only after addressing significant challenges linked to environmental, ecological and socio-political implications.

Government of India has proposed about 30 river linking projects, 16 in the peninsula and 14 in the Himalaya. Of these, the Ken-Betwa Link Canal Project (KBLCP), covering the states of Madhya Pradesh and Uttar Pradesh, has been accorded priority and initial processes have already been taken up. However, this project falls within the core area of Panna Tiger Reserve (PTR), Madhya Pradesh, with important implications causing wildlife habitat loss from submergence and consequent fragmentation. The functional impacts of the project are also likely to be far reaching, beyond the conventional expectation around the project site. The riverine habitats are specialized habitats and the loss of such habitats could amount to loss of unique species that depend on them closely. In addition to the prevailing legal protection and socioeconomic considerations, it is important to take cognizance of the National Water Policy which underscores integrated perspective to govern the planning and management of water resources, accounting for the local, regional, and national contexts as well as environmental considerations.

KBLCP, primarily an irrigation and poverty alleviation project, was conceived in 1994-95 and subsequently, a joint project of National Water Development Agency (NDWA), Ministry of Water Resources, Central Water Commission (CWC) and other agencies was developed to realize the project objectives and components. It envisages diversion of surplus water of Ken basin to Betwa basin while proposing to irrigate and provide drinking water en route and the command area. The project involves construction of a large dam at **Dhaudan** village and a 2 km tunnel inside the Panna Tiger Reserves core area in Chhatarpur district. The project also envisages utilizing water from **Daudhan dam** through Ken-Betwa link canal to create irrigation facilities in Chhatarpur and Tikamgargh districts of Madhya Pradesh, and Jhansi District of Utter Pradesh.

As per the Project Report (DPR), the link canal will provide irrigation en route and drinking water supply towns/villages en route for 13.42 lakh population. The remaining water will be diverted to Betwa River upstream of existing Parichha weir. The water diverted to Betwa River will be utilised in the drought prone and water scare areas for providing irrigation to about 1.00 lakh ha in the Betwa basin in the districts of Madhya Pradesh. Besides, water will be released downstream from the dam, which will be utilized through Bariarpur for stabilising existing irrigation of about 2.52 lakh ha in Banda district of Uttar Pradesh. Additionally, water will also be released from the dam for providing irrigation to 3.23 lakh ha of un-irrigated area annually through Left Bank Canal (LBC) of ex-KMPP project of Madhya Pradesh and Right Bank Canal (RBC) off-taking from Bariarpur pick-up weir in Panna and Chhatarpur districts of Madhya Pradesh.

In KBLCP, 10 villages, including four villages located within PTR, will go under submergence, which means that 1913 families with 8339 persons will be dislocated. **The total (DPR) under Daudhan dam project is 90.00 sq. km; of this 58.03 sq. km area falls within the Panna Tiger Reserve, including 41.41 Sq km of forest area** and remaining 16.62 sq. km being revenue area within the reserve. The remaining 31.97 sq. km submergence area is outside the Panna Tiger Reserve; of which 11.17 sq. km is forest area of Chhatarpur division and remaining area is revenue land.

Besides construction of a dam, two power houses, one at the body of the dam and second at the exit of the lower level tunnel of 1.1 km will be constructed; 2 km long upper level tunnel w1II also be constructed

within Panna Tiger Reserve. From the exit of the tunnel, Ken-Betwa link canal of 221 km length will be constructed.

The proposed project will cause significant impacts on biodiversity, specifically in the riverine habitats, both the upstream portion where submergence will take place and downstream where flow-regimes will be affected. In addition to the tiger, which has been recovering following concerted efforts over the last six years, significant nesting habitats of vultures are also likely to be affected by the project. It is evident that Panna Tiger Reserve is emerging as an important source population of tiger in the entire landscape and the proposed project will certainly cause alarming habitat loss and fragmentation to the entire tiger population in the landscape. The Environmental Impact Assessment (EIA) for this project clearly recognizes these major impacts on biodiversity values, although there are several factual errors in the species inventory as provided in the EIA.

Further, current Environment Management Plan (EMP) considers only about 10.0 km radius from the project site and 1.0 km on either side of canal and this is clearly inadequate to address the ecological impacts of the project. In this context, investigating the project impact and benefits from the landscape context is not only relevant, but is imperative to address the concerns of all stakeholders and for providing realistic options for conservation of the area.

Panna Tiger Reserve (PTR)

Panna National Park was formed in 1981. In 1994, this park was declared as India's 22nd Tiger Reserve of the country. The core area of the Tiger Reserve is only 576 sq. km, which is too small to sustain a source population of the tiger in the long term. Unlike other Tiger Reserves, it has a high degree of isolation having no functional corridor connection with other tiger areas. Due to its small size and its isolation from other Tiger Reserves, the risk of population extinction of tiger from the reserve is very high, unless the conservation effortis approached in the landscape context.

The Panna Tiger Reserve is situated in the semi-arid region of the Vindhyan mountain range spread over the Panna and Chhatarpur districts in the northern part of Madhya Pradesh. The terrain here consists of extensive plateaus, rocky cliffs, gorges, caves and rock crevices. The caves, rock crevices, gorges and rock cliffs are critical habitats for breeding and resting of the key species such as tiger, leopard, hyena, sloth bear and several species of vultures.

The forests along Ken and its tributary form a significant part of the catchment area of the river. Ken Gharial Sanctuary and adjoining forests of the National Park offer certain compactness of the habitat. This river is one of 16 important perennial rivers of Madhya Pradesh and is very healthy in term of qualify of water. It is considered as the lifeline of this reserve and the least polluted of the Yamuna's tributaries.

OBSERVATIONS OF THE COMMITTEE AND THE NBWL:

Ken Betwa Link Canal Project- the proposal under FC Act:

Ken-Betwa Link Project involves diversion of surplus water of Ken basin to Betwa basin while proposing to irrigate and provide drinking water en route and the command area. The project involves construction of a large dam at **Dhaudan village** on Ken River and a 2-km tunnel inside the Panna Tiger Reserves core area in Chhatarpur district. The project envisages utilizing water from **Daudhan dam** through Ken-Betwa link canal to create irrigation facilities in Chhatarpur and Tikamgargh districts of Madhya Pradesh, and Jhansi District of Utter Pradesh.

The proposal for forest clearance under section 2(ii) of Forest Conservation Act 1980 consists of diversion of **6017.00 ha** of forest land in favour of Rashtriya Jal Vikas Abhikaran for development of Ken-Betwa Link Project in Chattarpur, Panna and Tikamgarh, Madhya Pradesh.

The forest area proposed in KBLCP is as under:

Forest area	RF (ha)	PF(Ha)	Total (ha)	Density	Eco class
Chhatarpur (Territorial)	0	337.55	337.55	0.5	3
Tikamgarh (Territorial)	91.18	9.34	100.52	0.2-0.5	3
Panna National Park	821.86	4757.06	5578.92	0.2-0.5	3
	913.04	5103.95	6016.99		

As per the FC proposal, the Submergence area of the Panna Tiger Reserve proposed for diversion is 5578.92 ha. [Core Zone- 4206.50 ha and Buffer zone- 1372.42 ha]. The forest land proposed for Canal is almost 11 Km. away from the buffer line of Panna Tiger Reserve.
The details of the land use in the Daudhan dam and the submergence area as provided by the project proponent in the FC proposal are as under:

Component wise breakup			
S.no	**Component**	**Forest Land (ha.)**	**Non-Forest Land (ha.)**
1	Submergence Area	5761	3239
2	Spillway	30	0
3	Power House-1	7	0
4	Power House-2	4	0
5	Upper level tunnel	1.15	0
6	Lower level tunnel	0.55	0
7	Plant area	5	0
8	Road Bhusor gate to Dam Axis	10	0
9	Approach road for PH-2	2	0
10	Road from plant area to abutment	0.8	0
11	Land of switch yard, transformer yard etc.	5	0
12	Canal	190.5	2097
13	Canal LBC	0	63
	Total	6017	5399

The committee also perused /examined the report submitted by the standing committee of National Board of Wild Life (NBWL) and is broadly in agreement with the recommendations of the NBWL. The committee agrees that no development project should destroy the ecology of fragile ecosystem and important tiger habitat of the country. The construction of Dam in site within Panna tiger Reserve is not the best possible option for development of water resources in the drought prone area of Bundelkhand keeping in view the pristine forests of PTR and its rich biodiversity. It is important to note that the PTR had lost it tiger due to human interventions in the area. As a conservation measure, tigers were introduced in the PTR and the project has been successful in rehabilitation of tiger. Now the project is in second phase and is likely to be completed in 2020. Any disturbance in the tiger habitat will be set back to tiger conservation efforts of NTCA. The concerns of the NTCA have been reflected in the report of the standing committee of National Board of Wild Life (NBWL).
The following are the observations of the committee:

1. Loss of breeding and shelter sites for other Species

It is true that Panna Tiger Reserve has largely been valued with respect to the requirement of the tiger, a flagship species. The importance of other key wildlife such as Sloth bear, Leopard, Rusty spotted cat, Hyena, Sambar, Chital, Four-horned antelope and Chinkara are largely ignored under the shadow of tiger, although tiger conservation may support the conservation of its associated fauna. Ken River along with its tributary is a lifeline of the Park. Ken river basin is full of gorges, caves, rock crevices which are normally occupied by wild mammals for breeding and resting. The committee visited the site and

observed the wildlife habitat. During hot days in summer, these gorges, caves, rock crevices are major shelters for important birds and other animals. The loss of these critical and specified habitats due to submergence will be irreversible specifically in the major submergence zone.

2. Disturbance to wildlife during construction phase

The site of the Daudhan dam is within the core area of the reserve. The proposed dam falls in a major category and construction work may continue for several years, perhaps even a decade. The blasting of stone quarries, use of heavy machinery, movement of heavy vehicles and presence of over 500 workers at a time as per NWDA are some of the major concerns. The high engineering activities with presence of a large number of labourers at the construction site as well as at two proposed canal/tunnel sites within the heart of a critical tiger habitat (CTH) of the reserve may exert tremendous biotic pressure and disturbance that would keep away species sensitive to such activities.

3. Irrigation dams and flow of rivers in semi-arid regions

Most of the dams in arid and semi-arid regions are functioning much below their projected capacities. With increasing demand and crisis on account of shortage of water in the catchment, the water harvesting, its utilisation in the upper catchment area may be much higher than the estimate. During a drought year, water in the dam may be much below its capacity even during the peak monsoon. As in other dams in dry regions, the Ken River downstream of the proposed dam will be dry without much flow during the year. The calculations of perennial water requirement (ecological flow) downstream the river, the ecological studies regulating the river flow are not available. As a result, the downstream villages may suffer due to paucity of water and poor recharge of the ground water. Although, The need to maintain environmental flow has been mentioned in all recent dam projects, it is not practically happening in most of the cases. Thus it is very important and significant concern in this case also.

In the semi-arid region, the relative loss of estimated benefits due to reduction of some height of the proposed dam may not be much compared to the ecological and environmental damage. With a relatively lower height, say by 10 meters, excess water during the monsoon can be allowed to flow through canals for filling ponds, small reservoirs and lakes between Ken and Betwa rivers. The ponds may be deepened or water reservoirs created to store the entire excess water of Ken for this purpose. If required, this needs examination by a group of hydrology/irrigation experts in the background of the experience with existing dams in semi-arid regions.

The water flow downstream should be regulated in line with the natural flow regime and, in the lean period, 100% of the existing flow regime should be maintained while in the non-lean period, the prescribed minimum by hydrology and aquatic biodiversity experts should be ensured. The break in release of daily minimum water should be considered as destruction of habitat. The minimum flow of water in the Ken River may save crocodiles and other aquatic animals and it will also maintain the health of river till it joins the Yamuna. A provision of e-flow has already been made in the EIA and EMP of the project to save the wildlife including mugger and gharial, and to maintain the water regime downstream of the dam, but the quantity may be prescribed under some agreement so that the provisions are not ignored as happens in the case of other dams.

4. Damage to existing Gangau weir

Gangau weir is located 2.5 km downstream from the proposed Daudhan dam site. A large part of Gangau weir has been resulting in reducing the storage capacity of the weir. This committee was informed that there is a major crack in the dam structure and this may be further damaged or even break up during the monsoon. The water yield downstream of Ken River is due to release of stored water within thick layer of sandy soil in the river. If it is damaged, the loss of soil for cultivation and damage to downstream villages may be very serious. The repairing of the weir is urgently needed to avoid a disaster downstream.

5. Number of trees to be submerged

Total counting of trees in the proposed submergence area has not been done but a sample survey by forest department has estimated that about 72 lakh trees above 20 cm girth at breast height would submerge in the National Park Area and this number may go up to about 12 lakh stems when young Poles and established sapling are accounted. Equally high number of trees will be cut or lost in the forest areas outside the National Park. Thus considerable quantify of carbon stored as biomass would be released

once the dam is constructed, in addition to loss of vegetation diversity.
The project proponent was asked to provide the digital terrain model (DTM) at different contour height to assess the exact estimate of the forest area submerged and the number of trees to be felled. The user agency has provided DTM report with contour height of 289, 288 and 287 and not provided DTM report of submergence of forest area which is not sufficient to estimate the number of trees to be felled in submerged area.
There are certain proposed structures such as powerhouses close to the dam and these may be re-examined and avoided in order to minimize disturbance.

6. Impact of construction activity on ecosystem:

There is going to be significant secondary impacts caused by transportation and construction activities. Technological integration is required in terms of establishing ropeway for transportation of material and people, and such infrastructure may subsequently be added to management of the reserve and the proposed project during construction and post construction phases for monitoring and management purposes.

7. Benefit Cost Analysis

The committee examined the Benefit/Cost analysis as produced by the project proponent. In the cost benefit ratio the capital Cost Rs1374437.32 lakhs, annual cost Rs. 166242.34 and benefit of Rs. 282899.38; has been considered. **The B/C ratio has been projected at 1.7 to justify the project.** Surprisingly the total cost has not included the cost of ecosystem services lost due to diversion of forest. As per the CB guideline adopted by the ministry, the cost of ecosystem service of 1.0 ha forest area (density 1.0) is Rs.126 lakh which at the current price is translated at Rs. 481 lakh/ ha for a period of 50 years. If the cost of ecosystem services lost is considered then the B/C ratio will be very less making the project economically inviolable.

8. Other observation

Based on the observations on field and the study of the report of the standing Committee of NBWL, the committee is of the opinion that the developmental project should not destroy the ecology of the remnant fragile ecosystems of an important tiger habitat in the country. In an ideal situation, it would have been better to avoid KBLCP in such wilderness areas such as PTR specifically when it runs the risk of providing justification or unhealthy precedence for more such developmental projects within Protected Areas. Certainly it will not be in the interest of wildlife and the overall well-being of the society in the long-term. However, given that wildlife conservation cannot be implemented based on the principles undermining people's livelihoods and survival, it may be a compulsion to consider a balanced approach and explore options to maximize conservation benefits, if some loss cannot be avoided. It is also a fact that public demand for supply of water which is for irrigation and drinking water cannot be denied.
The committee is not sure that the present proposal is indeed the best possible option for addressing livelihood and development of the region using water resources from the river Ken, as the committee members do not have required expertise in matters relating to hydrology. It is suggested that a team of independent experts on surface water hydrology, drawn from leading scientific institutions, should have been requested to examine the hydrological aspects of the Ken-Betwa river link, as this involves submergence of a significant habitat of core area of a Tiger Reserve which is considered as an inviolate area for development.

9. The following observations are also made by the committee.

i. Since the project site is within the core area of PTR it will result in encroachment on Natural reserves. Alteration of natural hydrological river regime leads to levelling river flow values within a year and modifies the character of riverbed process. Another, alteration caused by reservoir creation is decrease of flow quantity. This feature is induced by increase in evaporation. Further, with the reservoirs, the sediment runoff also sharply decreases, owing to alterations in hydrological regime.
ii. Alteration of hydro chemical river regime cause levelling of seasonal chemical water mixture, as well as reduction of biogenic substances' river flow. Water quantity in reservoirs depends on specific conditions and therefore may be either better or worse than in rivers. Processes of natural purification, resulting from sedimentation, de-siltation, dilution, destruction of organic

substances, contributes to improving water quality. In turn, water worsen when by deceleration of water exchanges, development of organic life and processes of oxygen and thermal stratification.

iii. In the reservoir there is considerable loss of water due to natural evaporation and transpiration by aquatic weeds and in the canals due to seepage and also over use of water (Goldsmith and Hiddyard, 1984) the change in micro-climate of the area, in the vicinity of reservoir, resulting in the moist ecosystem and offers ideal conditions for pest infestation and consequently loss of agricultural production. The change in micro-climate also leads to diseases like malaria, filarial, and color blindness. The change in micro-climate due to the reservoirs is in the form of increased humidity and reduced extreme temperature.

iv. The consumptive nature of irrigation means that some change to the local hydrological regime will occur when new reservoirs are created. A dam acts as a barrier between upstream and downstream movement of migratory river animals. A dammed river is said to be hungry for sediment, because on the downstream side, the rate of deposition of sediment is greatly reduced. This results in change in shoreline ecosystems and deepening of the river bed. However, the impact of Daudhan Dam in this respect may be very less due to the presence of Gangau weir in the downstream at a distance of 2.5 km from proposed dam site.

10. Several representations were made to FAC and they were taken on board. Salient features of the representations are listed below. These are over and above the issues related to tiger and other wildlife and its corridor etc.

1. Representation from Raghu Chundawat and Joanna Van Gruisen:

a. The submergence is Critical Core Area of a Tiger Reserve and as such its pros and cons should be very seriously and transparently evaluated.
b. EIA is totally incompetent and inadequate.
c. Benefit cost figures of 1:56 (1:71 for the Dhaudan project) include large fisheries and tourist hut income for a reservoir that will be within a National Park which will not be practically impossible
d. Seasonality in water demands
e. Rainfall data is flawed
f. Inaccuracy in submergence area figures

2. EIA Resource and Response Centre (ERC)

a. submergence calculation made by the National Water Development Agency (NWDA) is apparently faulty
b. Change in Power Houses Location affects forest area diversion?
c. Impacts on Ken Gharial Wildlife Sanctuary. EIA does not mention minimum ecological water flow requirements to the Ken Gharial Sanctuary.
d. Impact of Decade Long Construction Phase

3. Prerna Bindra, Former Member, Standing Committee, National Board for Wildlife

a. The project is entirely located in one of India's finest tiger reserves, Panna, and will submerge a large chunk of the core area of the park and also nesting sites of the critically endangered white-backed and long-billed vulture.
b. Non-inclusion of impact on Ken Gharial Sanctuary
c. Ambiguities in the data in term of loss of vulture habitat
d. No assessment of hydrological impacts
e. Procedural violations and misconducts in the matter of public hearings
f. The EIA, the main document that helps assess, understand, manage, mitigate and decide about the viability of the project, is flawed, shoddy and incomplete.
g. Need for proper, scientific assessments of environmental, social, ecological, economical cost-benefit analysis

4. **SANDRP (SOUTH ASIA NETWORK ON DAMS, RIVERS AND PEOPLE)**
    a. Contradictory figures for Forest Land required: The Standing Committee of the National Board of Wildlife, while considering this project in its 39th meeting on 23.08.2016, said that 105 sq km or 10500 ha of Panna Tiger Reserve (PTR) will be affected. The FAC documents give the figure of 5578.92 ha of forest land of PTR and 2922 ha of Non -Forest land of PTR so total of 8500.92 ha, full 2000 ha less than what the NBWL
    b. EAC The minutes of the June 2016 meeting of Expert Appraisal Committee of MoEF on River Valley projects noted: "Total submergence area is 9000 ha out of which 5258 ha is forest land (includes 4141 ha Panna Tiger Reserve). A total of 10 villages consisting of 1585 families are likely to be affected by this project." Against this, the proposal before FAC says that FL in the submergence area is 5761 ha. Moreover, the proposal before FAC says that land of 136 villages will be affected by the project. Total land requirement for the project as per the proposal before FAC is 11984 ha.
    c. Non-inclusion of impact on Ken Gharial Sanctuary
    d. No assessment of impact on biodiversity and hydrology
    e. Flawed and incomplete EIA
    f. Violations of norms every step of the way, including at Public Consultations, EIA, EAC, SBWL, NBWL and NTCA, to mention a few
5. **CENTRE FOR INLAND WATERS IN SOUTH ASIA**
    a. The proposal is based on incomplete studies, concealment of facts, and distorted figures. According to the DPR itself, a scientific topographic survey of the project area was NOT made (because NRSA wanted a few years' time).
    b. Not only the Gehrighat Gorge will be submerged but also the 30-40 m deep, 3-4 km long narrow gorge at Pandavan, thereby destroying India's unique geo-heritage on River Ken. It will risk also the Kishengarh-Amanganj highway by enhancing flood impact in high rainfall years.
    c. The proposal before the FAC does not include the area of forest to be affected by the construction of another weir 1 km downstream of the existing Bariyarpur barrage and the realignment of the LBC. This is part of the Phase I of the KB Link as mentioned in the DPR but not considered even by the EIA report.
    d. The entire K-B Link project is rooted in distorted, outdated hydrological data
    e. No mention on concerns with the provision for Environmental Flows

11. Other observations made by Committee

1. The status of land currently under Gangau Weir which after decommissioning will open up 1400 ha forest land that was previously submerged.
2. Water availability for agriculture (10.5 lakh hect including MP and UP) and drinking from the proposed dam: NBWL report states drinking water will be supplied to 13.4 lakh people. How this will be done though is not clear. Details of canal are though provided. Does these figures inclusive of transport loss or exclusive of it is unknown. During the lower orr visit we have seen numerous pumps lifting water from canal (legal or illegal is not known). What measures are promulgated to avoid water theft is not known.
3. The entire area of unique species *Anogeissus pendula* will be under submergence. There is no specific plans to restore this unique habitat type. Bulk of these trees will fall under 20cm girth thus missing from loss of tree count?

RECOMMENDATIONS

The committee observed that if there is no other option and the present proposal is the best possible option, the FC proposal may be considered under the following conditions.

i. It is not possible to compensate the loss entirely because a large proportion of submergence area falls in a riverine habitat, which is unique and cannot be replicated elsewhere. The project proponent shall ensure that similar extent of revenue area to be added to Panna Tiger Reserve, either as a part of the core or

corridor with other habitats or satellite core areas and consider the entire landscape as one conservation unit allowing for development and livelihood needs, since there is hardly any connectivity to other source areas and Panna landscape has to be managed to as a single viable landscape in the interest of long-term conservation. It is insufficient to compensate for the loss of forestland, both within the Tiger Reserve and outside, merely through declaring adjacent territorial forest areas adding similar extent of the submergence area under the jurisdiction of the MP Forest Department as "core" or "buffer" areas to the existing PTR because such territorial forests are already available for use by tigers and other wildlife. Therefore it is essential to compensate the loss of "forest land" through addition of revenue lands/non-forest lands by way of purchase or otherwise by the project proponents and the government.

The project proponents and the government should compensate the loss of forestland through purchase and transfer to PTR of 6017 hectares of revenue and private land. Although the tigers mostly use the forests of PTR to the east of Ken River, it is really to the west of Ken River that habitat has to be consolidated if the Greater Panna Landscape for sustaining a viable tiger population is to be achieved. The status of such revenue lands should be declared as "forest land" under the control of the Forest Department. The committee also examined the site for compensatory afforestation and observed that there are 239 sites identified for CA. The CA scheme as approved by the competent authority has 239 sites. These sites are far away from the PTR. These CA sites are falling in degraded forests.

The CA sites, after afforestation will not serve the purpose of strengthing the tiger landscape since these CA sites are smaller and not contiguous. It will not form a landscape for tiger rehabilitation at all. The Committee again reiterate that the CA should be carried out over non forest land which shall be procured by the user agency from public in a transparent manner. On the western side of PTR as, reported by committee above. This opinion is also expressed in pursuance of FCA guidelines 3.2(ix) which is clarified as below:-

"The provisions of the above guideline would be applicable to only central Sector projects and not on State Sector Projects, which are being undertaken by Central PSU's on turnkey basis. In such cases, Compensatory Afforestation on equivalent non-forest land/ a certificate of Chief Secretary regarding non-availability of equivalent non-forest land anywhere in the state shall be insisted upon."

In the above cases Committee feel that NWDA is a national authority which is working as turnkey basis. In this backdrop the above clarification the CA is being insisted by the Committee on non-forest land.

The committee recommends that the project proponent and State Government should consider equivalent non forest area (6017 ha) adjoining to PTR from the revenue and private land and add to the PTR as a part of Core/ Corridor with other areas or satellite core area.

ii. The committee examined the Benefit/Cost analysis as produced by the project proponent. In the cost benefit ratio the capital Cost Rs.1374437.32 lakhs, annual cost Rs. 166242.34 and benefit of Rs. 282899.38; has been considered. **The B/C ratio has been projected at 1.57 to justify the project.** The BC ration has not paid attention to eco system services lost due to diversion of unique riverine eco system. The economics of eco-good and services to be lost or to be lost in future, a detailed study regarding- is required to be done by reputed institutions to take future action and modification if required.

The committee recommends for benefit cost analysis should be done considering the ecological cost of diversion of PTR.

iii. The Ken River has a course of 55 km through the National Park. A major part of the Ken River in the park and its tributary along with its unique habitats of caves, gorges, rock crevices along both banks of the river will go under submergence at full-proposed level of water. To maintain some scope of breeding and resting sites, and to save some critical habitat for wildlife, it is necessary to keep a part of the river without submergence even during the peak height of water. The proposed maximum FRL is

likely to submerge the area even beyond Ghairighat and this would significant affect the habitat and connectivity and to ensure that the water level below the Ghairighat, specifically below the road crossing the river. Thus, enough length of the river should be left without submergence during full level of water. This is possible only by reducing the height of dam by at least 10.0 meters. This aspect of height reduction of the Dhaudan dam may be examined in the interest of conserving the Park. Water supply from the dam and also adequate flow in the river during monsoon to recharge the ground water from the dam to the site where it meets the Yamuna should be ensured. Some water should also be spared for PTR management including fire management.

The water flow downstream should be regulated in line with the natural flow regime and, in the lean period, 100% of the existing flow regime should be maintained while in the non-lean period, the prescribed minimum by hydrology and aquatic biodiversity experts should be ensured. The break in release of daily minimum water should be considered as destruction of habitat. The minimum flow of water in the Ken River may save crocodiles and other aquatic animals and it will also maintain the health of river till it joins the Yamuna. A provision of e-flow has already been made in the EIA and EMP of the project to save the wildlife including mugger and gharial, and to maintain the water regime downstream of the dam, but the quantity may be prescribed under some agreement so that the provisions are not ignored as happens in the case of other dams. The Committee feels that the dam height which is 288 meters, as per DPR, can be reduced at least by 10.0 meters. It will reduce the submergence areas of around 2000 ha of forest area. As reiterated above, the excess water in rainy season can flow out of the dam. The ponds and canals can be made to store this excess water downstream.

Committee recommends that the water flow downstream should be regulated in line with the natural flow regime and, in the lean period, 100% of the existing flow regime should be maintained while in the non-lean period, the prescribed minimum by hydrology and aquatic biodiversity experts should be ensured. In drought-prone areas, dams are not filled in the dry period when water is most needed. In this background the height of the Dhaudan dam may be re-examined in the interest of conserving the Park and committee recommends that the height may be reduced by 10.0 meters if not at least 5.0 meter as a trade-off between conservation and development. Water supply from the dam and also adequate flow in the river during monsoon to recharge the ground water from the dam to the site where it meets the Yamuna should be ensured. Some water should also be spared for PTR management including fire management.

iv. There are certain proposed structures such as powerhouses close to the dam and these may be re-examined and avoided in order to minimize disturbance, since power generation is not the primary objective of the project and will exert continued disturbance to the area.

The Committee is of the opinion that the proposed Powerhouse, which have the capacity of 78 MW, shall not be constructed in the forest area to be diverted. This is based on the strong technical conviction that it will create permanent, irreversible disturbance to the tiger habitat in PTR. This issue has already been discussed in the Standing Committee of NBWL and agreed upon by MoWR.

v. Committee observed that about 2287.5 ha of land will be used for construction of canal. This includes 190.5 ha of forest land.

Committee recommends that the canal should be realigned to minimise the use of forest land for construction of canal.

vi. There is going to be significant secondary impacts caused by transportation and construction activities. Technological integration is required in terms of establishing ropeway for transportation of material and people.

vii. Provision should be made by the project to strengthen and improve habitat management enforcement, and monitoring activities in the core as well as in buffer areas, as there is risk of increased human

activities due to this project. Further, support should be provided for buffer management and community activities, including eco-development and skill development programs, for local villagers. Alternative activities for local communities involved in extractive activities inside PTR should be implemented. In the long-term interest of tiger conservation, it is important to consider and implement landscape level conservation, which is administratively/legally effective by some sort of Landscape Management Authority/Council/ Society and should be brought under the purview of tiger reserve management.

viii. Given that species such as tiger, vultures and gharial are the key flagship species that are likely to be impacted by this project, there is certainly a need to institute Species Recovery Program in the landscape context and this should be executed after scientifically assessing the population status, response to such disturbance and habitat loss, and long-term viability options.

ix. It is recommended that a dedicated team involving State Forest Department, National Tiger Conservation Authority, Wildlife Institute of India and the project proponent including NDWA should oversee this project during and post construction phases, and should provide regular management inputs for ensuring the conditions proposed herewith

x. The project proponent has not provided the digital terrain model (DTM) for true assessment of the area of forest likely to submerge. The area calculation is based on orthogonal projections. The actual calculation based on DTM need to be provided by the project proponent. Total counting of trees in the proposed submergence area has not been done but a sample survey by forest department has estimated that about 18 lakh trees above 20 cm girth at breast height expected to be submerged in the National Park Area and this number may go up . Equally high number of trees will be cut or lost in the forest areas outside the National Park. Thus considerable quantity of carbon stored as biomass would be released once the dam is constructed, in addition to loss of vegetation diversity.

As per DPR the numbers of trees to be felled is around 23 lakhs (above 20 cm.) This figure had been achieved by sampling in 56 compartment of 1.0 ha each. The trees between 10 to 20 cm have not been enumerated. It has been observed by the Committee that there is a profuse crop of plants below 20 cm. These plants are around 8-10 years old. The project completion will take 8 years and these trees will not be felled at once. It will take 7-8 years to fell these trees in the submergence area. Most of these trees will move to above 20 cm class during the currency of project construction.

The Committee recommends that the sampling intensity should be increased and fresh enumeration shall be carried out by the State Government in consultation with MoEF&CC. This should be done in entire project area.

xi. The committee recommends that felling should not be done at the height of 4 meter below FRL.

19. Further the FAC considered the recommendations made by the National Tiger Conservation Authority (NTCA) as per provisions of Sections 38 0 (2), 38 (0)(1)(b) and 38 (0)(1)(g) of the Wildlife (Protection) Act, 1972 inclusive of recommendations of the NTCA Committee constituted in December, 2013, recommendation of the Committee constituted by the Standing Committee of the National Board for Wildlife (NBWL)vide its 37th Meeting, and discussions held by the Expert Group which was suggested in the 38th Meeting of the SC of NBWL,); vide their letter no. 7-2/2016-NTCA dated 22.08.2016.

The recommendations are:

i. The following protected areas in the landscape shall be brought under Project Tiger;
   - **a)** Nauradehi Wildlife Sanctuary, Madhya Pradesh
   - **b)** Rani Durgawati Wildlife Sanctuary, Madhya Pradesh
   - **c)** Ranipur Wildlife Sanctuary, Uttar Pradesh

   Commencement of works shall not be permitted till notification of at least core/critical tiger habitats is carried out by respective State Governments. States should expedite the process as benefits of the project shall accrue to both.

ii. Critical areas in buffer of the Panna Tiger Reserve, which facilitate tiger dispersal to the west and south, shall be taken into the core/critical tiger habitat. Necessary funding

support to voluntarily rehabilitate people from these areas shall be borne by the user agency.

iii. Areas of South Panna and Chhatarpur Divisions which have historically seen tiger presence shall be notified as buffer of the Panna Tiger Reserve and shall be brought under unified control of the Field Director Panna to ensure suitable interventions in the long run.

iv. The aforesaid Landscape Management Plan shall be prepared by the NTCA and WII with complete funding support by the user agency in three years. Phase I of the same shall focus on delineation of connecting/interlinking areas for tiger dispersal, at the micro level in consultation with stake holders and shall be completed within a year of commencement of LMP preparation work. No construction activity shall commence prior to delineation of these areas at the micro level. Strategies and management interventions for these delineated areas shall be proposed and implemented subsequently.

v. The LMP shall *inter alia,* also focus on a vulture recovery programme in consultation with domain experts as per a dynamic scenario based on effect of construction of the works and water levels on nesting behavior.

vi. The LMP shall be made part of the adjoining area plan/corridor plan of the Tiger Conservation Plan (TCP) of the Panna Tiger Reserve which shall categorically propose a tripartite Memorandum of Understanding between the State, Ministry controlling the User Agency (Ministry of Water Resources) and the NTCA ensuring reciprocal commitments by each party to safeguard the landscape. The contents of the MoU shall be worked by mutual consultation between the parties. However, the Panna Tiger Reserve Management need not wait for the LMP to be completed to furnish the TCP, as the LMP shall be incorporated as part subsequently by the NTCA as per Section 38 (0)(1)(a) of the Wildlife (Protection) Act, 1972.

vii. At Gherighat region in the Panna Tiger Reserve, an early warning system shall be installed by the user agency to predict water levels so as to maintain connectivity with the west of the tiger reserve. If required, structural interventions camouflaged to mimic nature shall be constructed at cost of the user agency to maintain tiger dispersal to the west.

viii. Along the canal alignment, structural interventions shall be carried out at wildlife cross over points, which are duly camouflaged and mimic nature, at cost to the user agency, so that dispersal is not hindered.

ix. At the end of ramification of the submergence water level, suitable water retention structures like dykes, shall be created by the user agency which can hold water during pinch periods for wildlife after the water has receded

x. As the mitigation strategy envisaged involves operationalizing a landscape approach to tiger conservation, no new mining areas shall be proposed in the delineated corridor areas as well as those wherein tiger dispersal movement has been historically recorded. Further, extending of existing mining leases shall not be carried out until it is concretely justified that the project is in public interest and following due process of law.

xi. A Committee shall be set up to monitor the works during pre-construction, during construction and post construction phases as follows;

(i) AIG (NTCA), Regional Office, Nagpur with AIG (NTCA), Headquarters as link officer

(ii) Representative of the Wildlife Institute of India, Dehradun, conversant with the landscape

(iii) Deputy Director, Panna Tiger Reserve with Field Director, Panna as link officer

(iv) Representative of the Global Tiger Forum

xii. Forest Clearance in the said case shall follow its due course and the matter shall be referred to the NTCA under Sections 38 (0)(1)(b) and 38 (0)(1)(g) of the Wildlife (Protection) Act, 1972 by the Forest Advisory Committee, when received, as per procedure.

20. The FAC also received several representations from non-governmental organizations working in the field of conservations and considered the concerns raised by them.

21. The FAC considered the report of the sub-committee of the FAC submitted by ADG (FC).

The chairman of the sub-committee, the ADG (FC) presented the report and its recommendations. The FAC interacted with the representatives of the project proponent (NDWA), State Government and sought their views. Non official members raised the issue of huge no of trees to be felled/removed and questioned that how the vast patches having naturally growing *Anogeissus pendula* would be compensated once the area is submerged. Concerns about the loss of habitat of endangered vulture and other wild animals were also raised.

The FAC also considered the recommendations of the sub-committee of NBWL (prepared by Dr. H.S.Singh and Sukumar), Wildlife Institute of India (WII) and also the wildlife clearance given by NBWL. The FAC also considered representations from non-governmental organizations working in the field of conservations and considered the concerns raised by them.

After careful consideration and discussion on the facts placed and report of Sub-committee of FAC vide dated 21.03.2017, the FAC accepts the recommendations of the sub-committee, the FAC, feels that the construction of Daudhan dam inside the PTR is not the best option in light of the conservation of the pristine forest and its eco system.

However the FAC also observed that if there is no other option and the present proposal is the best possible option available with the government in light of the demand of water in this area and for human welfare, the FC proposal for diversion of forest land from PTR may be considered with following observations and conditions as recommended by the subcommittee of the FAC and agreed upon by FAC.

i. It is not possible to compensate the loss entirely because a large proportion of submergence area falls in a riverine habitat, which is unique and cannot be replicated elsewhere. The project proponent shall ensure that similar extent of revenue area to be added to Panna Tiger Reserve, either as a part of the core or corridor with other habitats or satellite core areas and consider the entire landscape as one conservation unit allowing for development and livelihood needs, since there is hardly any connectivity to other source areas and Panna landscape has to be managed to as a single viable landscape in the interest of long-term conservation. It is insufficient to compensate for the loss of forestland, both within the Tiger Reserve and outside, merely through declaring adjacent territorial forest areas adding similar extent of the submergence area under the jurisdiction of the MP Forest Department as "core" or "buffer" areas to the existing PTR because such territorial forests are already available for use by tigers and other wildlife. Therefore it is essential to compensate the loss of "forest land" through addition of revenue lands/non-forest lands by way of purchase or otherwise by the project proponents and the government.

The project proponents and the government should compensate the loss of forestland and tiger habitat through purchase and transfer to PTR equivalent revenue and private land. Although the tigers mostly use the forests of PTR to the east of Ken River, it is really to the west of Ken River that habitat has to be consolidated if the Greater Panna Landscape for sustaining a viable tiger population is to be achieved. The status of such revenue lands should be declared as "forest land" under the control of the Forest Department. The committee also examined the site for compensatory afforestation and observed that there are 239 sites identified for CA. The CA scheme as approved by the

competent authority has 239 sites. These sites are far away from the PTR. The CA sites, after afforestation will not serve the purpose of strengthing the tiger landscape since these CA sites are smaller and not contiguous. It will not form a landscape for tiger rehabilitation at all.

The FAC agrees with the report that the CA should be carried out over non forest land which shall be provided by the user agency/ state government on the western side of PTR, the revised CA scheme should also include mandatory plantation of *Anogeissus pendula* to address the issue raised by one of the non-official members.

The FAC also considered the guidelines 3.2(ix) issued for implementation of FC Act reproduced below:-

"The provisions of the above guideline would be applicable to only central Sector projects and not on State Sector Projects, which are being undertaken by Central PSU's on turnkey basis. In such cases, Compensatory Afforestation on equivalent non-forest land/ a certificate of Chief Secretary regarding non-availability of equivalent non-forest land anywhere in the state shall be insisted upon."

The FAC is of the opinion that NWDA is a national authority which is working as turnkey basis to implement the project of the State Government.

In this backdrop the above clarification the CA is being insisted by the Committee on non-forest land the FAC recommends that the project proponent and State Government should consider identifying equivalent non forest area adjoining to PTR from the revenue and private land and add to the PTR as a part of Core/ Corridor with other areas or satellite core area.

In case of displacement of people from the sites identified for Compensatory Afforestation, the R&R plan duly approved by the Competent Authority may be furnished.

ii. The FAC considered t**he B/C ratio which has been projected at 1.57 to justify the project.** The FAC agrees that BC ratio has not paid attention to eco system services lost due to diversion of unique riverine eco system. The economics of eco-good and services to be lost or to be lost in future, a detailed study regarding- is required to be done by reputed institutions to take future action and modification if required.

The committee recommends for benefit cost analysis should be done considering the ecological cost of diversion of PTR.

iii. The FAC considered the fact that the Ken River has a course of 55 km through the National Park. A major part of the Ken River in the park and its tributary along with its unique habitats of caves, gorges, rock crevices along both banks of the river will go under submergence at full-proposed level of water. To maintain some scope of breeding and resting sites, and to save some critical forest areas, it is necessary to keep a part of the river without submergence even during the peak height of water. The proposed maximum FRL is likely to submerge the area even beyond Ghairighat and this would significantly affect the forest and connectivity and to ensure that the water level below the Ghairighat, specifically below the road crossing the river. Thus, enough length of the river should be left without submergence during full level of water. This is possible only by reducing the height of dam by at least 10.0 meters.

The FAC feels that the water flow downstream should be regulated in line with the natural flow regime and, in the lean period, 100% of the existing flow regime should be maintained while in the non-lean period, the prescribed minimum by hydrology and aquatic biodiversity experts should be ensured. The break in release of daily minimum water should be considered as destruction of forests. The minimum flow of water in the Ken River may save crocodiles and other aquatic animals and it will also maintain the health of river till it joins the Yamuna. A provision of e-flow has already been made in the EIA and EMP of the project to save the

wildlife including mugger and gharial, and to maintain the water regime downstream of the dam, but the quantity may be prescribed under some agreement so that the provisions are not ignored as happens in the case of other dams. The Committee recommended that the dam height which is 288 meters, as per DPR, can be reduced at least by 10.0 meters. It will reduce the submergence areas of forest area to considerable extent. As pointed out by the sub-committee, the excess water in rainy season can flow out of the dam. The ponds and canals can be made to store this excess water downstream.

Considering the observations referred above the FAC recommends that the water flow downstream should be regulated in line with the natural flow regime and, in the lean period, 100% of the existing flow regime should be maintained while in the non-lean period, the prescribed minimum by hydrology and aquatic biodiversity experts should be ensured. In drought-prone areas, dams are not filled in the dry period when water is most needed. In this background the height of the Dhaudan dam may be re-examined in the interest of conserving the Park and recommends that the height may be reduced by 10.0 meters if not at least 5.0 meter as a trade-off between conservation and development. Water supply from the dam and also adequate flow in the river during monsoon to recharge the ground water from the dam to the site where it meets the Yamuna should be ensured. Some water should also be spared for PTR management including fire management.

iv. As recommended by the sub-committee, there are certain proposed structures such as powerhouses close to the dam and these may be re-examined and avoided in order to minimize disturbance, since power generation is not the primary objective of the project and will exert continued disturbance to the area.
The FAC is of the opinion that the proposed Powerhouse, which have the capacity of 78 MW, shall not be constructed in the forest area to be diverted to avoid constant disturbance in the PTR.

v. The FAC considered the fact that about 2287.5 ha of land will be used for construction of canal. This includes 190.5 ha of forest land. The FAC agrees with the sub-committee that the construction of canal through forest land should be avoided.

The FAC recommends that the canal should be realigned to minimize the use of forest land for construction of canal.

vi. There is going to be significant secondary impacts caused by transportation and construction activities. FAC recommends that technological integration is required in terms of establishing ropeway for transportation of material and people wherever technologically feasible. No building material for the construction of dam/power house/canal or any other purpose should be permitted from the national park/forest area.

vii. FAC considered the sub-committee report and recommends that provision should be made by the project to strengthen and improve habitat management enforcement, and monitoring activities in the core as well as in buffer areas, as there is risk of increased human activities due to this project. Further, support should be provided for buffer management and community activities, including eco-development and skill development programs, for local villagers. Alternative activities for local communities involved in extractive activities inside PTR should be implemented. In the long-term interest of tiger conservation, it is important to consider and implement landscape level conservation, which is administratively/legally effective by some sort of Landscape Management Authority/Council/ Society and should be brought under the purview of tiger reserve management.

viii. FAC considered the sub-committee report and recommends that species such as tiger, vultures and gharial are the key flagship species that are likely to be impacted by this project, there is certainly a need to institute Species Recovery Program in the landscape context and this should be executed after scientifically assessing the population status, response to such disturbance and habitat loss, and long-term viability options.

FAC also recommends that a dedicated team involving State Forest Department, National Tiger Conservation Authority, Wildlife Institute of India and the project proponent including NDWA should oversee this project during and post construction phases, and should provide regular management inputs for ensuring the conditions proposed herewith.

ix. The FAC expressed the concern that the project proponent has not provided the digital terrain model (DTM) for true assessment of the area of forest likely to submerge to the sub-committee. The actual calculation should be based on DTM and the same need to be provided by the project proponent. The sub-committee has reported that total counting of trees in the proposed submergence area has not been done but a sample survey by forest department has estimated that about 18 lakh trees above 20 cm girth at breast height are expected to be submerged in the National Park Area and this number may go up. Equally high number of trees will be cut or lost in the forest areas outside the National Park. Thus considerable quantity of carbon stored as biomass would be released once the dam is constructed, in addition to loss of vegetation diversity.

The FAC also considered the fact that as per DPR the numbers of trees to be felled is around 23 lakhs (above 20 cm.) This figure had been arrived by sampling in 56 compartment of 1.0 ha each. Trees between 10 to 20 cm diameters have not been enumerated. It has been observed by the sub-committee that there is a profuse crop of plants below 20 cm diameter. These plants are around 8-10 years old. The project completion will take 8 years and these trees will not be felled at once. It will take 7-8 years to fell these trees in the submergence area. Most of these trees will move to above 20 cm diameter class during the currency of project construction.

In light of the above the FAC recommends that the sampling intensity should be increased and fresh enumeration shall be carried out by the State Government in consultation with MoEF&CC. This should be done in entire project area.

x. The sub-committee has recommended that felling should not be done at the height of 4 meter below FRL because the water will recede fast below 4m of FRL. The FAC also recommends the same.

xi. **Further the FAC observed that-recommendations made by the National Tiger Conservation Authority (NTCA) as per provisions of Sections 38 0 (2), 38 (0)(1)(b) and 38 (0)(1)(g) of the Wildlife (Protection) Act, 1972 inclusive of recommendations of the NTCA Committee constituted in December, 2013, recommendation of the Committee constituted by the Standing Committee of the National Board for Wildlife (NBWL)vide its 37th Meeting, and discussions held by the Expert Group which was suggested in the 38th Meeting of the SC of NBWL,); vide their letter no. 7-2/2016-NTCA dated 22.08.2016 referred above in para 19 are agreeable and the FAC also agrees with the same.**

22. The minutes of the meeting of the FAC may kindly be seen at **F/X**

23. The recommendation of FAC referred at Para 21 above was placed before the competent authority for consideration and approval. The competent authority has considered the recommendations of FAC and has observed on condition no.21 (3), reproduced bellow:

"*Considering the observations referred above the FAC recommends that the water flow downstream should be regulated in line with the natural flow regime and, in the lean period, 100% of the existing flow regime should be maintained while in the non-lean period, the prescribed minimum by hydrology and aquatic biodiversity experts should be ensured. In drought-prone areas, dams are not filled in the dry period when water is most needed. In this background the height of the Dhaudan dam may be re-examined in the interest of conserving the Park and recommends that the height may be reduced by 10.0 meters if not at least 5.0 meter as a trade-off between conservation and development. Water supply from the dam and also adequate flow in the river during monsoon to recharge the ground water from the dam to the site where it meets the Yamuna should be ensured. Some water should also be spared for PTR management including fire management."*
and observed as under:

"The proposal at 'X' N-28 [Para 21(3)] will have far reaching consequences and we may take view of an expert on hydrology before taking a final call".

The observation of the competent authority may be placed before FAC in its meeting to be held on 25.04.2017 for reconsideration.

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