

**MINUTES OF THE EIGHTH MEETING OF STEERING COMMITTEE ON R&D SCHEME FOR CONSERVATION & DEVELOPMENT HELD ON 2<sup>nd</sup> DECEMBER, 2019 AT MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE, INDIRA PARYAVARAN BHAWAN, NEW DELHI**

The Eighth meeting of the Steering Committee on R&D Scheme for Conservation & Development was held on **2<sup>nd</sup> December, 2019** at Ministry of Environment, Forest & Climate Change, Indira Paryavaran Bhawan, Jor Bagh, New Delhi to consider 3 projects received online under the new R&D Scheme for Conservation & Development. The list of participants is at **Annexure-1**.

**2. Confirmation of Minutes of 6th Meeting of the Steering Committee**

The minutes of the Seventh Meeting of Steering Committee held on 24<sup>th</sup> October, 2019 were circulated to the Committee members and were confirmed subject to the following corrections in the following:

- a) The words “16<sup>th</sup> November 2018” should be replaced by the word “16<sup>th</sup> August 2019”
- b) **3.2** No.90/2018/RE: Project titled “**To quantify the Economic and Ecological Services of Eco-tourism as a Livelihood Option for the Sustainability of the Rhino Population in Manas Tiger Reserve, Assam**” of PI- Dr. Ajay Kumar, Scientist C, Forest Ecology and Climate Change Division, Rain Forest Research Institute, Deovan estate, Sotai Ali, A.T. Road (East), Jorhat, Assam
  - 1) In page 4, Title of the project is changed to “**Quantification of the Economic and Ecological Services of Eco-tourism as a Livelihood Option for the Sustainability of the Rhino Population in Manas Tiger Reserve, Assam**”
  - 2) In page 6, Objective 3 is revised from “To assess the contribution of local communities living in buffer area of Manas National Park. Dependency analysis (Survey) for wild fruits, Medicinal Plant, fuel wood & fodders, number of Tourist etc.”  
to  
“To assess the contribution of Ecological Services and Economic Services as Livelihood Option for the local communities living in buffer area of Manas National Park. Dependency analysis (Survey) for wild fruits, Medicinal Plant, fuel wood & fodders, number of Tourist etc.”
- c) **3.4** No.151/2018/RE: Project titled “**Assessment of Landfill Gas Recovery and Utilization and Reduction of GHG Emission at the Madurai landfill, Tamil Nadu, India**” by PI- Dr.D.Brindha, Assistant Professor, Department of Civil Engineering, Thiagarajara College of Engineering, Madurai 625105
  - 1) In page 11: Project Duration is for 2 years
  - 2) In page 13: In the details of equipment required under the project, an item – New HP Core i7, 8GB Ram Computer for Rs 37,000/- is to be included.
  - 3) Since all the equipment are to be purchased in the first year itself, the Year-wise and Component-wise break-up of cost of project has been revised as given below:

**Revised cost of the project and year-wise break-up of the cost (in Rs):**

Tenure	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total Budget
2 years	<b>12, 81,100</b>	<b>8,35,100</b>	0.00	21,16,200

**The component-wise break-up of revised cost of the project is given below (in Rs.):**

COMPONENT	Year 1	Year 2	Year 3	Total Cost (In Rs.)
<b>Salary</b>	5,10,600	5,10,600	0	10,21,200
<b>Equipment</b>	4,62,000	-	0	4,62,000
<b>Consumables</b>	15000	15000	0	30,000
<b>Travel Cost</b>	50,000	50,000	0	1,00,000
<b>Contingency</b>	25,000	34,500	0	59,500
<b>Institutional Charges</b>	0.00	0.00	0	0.00
<b>Any Other*</b>	2,18,500	2,25,000	0	4,43,500
<b>Total Budget</b>	<b>12, 81,100</b>	<b>8,35,100</b>	-	<b>21,16,200</b>

\*“Any Other” component mentioned in the table above comprises Installation of monitoring wells for conducting pump test (Rs.4 lakhs) and dissemination of project work (Rs.43,500/-), which are equal to Rs.4,43,500/-

4) In page 14, the sentence – “The Committee desired the project should be extended for three years.” is deleted.

**d) Agenda Items 3.7 and 3.8:** The words “4<sup>th</sup> Meeting of TFAC held on 29.05.2019” is replaced by the words “2<sup>nd</sup> meeting of TFAC held on 29.04.2019”.

**3. Consideration of Proposals**

Dr. T. Chandini, Advisor welcomed Shri Ravi Agrawal, Additional Secretary, MoEFCC and Chairman and the members of the Steering Committee and the invited experts including representatives of Wildlife Division and Research & Training (RT) Division of the MoEFCC for consideration of the 8 new projects listed at **Annexure-2**. It was informed that these projects have been received on-line on the MIS-Portal under the new revamped Scheme on R&D for Conservation and Development. The projects were first considered in the meetings of Technical and Financial Appraisal Committee (TFAC) under the R&D Scheme on Conservation & Development and have been recommended for funding by the TFAC.

**The projects were taken up for consideration.**

**3.1** No.275/2018/RE – Project titled **“Tracking and assessment threats of highly critically endangered scaly giant Chinese Pangolin (*Manis pentadactyla*) with special reference to sensitization of local communities for its long-term conservation in north-eastern states of India”**. **PI:** Dr Janmejy Sethy, Assistant Professor, Amity Institute of Forestry and Wildlife, Amity University, Gautam Budhh Nagar, Noida 201303, Uttar Pradesh

**Project Duration:** 3 years

**Geographical location of the project:**

<b>S.No</b>	<b>State</b>	<b>District</b>	<b>Sub -District</b>	<b>Latitude</b>	<b>Longitude</b>
3.	ARUNACHAL PRADESH	CHANGLAN	Vijoynagar	27 1131N	96 59 59 E
4.	MANIPUR	SENAPATI	CHILIVAI PHAIBUNG	24.44 N	93.58 E
5.	MIZORAM	SAIHA	Tuipang	23.43. 37.5816 N	23.43. 37.5816 N
6.	NAGALAND	DIMAPUR	DIMAPUR	25 92 N	93 73E

The proposal was considered in the 2<sup>nd</sup> meeting of TFAC held on 29<sup>th</sup> April 2019. It was placed for reconsideration in the 8<sup>th</sup> TFAC meeting held on 16.09.2019; however the PI did not attend and had sought deferment. In the TFAC meeting held on 29<sup>th</sup> April 2019, the PI had made a presentation and informed that the Chinese Pangolin is listed as Critically Endangered in IUCN List (2016-3) due to high levels of hunting and poaching. Pangolins are one of the most heavily trafficked mammals in illegal wildlife trade globally, driven by demand for meat and scales for traditional medicines. In India, Chinese pangolin is restricted to the north-eastern states only. Its occurrence was way back in 1970s and before. Thereafter, the population of Chinese pangolin in these states declined and till recent times, its distribution was even doubtful. No work has been done on status, distribution, activity pattern, habitat preference and the driving factors for the decline in population of Chinese pangolin in this region. This species is listed as Critically Endangered A2d+3d+4d due to high levels of poaching for meat and scales, both targeted and untargeted, across its range With paucity of research on pangolins in the country; information on trade of pangolins routes and reasons for trading, analysing socio-economic aspects, and awareness campaign for sympathetic towards pangolin will serve as an important factor for conservation of the species. There is virtually no information available on population level and the information on extent of trade is limited and inconsistent.

The proposed study aims to collect baseline information on status, distribution, activity patterns, habitat use and the driving factor for the decline in population and also define solutions for mitigating major threats and initiate implementation of conservation program across North-East India. Educational awareness will be essential for long term conservation of the species and will be crucial to control cases of hunting, poaching and illegal trading in the region. In view of this, the proposed study aims to determining the population status, distribution and suitable habitats of the species as it is a fundamental part of conservation planning for any species in a given area.

The study also focuses on the trends and techniques used for hunting pangolins in the region, involvement of local communities so as to create awareness among the indigenous communities and help in conservation of the species. Detailed information on the area profile and occurrence of the species will be collected from the forest department and local communities (who can be identified the species with accuracy and confidence) in and around the study areas. For determination of the population status and the distribution of Chinese pangolin in the study area, standard ecological methods (line transects, boroscope camera, camera traps, direct sightings and indirect of signs) and questionnaire survey methods (interviews with local people, forest officials and hunters) will be used. Camera-traps (self-activating cameras placed on a frequently used paths) will be used to detect presence-absence of species or to collect an index of abundance for difficult to see species.

The TFAC had observed that the Chinese Pangolin has been vanishing from the North – Eastern States. It could be extinct in future, if urgent measures for its conservation and

measures for curbing trading/trafficking are not taken. The TFAC had suggested that some experts/students from North Eastern University may be included in the team for better co-ordination with locals, finding routes etc. Local support/Collaboration is needed for carrying out such study in sensitive area/state. The TFAC had also desired that the RE Division obtain the views/comments of the Wildlife Division and Wildlife Crime Control Bureau of the MoEFCC on the scope of the proposed project for further consideration. Comments have been received from Additional Director, Wildlife Crime Control Bureau, MoEFCC, vide e-mail dated 03.10.2019 (which was circulated to the TFAC before the meeting) and they have fully supported the study.

The Committee desired that the conservation strategy and alternative livelihood options should be developed as the outcome of the project. Eco-tourism could be an option. Moreover, those households that will directly benefit from the eco-tourism industry should have better knowledge of local natural resources and greater general awareness of conservation issues. One of the basic objectives of ecotourism is to engage local communities so that they benefit from conservation, economic development and environmental education. Locals serve mostly as tourist guides, food providers, or souvenir vendors in the locality. GIS, GPS data should be prepared and movement of animals should be recorded. Activity and movement patterns can be estimated using data collected by direct observations and capture-recapture collected using live traps, camera trapping or using radio tracking devices. It was observed by the Committee that the area of study is large and the PI may find it difficult to work in such large and inaccessible areas. Therefore, it was suggested that the project may be sanctioned initially for one year and then extend for another two years after assessing the work done in the first year.

The TFAC after deliberation had recommended the project for funding initially one year and extendable for another two years after assessing the progress of one year work by TFAC.

**Objectives of the Project:**

1. To study the population status and distribution of Chinese pangolin across different protected areas and reserve forest in North-eastern states of India
2. To determine the habitat preference and activity pattern of Chinese pangolin in the study areas
3. Assessment of conservation threats via hunting, capturing techniques, poaching and illegal trading of pangolin
4. Understanding reasons for hunting of pangolin and social-economic status of communities surrounding habitats of pangolin
5. Identify the degree of trading and trade routes in the North-eastern states of India and through the States of West Bengal (Siliguri) and Bihar upto More border.
6. To develop a Conservation Strategy and Alternate Livelihood Options available to the local communities and persons involved in trafficking and trading of endangered animals and in particular the Chinese Pangolin.
7. Attitude and perceptions of local communities towards Chinese pangolin and pangolin Conservation
8. Sensitization of local communities through educational awareness programme and capacity building

**Expected outputs of the project:**

Considering the fact that Chinese pangolin (*Manis pentadactyla*) is the most hunted mammalian species and is categorized as Critically Endangered species by IUCN and CITES, conservation of the species and constrain its trading in the region will be the prime

objective of the study. This project aims at ground-based survey.

Some of the practical conservation outputs of the study include:

1. Development of maps of trading hotspots zones in the States to strengthen patrolling activities to curb pangolin trade in the state.
2. Reduction of poaching cases due to awareness programs.
3. People's perception towards conservation of pangolin will be changed.
4. Degree of hunting, trading and trading routes including via Siliguri (West Bengal), Bihar upto More border will be available helping to restrain pangolin trade in the region.
5. Students and school children will develop a better mindset towards conservation of wild species in the region.
6. Proper trained and knowledge forest guards will be established through capacity building
7. Gaps between plans of forest management and their implementation by local communities will be reduced.

**(Revised) Outcome of the project**

- (i) Information on the population status and distribution of Chinese pangolin in different landscapes of North East, India. The study will be a first of its kind to identify the status of the critically endangered species in the country.
- (ii) Development of a baseline database on their distribution, relative abundance activity pattern and habitat preference.
- (iii) Development of maps of trading hotspots zones in the state to strengthen patrolling activities to curb pangolin trade not only of North East India but also from Siliguri in West Bengal and to More Border through which most of the trading takes place.
- (iv) Data on extent of hunting, trading and trading routes will be available helping to restrain pangolin trade in the region.
- (v) Conservation strategy and alternative livelihood options should be developed so that people's perception towards conservation of pangolin is changed. Eco-tourism could be an option. Moreover, those households that will directly benefit from the eco-tourism industry should have better knowledge of local natural resources and greater general awareness of conservation issues. One of the basic objectives of ecotourism is to engage local communities so that they benefit from conservation, economic development and environmental education. Locals serve mostly as tourist guides, food providers, or souvenir vendors in the locality. GIS, GPS data should be prepared and movement of animals should be recorded. Activity and movement patterns can be estimated using data collected by direct observations and capture-recapture collected using live traps, camera trapping or using radio tracking devices.
- (vi) Reduction of poaching cases due to education awareness programs. Students and school children will develop a better mindset towards conservation of wildlife in this region.

**Total project Cost: Rs. 36,70,941/-**

**The proposed cost of the project and year-wise break-up of the cost is given below:**

<b>Tenure</b>	<b>1<sup>st</sup> Year (in Rs.)</b>	<b>2<sup>nd</sup> Year (in Rs.)</b>	<b>3<sup>rd</sup> Year (in Rs.)</b>	<b>Total Budget (in Rs.)</b>
3 years	13,09,241	11,47,300	12,14,400	<b>36,70,941</b>

**The component-wise break-up of cost of the project is given below:**

COMPONENT	Year 1 (In Rs.)	Year 2 (In Rs.)	Year 3 (In Rs.)	Total Cost (In Rs.)
Salary	4,68,000	4,68,000	5,04,000	14,40,000
Equipment	1,47,219	0.00	0.00	1,47,219
Consumables	2,00,000	2,00,000	2,00,000	6,00,000
Travel Cost	3,00,000	2,50,000	2,50,000	8,00,000
Contingency	75,000	50,000	50,000	1,75,000
Institutional Charges	1,19,022	1,04,300	1,10,400	3,33,722
Any Other	0.00	75,000	1,00,000	1,75,000
<b>Total Budget</b>	<b>13,09,241</b>	<b>11,47,300</b>	<b>12,14,400</b>	<b>36,70,941</b>

**The details of manpower and equipment required for the project is given below**

Technical-1(Technical on contract); Casual labour (Non-Technical)-1

**Details of equipment required under the project are given below:**

S.No.	Equipment	No of Units
1.	Boroscope Camera -Elvy 1m : 8mm WiFi Endoscope Len 720P Hard Cable Mini Wi Fi for Phone Camera Android Inspection Surveillance Boroscope	10
2.	Digital Camera-Canon EOS 200D 24.2MP Digital SLR Camera with EFS 18-55 mm is STM Lens and EF-S 55-250 mm is STM Lens	1

The project was taken up for consideration by Steering Committee. The PI stated that there are 2 species of Pangolin – i) the Indian Pangolin found all over the country and ii) the Chinese Pangolin, which is found in NE States, parts of Bihar, Siliguri in West Bengal. Scales of the Pangolin are used in traditional Chinese medicine.

Representatives of Wildlife Crime Control Bureau, MoEFCC stated that the Objective No.5 must include trade route not only of NE but also from Siliguri in West Bengal and to More Border through which most of the trading takes place. This was agreed to. The Committee observed that the Consumables must elaborate the details of items such as camps, and camping material, etc for which the bulk of the cost is proposed. The Committee also desired that the PI must submit a Letter of Undertaking endorsed by Head of Institution that no such work has been undertaken and that the equipment being purchased under equipment is not available in the institution and that it would be transferred to the Institution after the completion of the project. The Committee desired that the PI coordinate with the WLCCB and desired that the MoEFCC obtain details of the nodal officer in WLCCB who would coordinate for the project. The Steering Committee after deliberations recommended the project for funding with these conditions.

**3.2 No.398/2018/RE - Project titled “Development of low energy- low carbon ECO cementitious binders via synergistic use of low graded industrial wastes for sustainable development”.** PI: Er. Rajesh Kumar, CSIR Central Building Research Institute, Roorkee

Co-PI: Dr. (Mrs.) Rajni Lakhani, Group Leader & Sr. Pr. Scientist, Organic Building Materials Group, CSIR Central Building Research Institute, Roorkee

**Location of Project:**

S.N.	State	District	Sub-District	Latitude	Longitude
1.	UTTARAKHAND	HARIDWAR	Roorkee	29.8654 degree N	77.9023 degree E

**Duration of the project:** 3 Years

**Objective of the project:**

India is currently the second largest consumer of cement after China. As per Mineral Commodity Summaries- 2016 and 2017, the cement production in 2015 was estimated at 4,100 million tonnes (MT), out of which China (2,350 million tonnes) was the largest producer in the world, contributing about 57 percent to the world output, followed by India (300 million tonnes i.e. 7 percent) and USA (84 million tonnes i.e. 2 percent). In India, there are huge limestone deposits but most of the deposits in India presently available for cement manufacture are either marginal grade or low grade. Hence, urgently a serious thought is essential not only for detailed exploration of limestone deposits to convert the resources to reserves (as per UNFCC), but also for development of a cost effective techniques to use low grade high siliceous limestone in India for production of quality cements. The primary objective of this research will be to explore methods for the development of low energy low carbon composite ECO cements using low graded industrial wastes to reduce the environmental impact of cement production, while maintaining or improving current performance Indian standards.

The cement industries are using high grade fly ash as replacement materials with already manufactured ordinary Portland cement (OPC) clinker. But, till now no attempt has been made to use low grade limestone slurry waste & low grade fly ash in synthesis of OPC cement clinker itself. Because, as such slurry waste cannot be used in cement because of its high loss of ignition.

Every year about 17-18 MT of stone waste is generated from stone industries which may increase to a level of 25 MT in the coming decades. Waste is a fine white powder (<70  $\mu\text{m}$ ), enriched with  $\text{CaCO}_3$  and  $\text{MgCO}_3$  as a main constituent. Major issues from generation of stone waste generation are Ground water contamination due to land filling; Air pollution due to increased level of suspended particulate in atmosphere and Choking of drain in rainy season due to unorganized disposal etc. It is therefore imperative to utilize low grade industrial wastes (after their thermal activation) to develop eco-binders to reduce carbon foot-print. Also, the developed cement will help in conserving the natural resources by utilizing limestone waste. The developed alternative binder will have following advantages:

Development of low energy- low carbon ECO cementitious binders via synergistic use of low graded industrial wastes for sustainable development. The cement industry is facing challenges because of limited reserves of limestone that may last for next 15-20 years and power shortage for manufacturing process because of limited supply of coal. It also consumes huge amount of energy during its production. This has led to the search of alternative cements which could be less energy intensive, environmental friendly and also possess superior property like that of ordinary Portland cement. Exploitation of the potential benefits of the mineralogical constituents of the wastes materials could pay a way

for such kind of development. Some of these cements could be the less carbon cement, calcium sulpho-aluminate based cement etc. For taking urgent action to combat climate change and its impacts, Research in these areas is essentially needed and this will continue to be the priority area of Indian cement and construction industries.

In this project; 3 wastes were supposed to be used i.e. Fly ash (up to 45-50%), Low-grade limestone slurry waste (it is slurry waste and helps minimise mining of limestone because it is disposed off after mining nearby local areas) (up to 30-35%) and Red mud waste/bauxite residue from bauxite mining (up to 15-20%). These things are well stated in the Abstract of Proposal and presentation also. Low-grade limestone slurry waste is a hazardous waste. Low-grade limestone slurry waste is a waste product that is disposed off nearby local areas of mining. Annual disposal can reach up to 20 MT. Therefore it is a huge problem as the particles are lesser than 75 microns, which causes air pollution (by increasing PM2.5 and PM10 levels), land pollution and water pollution. Thus, this waste comes under the hazardous wastes category.

- Up to 30% less CO<sub>2</sub> than normal OPC clinker,
- Reduction in burning temperature: ~250-300°C;
- Fuel consumption: ~20-25% less;
- Electricity costs for the manufacturing process: ~25-30% less.

Further, the use of low-grade limestone slurry waste will help reduce mining of limestone. Therefore, it is not an environmentally degrading and polluting activity. The pollution activity will be minimized by using this waste without any environmental degradation.

The project was considered in the 7<sup>th</sup> TFAC meeting held on 04.09.2019 and based on clarifications submitted by PI vide email dated 10.10.2019 reconsidered in the 9<sup>th</sup> TFAC meeting held on 18.11.2019. The Committee desired that the longevity and strength of materials/products developed in building construction should be assessed as the properties of the products developed by PI would differ from that of conventional cement. The durability /strength, etc should compare well with that of OPC and meet the standards set by Bureau of Indian Standards (BIS) Code for quality parameters. The Committee desired that the products developed should be tested by BIS. The Committee suggested that other waste materials such as from fertilizer Industry may also be used for preparing end products and tested as per BIS Specifications. The Committee desired that linkage with solid waste industry should be established right in the initiation of project implementation and their waste materials including flyash (50% or more) be used for producing materials which are good substitutes for cement. The project may include a component for creating awareness amongst the Industry involving Thermal Power (Flyash), Fertilizer (gypsum), Aluminium (Red Mud), etc for use of their waste materials.

The TFAC had recommended the project for funding with the condition that PI must examine characteristics such as cost, life of the product, strength, eco-friendly nature, vis-a-vis normal constituents and other product mixtures already in use in production of cement. etc. The TFAC observed that PI has sought Equipment grant for a number of equipment, although the Institution is a CSIR laboratory and is well equipped and hence equipment costs may be deleted. This was agreed to by the PI who has agreed to use equipment by outsourcing in IIT Roorkee for advanced instrumental analysis, as per need. After curtailment, the total cost of project was reduced from Rs 87.42 lakhs to 37.42 lakhs.

**(Revised) Specific Objectives**

- i) Selection of industrial waste raw materials for primarily feed composition in cement kiln, based on chemical constituents. In addition to limestone slurry waste, other waste materials such as including flyash (50% or more) from Thermal Power, gypsum from fertilizer Industry, Red Mud from Alumina Industry may also be used for preparing end products and tested as per BIS Specifications.
- ii) Mix proportion and Time- Temperature optimization for ECO- cements
- iii) Development of ECO-binders i.e. OPC based and CSAB based Cements
- iv) Evaluation of different cement phase formation (C3S C2S ratio,
- v) C3S—C3A ratio, C2S-C4A3S ratio etc.)
- vi) Determination of Physico-mechanical, durability, microstructural properties of the ECO cement pastes and mortars,
- vii) Studies of the thermodynamics of Ternary CaO-SiO<sub>2</sub> -Al<sub>2</sub>O<sub>3</sub> or quaternary system CaO-SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-Fe<sub>2</sub>O<sub>3</sub> to understand the cement chemistry,
- viii) Use of the developed ECO binders in certain building applications.
- ix) Longevity and strength of materials/products developed in building construction should be assessed as the properties of the products developed by PI would differ from that of conventional cement. The durability /strength, etc should compare well with that of OPC and meet the standards set by Bureau of Indian Standards (**BIS**) Code for quality parameters. The products developed should be tested by BIS.

**Outputs of the Project:**

Products (02), Patent (01), Publications (05)

**Outcome of the Project:**

- i) Building products (Paver blocks, Tiles and Lightweight materials)
- ii) Low energy- low carbon ECO cements
- iii) Standard Policy Documents /Guidelines for use of the Products

**(Revised) Cost of Project: Rs 37,42,600**

**(Revised) Cost Break-up of project (in Rs):**

Tenure	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total Budget
3 years	10,57,000	13,67,800	13,17,800	37,42,600

**The component-wise break-up of cost of the project is given below (in Rs.): (Revised after deletion of equipment cost of Rs 50,00,000/-)**

COMPONENT	Year 1	Year 2	YEAR 3	Total Cost
Salary	6,72,000	7,92,000	7,02,000	21,66,000
Consumables	3,00,000	4,15,800	4,15,800	11,31,600
Equipment	0	0	0	0
Travel Cost	50,000	75,000	75,000	2,00,000
Contingency	35,000	50,000	50,000	1,35,000
Institutional Charges	0	0	0	0
Any Other	0	35,000	75,000	1,10,000
<b>Total Budget</b>	<b>10,57,000</b>	<b>13,67,800</b>	<b>13,17,800</b>	<b>37,42,600</b>

**Additional manpower Requirement:**

1. Lab Assistant -1
2. Project Assistant (2)
3. MTS -1

The project was considered by Steering Committee, wherein the PI made a presentation. The SC after deliberations recommended the project for funding subject to the following:

The PI will submit a detailed work plan for every year. During 1<sup>st</sup> Year, laboratory studies will be taken up for determining characteristics the materials and wastes and composition to be used. The PI will also tie-up with the Industry from whom the waste materials are to be procured and also create an awareness about the project's proposed objectives for use of their wastes in cement industry. During 2<sup>nd</sup> Year, actual detailed tests will be undertaken and products – characteristics compared with BIS standards. During 3<sup>rd</sup> year, characteristics of the final products vis-a-vis their potential use in comparison with conventional products will be undertaken. The PI will also engage with Industry/potential users of the products for upscaling their production/use.

The Steering Committee also desired that the application be revised online to reflect the aforesaid details. The Letter of Undertaking must in addition to stating that no such work has been undertaken must clearly specify that no equipment is proposed to be purchased under the project. The cost break-up must be revised in the application and also should be consistent with details provided in the Annexures to the application.

**3.3** No.354/2018/RE - Project titled “**Development of performance improved precast lightweight composite materials using solid waste.**” PI: Dr. (Mrs.) Rajni Lakhani, OBM Division, CSIR Central Building Research Institute, Roorkee-247667, Uttarakhand.

**Co-PI:** Er. Rajesh Kumar, Scientist, Room No. 107, OBM Division, CSIR Central Building Research Institute, Roorkee 247667, Uttarakhand

**Project Duration:** 3 years.

**Project Location:** CSIR Central Building Research Institute, Roorkee, Uttarakhand.

**Objectives of Project:**

- Development of lightweight composites using Stone waste and waste pozzolanic materials
- Performance improvement by using natural/synthetic fibres
- Optimization of thermal performance for composite climate
- Scale up of the developed process up to pilot level

**Outputs:**

- i. Products (02 Nos.)
- ii. Process Know how 01 No.
- iii. Patent (01 No.)
- iv. Publications (03 Nos.)

**Outcome:**

- i. Precast lightweight composite materials

The Proposal was considered in the 6<sup>th</sup> meeting of TFAC held on 16.08.2019 and in the 9<sup>th</sup> TFAC meeting held on 18.11.2019 and recommended for funding.

It was informed that Kota stone is low grade limestone (Sedimentary nature) located in Kota, Jhalawar, Ramaganjmandi. Production is more than 20 MT/ year. Main constituents of kota stone are Calcium Carbonate (Low), MgO, SiO<sub>2</sub> (Rich), Al<sub>2</sub>O<sub>3</sub> etc. The processing of Kota stone by chain saw, diamond wire saws from quarries to smaller size results in more than 50% solid waste generation. It was stated that the Kota stone industry causes serious environmental problems, loss of green pasture, choking of drains in rainy season, dust nuisance, pollution of water from contamination and spoiling the aesthetics of the entire region. The CSIR-CBRI has developed a technology wherein 50-70% waste is being utilized as cementitious binder. Products developed include Paver blocks complying IS:1565; Tiles: complying IS: 1237-2012; Lightweight blocks meeting IS: 2185 (IV)-2008; Excellent thermal insulation & good acoustic properties of CFC blocks. Capacity of the plant is 5000 units/day and Profitability: 30-35 %. Stakeholders are Rajasthan State Pollution Control Board, Jaipur and Kota Stone Small Scale Industry Association (approx. 250 industries). Start-up capacity: Two plants has been set-up in Kota by Govt. with the production Capacity of 8,000 for flooring tiles, 3,500 rough pavers and 5,000 blocks/day and utilizing approx. 100 tonnes Kota stone waste per day. However, the amount of wastes generated from flaggy limestone industries is up to 10-12 MT per year and also generated by mining & processing of Kota stone which are accumulated over 50 years are estimated to be about 150 MT. It was informed that every year about 50 million tonnes of stone waste is generated from stone industries which may increase to a level of 350 million tonnes in the coming decades.

It was stated that the proposed research project which would also use Kota stone waste would add additional value by addressing environmental issues such as global warming; solid waste disposal; energy exploitation; and also address strength issues at same density for foamed concrete. The proposal relates to sustainable buildings in terms of Waste utilization, building energy saving policy Light weight, high strength, low thermal conductivity heat insulation, less energy intensive. The Light weight foamed concrete has gained interest in buildings-energy efficiency in terms of thermal insulation and reduce energy consumption in buildings- in terms of building insulation & heat preservation.

The PI informed that Lightweight concrete is a type of concrete, which includes an expanding foaming agent which increases the volume of the mixture while giving additional qualities and lessened the dead weight. High Performance LAC (HPLAC) has lower density, usually in 1100–1950 kg/m<sup>3</sup>, which can reduce over 20-50% bulk density of concrete and the consumption of materials such as steel, resulting in cost savings and economic benefit. Utilization of mineral admixtures such as silica fume, flyash and slag promoted the development of high strength and high performance LAC. HPLAC with compressive strength of 55-60 Mpa and density of 1800-1900 kg/m<sup>3</sup> can be prepared with excellent impermeability and resistance to chloride ion penetration by addition of 10-15 wt% fly ash and silica fume. By introducing 10 wt% of fly ash, silica fume and slag high performance LAC with density of 1624 kg/m<sup>3</sup> and compressive strength of 60.5 MPa was successfully produced. Advantages of Light Weight Composites are High strength, durability, a very high strength to density ratio, Resistance to freezing and thawing, reduce or no drying shrinkage, excellent thermal and acoustical properties, easy transportation, less reinforcement and Reduction in dimensions of foundation. Lightweight reinforced concrete can be used in making structural elements and save money, specially, in High-rise building, building on a low strength soil, where there are not sufficient coarse aggregate mines.

The TFAC had desired that the Light Weight Composites with at least 50%-60% of flyash content should be produced in tile making. Reference materials are also required for comparison. Relative merits and demerits of product developed should be brought out. Data on environment parameters and cost economics of the products produced should be provided. It was also suggested that PI should consult National Thermal Power Corporation Limited, (NTPC) Central Road Research Institute (CRRI), New Delhi. Energy Conservation Building Code (ECBC) guideline should also be consulted. It was suggested that the tiles should be assessed for cost effectiveness, weight, strength, durability and fire resistance. It was observed that the thermocol and other light weight materials will be used in place of wood in tiles. As these may be flammable, the Committee desired that all such products proposed under the project should be tested for fire resistance and flammability, especially if they are to be used as wall panels in building construction.

The TFAC had also observed that the PI has sought funds for a large number of equipment although the Institution is a CSIR laboratory and is well equipped and decided not to fund the Equipment as these are already available in the Institution. The Committee was also of the view that manpower requirement is high and requires revision. The Committee after deliberations recommended the project for funding subject to revision of the project by PI in the light of above mentioned comments of the Committee including reducing the cost of the project and submitting the Revisions on the Portal.

**(Revised) Cost of Project: Revised from Rs 87.20 lakhs to Rs 74.01 lakhs**

**(Revised) Cost Break-up of project (in Rs Lakhs):**

Tenure	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total Budget (in Lakhs)
<b>3 years</b>	30,92,000	21,67,000	21,42,000	<b>74,01,000</b>

**(Revised) Component-wise break-up of cost of the project is given below (in Rs. lakhs):**

COMPONENT	Year 1	Year 2	YEAR 3	Total Cost
<b>Salary</b>	7,92,000	7,92,000	7,92,000	<b>23,76,000</b>
<b>Equipment</b>	0	0	0	<b>0</b>
<b>Consumables</b>	7,00,000	6,00,000	5,00,000	<b>18,00,000</b>
<b>Travel Cost</b>	2,00,000	3,00,000	2,00,000	<b>7,00,000</b>
<b>Contingency</b>	4,00,000	4,00,000	4,00,000	<b>12,00,000</b>
<b>Institutional Charges</b>	0	0	0	<b>0</b>
<b>Any Other</b>	10,00,000	-	-	
<b>Any Other (Dissemination of Research work)</b>	0	75,000	2,50,000	<b>3,25,000</b>
<b>Total Budget</b>	<b>30,92,000</b>	<b>21,67,000</b>	<b>21,42,000</b>	<b>74,01,000</b>

**Additional Manpower Requirement:**

1. JRF/SRF (2)
2. Research Assistant (2)
3. MTS (2)

**Additional Equipment Required (Not Available with Institution)**

<b>Name of Equipment</b>	<b>No. of Units</b>
Autoclave curing machine for concrete	1
Transient Hot Bridge – Thermal Conductivity Meter	
Rheometer for foamed mortar	1
High capacity sieve shaker	1
High Performance Data Acquisition system along with Air Temperature & Humidity Sensors	1
Air content meter	

The proposal was considered in the 8<sup>th</sup> Meeting of Steering Committee. The PI stated that the extra manpower is required for undertaking the job of preparation and testing of materials. The PI reiterated that the manpower sought is required and requested that they be provided.

The Committee desired that cost for dissemination of research work to Industry be given under 1<sup>st</sup> year and 3<sup>rd</sup> year to engage with Industry. The Committee desired that details under “Any Other” for Rs 10 lakhs be provided. The Committee note that Consumables sought for Rs 18 lakhs appears to be high and may be elaborated. The Committee noted that the total cost of consumables for year 2 and year 3 of Rs 30 lakhs is very high and may be revised. The Committee noted that no additional equipment is to be provided under the project and details of equipment sought may be deleted. The Committee desired that another expert be co-opted for the project and details submitted. The Committee recommended the project with revision of cost to be reduced by about Rs 10 lakhs. The Committee desired that the application be revised with the conditions above and recommended the project for funding.

### 3.0 **Any other matter with the permission of the Chair.**

No specific issue was raised or discussed and the meeting ended with a Vote of Thanks to the Chair.

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**ANNEXURE-1****LIST OF PARTICIPANTS OF EIGHTH MEETING OF TECHNICAL & FINANCIAL APPRAISAL COMMITTEE (TFAC) OF R&D SCHEME HELD ON 02.12.2019 IN MoEFCC**

- |    |   |     |     |     |     |                  |
|----|---|-----|-----|-----|-----|------------------|
| 1. | Shri Ravi Agrawal,<br>Additional Secretary, MoEFCC                              | ... | ... | ... | ... | Chairperson      |
| 2. | Dr. Mayank D Dwivedi, Scientist, BSI representing<br>Dr. A.A.Mao, Director, BSI | ... | ... | ... | ... | Member           |
| 3. | Shri G.R.Rambabu, representing Chairman Central<br>Pollution Control Board      | ... | ... | ... | ... | Member           |
| 4. | Ms. R.Ramila, Section Officer, IFD<br>representing AS&FA                        | ... | ... | ... | ... | Member           |
| 5. | Dr.T.Chandini,<br>Advisor   | ... | ... | ... | ... | Member-Secretary |

Special Invitees:

6. Shri S.S.Kandpal, Joint Director, Wildlife Crime Control Bureau, MoEFCC
7. Shri R.S.Thakur, Deputy Director, Wildlife Crime Control Bureau, MoEFCC

MoEF&CC

8. Dr.Rubab Jaffer, Joint Director, RE Division
9. Shri Naresh Jaiswal, Under Secretary (RE)
10. Shri Goldie, Office Assistant, NIC

PROJECT INVESTIGATORS (PIs)/Co-PIs

1. Dr.Janmay Sethy, Assistant Professor, Amity Institute of Forestry and Wildlife, Amity University, Gautam Budhh Nagar, Noida 201303, Uttar Pradesh
2. Er. Rajesh Kumar, CSIR Central Building Research Institute, Roorkee
3. Dr. (Mrs.) Rajni Lakhani, OBM Division, CSIR Central Building Research Institute, Roorkee-247667, Uttarakhand.

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**ANNEXURE-2****Agenda for 8<sup>th</sup> Meeting of the Steering Committee on R&D Scheme, MoEFCC held on 2<sup>nd</sup> December 2019**

Projects to be considered:

<b>S. N.</b>	<b>Project ID No.</b>	<b>Thematic Area</b>	<b>Title of the Project</b>	<b>Principal Investigator</b>
1.	No. 275/2018/RE	Biodiversity Conservation	“Tracking and assessment threats of highly critically endangered scaly giant Chinese Pangolin ( <i>Manis pentadactyla</i> ) with special reference to sensitization of local communities for its long-term conservation in north-eastern states of India”	Dr Janmejy Sethy, Assistant Professor, Amity Institute of Forestry and Wildlife, Amity University, Gautam Budhh Nagar, Noida 201303, Uttar Pradesh
2.	No. 398/2018/RE	Waste Management	“Development of low energy- low carbon ECO cementitious binders via synergistic use of low graded industrial wastes for sustainable development”	Er. Rajesh Kumar, CSIR Central Building Research Institute, Roorkee
3.	354/2018/RE	Waste Management	Development of performance improved precast lightweight composite materials using solid waste.	Dr. (Mrs.) Rajni Lakhani, OBM Division, CSIR Central Building Research Institute, Roorkee-247667, Uttarakhand.

3.0 Any other matter with the permission of the Chair.