

MINUTES OF NINTH MEETING OF TECHNICAL AND FINANCIAL APPRAISAL COMMITTEE (TFAC) OF THE R&D SCHEME FOR CONSERVATION & DEVELOPMENT OF THE MoEF&CC HELD ON 18th NOVEMBER, 2019 AT INDIRA PARYAVARAN BHAWAN, MoEFCC, NEW DELHI.

The 9th meeting of the Technical and Financial Appraisal Committee (TFAC) of the Scheme on R&D for Conservation & Development of the MoEFCC was held under the chairmanship of Prof C.R. Babu on **18th November, 2019** at MoEFCC, Indus Conference Hall, Ground Floor, Jal Wing, Indira Paryavaran Bhawan, New Delhi. Advisor (RE), MoEF&CC and Member-Secretary of the TFAC welcomed the Chairperson and members of the TFAC for the meeting. List of participants is at **Annexure-1**. A total of **25 proposals** consisting of 3 proposals received under the new R&D Scheme on Conservation & Development and 22 on-going/completed projects under the old R&D Scheme were considered, and these are listed at **Annexure-2**.

1.0 Confirmation of Minutes of the Eighth Meeting of TFAC held on 26th September, 2019

In the minutes of 8th meeting of TFAC, Item 1 should be read as confirmation of Minutes of Seventh Meeting of TFAC held on 26th September 2019. The minutes of the 7th Meeting of the Technical and Financial Appraisal Committee (TFAC) held on 4th September, 2019 were confirmed.

2.0 A total of **25 proposals** of the R&D Scheme were taken up for consideration.

I RECONSIDERATION OF R&D PROJECTS RECEIVED ONLINE UNDER NEW R&D SCHEME:

1. No. 70/2018/RE – Project titled **“Municipal Waste Recycling A Model for Sustainable Energy and Clean Products – Application of AI and Institutional Policy for MSWM (Application of Modern Methods in Municipal Solid Waste Management Services relevant for situation in India)”** by PI: Prof R. Murugesan, Department of humanities and social sciences, National Institute of Technology, Tiruchirapalli 620 015

Duration: 3 years 3 months

Location of Project: Selected Municipalities of Delhi, Hyderabad, Tiruchirappalli, Chennai in Tamil Nadu

Project Details: The present systems of municipal solid waste collection across the cities in India and in general to the developing countries generally serve only a limited part of the urban areas. The key issue lies in lack of physical/ technological & financial resources. Only 50 to 60% of the solid waste is collected from the semi-urban and urban areas, these serve less than 50% of the population and once collected, it is mostly disposed of inadequately in uncontrolled open dumps. Approximately 85% of the total waste generated by the hospitals and clinics can be classified as regular domestic wastes, whereas 10 percent can be regarded as infectious and 5 percent as non-infectious but hazardous wastes.

The present study will conduct in depth review of research on the Municipal Solid Waste Management at the policy level – and involve the following: implementation level (taking into account) the role of Municipality (4 locations viz., Delhi, Tiruchi, Chennai, Hyderabad), understand the Municipality functions, financial budgets, skills set, attitude at the time of collection, dumping, recycle, reuse plans conducting questionnaire based survey to elicit information on the research problems identified in the project and evolve a socio-economic model, management model with scientific approach for MSWM taking into account typical cases in 4 geographies and international experience. The research work also find out the Innovative approach of recycling PET & Rubber and produce waste PET plastic derived additive using chemical processing .Preparation of modified asphalt binder with the addition of crump tyres and PET derived additives will also be carried out.

The proposal was considered in the 2nd TFAC meeting held on 29th April 2019. The Committee had observed that PI has not mentioned the plastic/PET in the objectives of the research proposal. A lot of work has already been done on plastic/PET. PI has given a large number of objectives (12nos); the committee desired that the PI may resubmit the project proposal with clear objectives and outcome and the views/comments of the Hazardous Substances Division of MoEFCC also obtained by RE Division on the revised proposal before approval.

Revised Objectives of the project:

- i) Review the prevailing rules, guidelines and the institutional structure for solid waste management including the municipal wastes. Review the types, scope and models of waste disposal undertaken by the municipalities & see the best practices.
- ii) Review the roles of all stakeholders including private sector participation to meet the objectives of solid waste management. Review the refuse collection methods, reuse pattern basis the pilot locations, end pattern, availability of landfills, extent of use/ reuse of resources and recycling resources technologies.
- iii) Review and assess, the technology solution to reduce, recycle, reuse or reconversion to the usable products (as raw material/ input product for usable materials). Basis the review, the availability existing technology solutions, design and develop applications, technology based on AI platform for recycling of solid wastes, especially the plastics for the ideal application and use by relevant stakeholders at an affordable cost or making them available in a suitable partnership model, taking into account the sustainability factors.
- iv) Review the new product, technology and services to suit the end use for proper planning & collection at source including transportation, recycling, reuse planning, and disposal of the solid waste as per specifications Basis the review, techno-economic feasibility, assess for deployment in the pilot locations for refuse collection, reuse and recycling of plastic wastes. The feasibility will also recommend relevant stakeholders and their roles for sustainable livelihood of potential stakeholders.

(Revised) Expected outcome of the project:

1. Model for pelleting Plastics/ PET Kiosks (a fabricated machine-like Automated Plastic Crushing Machine (ACM) of miniature size multipurpose activities) with AI application
2. Model for Waste to Energy bins (fabrication) with AI applications ...
3. Model for the Preparation of PET derivatives
4. Model for the Preparation of Crump Rubber (CR)

5. A Technology intensive product for prototype development and commercialization of technology and large-scale deployment.

(Revised) Cost of Project in Rs 203.19 lakhs

Cost Break-up of project (in Rs lakhs):

Tenure	1 st Year	2 nd Year	3 rd Year	Total Budget
3 years	68.79	73.02	61.38	203.19

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

COMPONENT	Year 1	Year 2	YEAR 3	Total Cost
Salary	30.37	30.37	30.23	90.97
Equipment	12.50	11.00	7.00	30.50
Consumables	7.50	9.50	6.00	23.00
Travel Cost	1.80	4.80	2.80	9.40
Contingency	2.85	3.02	2.54	8.41
Institutional Charges	8.97	9.53	8.01	26.51
Any Other	4.80	4.80	4.80	14.40
Total Budget	68.79	73.02	61.38	203.19

COMPONENT	Details	Total Cost (in Rs lakhs)
Salary	(Research Personal) PDF:2 JRF/SRF:3 Project Eng:2 Field Investigator/Surv.-1 Project Manager/Admin: 2 Consultant Adv.:1	120.81
Design, Development of proto-type design/ model for MSW recycling	(Raw materials, AI s/w fabrication devices Pelleting, balling etc.)	47.50
Travel Cost		11.00
Project overhead		23.88
Institutional Charges		
Total Budget		203.19

The details of manpower required for the project:

Technical

Sr.No.	Position	No of Manpower
1.	Research Fellows (JRF/SRF)	6
2.	Research Officer	1
3.	Research Assistant	1
4.	Specialist	1

Non Technical

Sr.No.	Position	No of Manpower
1.	Project Administrator	1

Details of equipment required under the project:

S.N.	Name	No of Units
1.	Models for pelleting kiosks	2
2.	Model for waste to energy bins (fabrication)	2
3.	Preparation of PET derivatives	1
4.	Preparation of Crump Rubber (CR) through ambient grinder & fabrication of test ring for mixing asphalt, CR & PET	1
5.	Rheological characterization of modified asphalt	1

The revised project proposal was considered in the 9th Meeting of TFAC held on 18.11.2019. PI made presentation before committee. It was informed that the TFAC provided inputs for revising the proposal, accordingly the proposal was modified: (i)The project will have focused objectives and clear outcomes (ii) Suitably link the objectives, methodology and a phase wise implementation of the project to be given

Accordingly, the objectives have been illustrated with focused approach,

- (i) design and fabricate a product for recycling municipal waste especially plastics (PET and low-density polythene – LPDE carry bags)
- (ii) fabricate a modular product that has multifunctional approach, commonly used applications, AI/ ML applications to meet the type of end use.
- (iii) the product will have key attributes of a Modular approach, recent technology applications (AI/ML), achieve better operational efficiency, sustainable & scalable and have efficient conversion technology and such features as per the market needs

Methodology involved in PHASE 1 : REVIEW RESEARCH & DESIGN APPROACH :A brief review of the demands, needs & requirements of the plastic producers (relevant stakeholders) and the extent of use by the institutions engaged in municipal refuse collection & disposal.Brief review of the institutional functions, financial budgets, skills set, attitude at the time of collection, dumping, recycle, reuse plans if any (basis the literature) in case such information not available (conduct sample survey based on research fellows conducting questionnaire based survey) to elicit information on the research problems identified in the project.

PHASE 2: TECHNOLOGY DEVELOPMENT & PRODUCT DESIGN (*for variety of users such as Plastic product manufacturers, MunicipalCorp.*) The Research Team will conduct review of the demand, supply and institutions (across variety of stakeholders) engaged in the recycling of MSW especially the plastic sector. Understand the present status of the plastic pelleting and technologies used for such recycling/ reuse of municipal wastes especially the plastics .Design and develop technology for plastic pelleting for variety of plastics as available from the primary source, MSW, and such other sources as identified.

Technology development involve :(i) Key attributes of the new technology for balling, pelleting, crushing and development of semi-finished product from the recycled MSW especially plastics (a low cost options with AI applications) (ii)the plastic strands are cut into small **pellets**, which are used as feedstock for making new **plastics** products.

Depending on the type of **plastics**, the **recycled plastic pellets** can be used to make a wide range of **plastic** products such as **plastic** bags, containers, trays, pipes, CD cases, garden furniture, carpets, and clothing.

PHASE 3: PILOT TEST AND TRIAL RUN OF THE FABRICATED DEVICE FOR MSW RECYCLING The final fabricated product will be tested for the pelleting, balling, crushing of the products especially plastics in the grades of PET and other commonly as available in MSW; Review the AI application for wider use of the products and devices for the above processes and registration of Patents for the some of the application, where technologies are not available Review the feasibility for wider scale application of the device/ product for MSW; Pre-launch of the product and devices with key stakeholders such as All India Plastic Manufacturers Association, Plastic Manufacturers Association at Chennai, Hyderabad, Delhi for wider applications will be done.

PI proposed a 2nd project approach Innovative approach of recycling PET & Rubber (i) To produce waste PET plastic derived additive using chemical processing; (ii) Preparation of modified asphalt binder with the addition of crump tyres and PET derived additives ;(iii) Study of rheological properties on the modified asphalt binder as per government regulations.

Innovative approach of recycling PET & Rubber (i) To produce waste PET plastic derived additive using chemical processing(ii) Preparation of modified asphalt binder with the addition of crump tyres and PET derived additives (iii) Study of rheological properties on the modified asphalt binder as per government regulations.

Advisor Team also includes experts from foreign university - Dr. Badri G, University of Washington, Seattle, USA; Dr. Sangeetha Khorana, Griffith University, UK and Dr. B. Ramaswamy, Vice Chancellor, PRIEST University, Tanjore-, Tamil Nadu along with PI & Co-PI. 2 key institutions are engaged, The Energy Research Institute (TERI). SAS reviews the project in the Policy perspective NIT design project on technology, management, financial and scale up process

The Committee observed that the project is mainly theoretical with no innovation involved. The project proposal is mainly focussed on review of literature and rules and regulations rather than on technology development. The technology for plastic processing, shredding, and pelletisation is a repetition of what is already available. The manpower requirement as proposed is also very high and not justified. The Committee informed that the National Green Tribunal(NGT) Order No. 606/2018 dated 14.05.2019 for Compliance of Municipal Solid Waste Management Rules, 2016 (Union Territory of Lakshadweep) requires compliance of recycling of municipal solid wastes. Transfer of proceedings in Writ Petition No. 888/1996, Almitra H. Patel Vs. Union of India &Ors., has been by the Hon'ble Supreme Court of India, vide order dated 02.09. 2014. The latest NGT Writ Petition No. 606/2018 dated 14.05.2019 in the case of Almitra H. Patel Vs. Union of India & Ors., for Compliance of Municipal Solid Waste Management Rules, 2016 also deals with the matter. The Committee also was of the view that shredded rubber has not been used for embankment of roads/canals/etc. Further, it was observed that the project formulation is vague and the roles of foreign advisers the consultant of The Energy Research Institute (TERI)and the PI are not defined.

The Committee after deliberations did not recommend the proposal for funding.

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**” by PI: Presentation by Er. Rajesh Kumar, CSIR Central Building Research Institute, Roorkee and to consider his representation received vide email dated 14.10.2019

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

Location of Project:

Sr.No.	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.

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.

Specific Objectives

- i) Selection of industrial waste raw materials for primarily feed composition in cement kiln, based on chemical constituents

- 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 Physicomechanical, durability, microstructural properties of the ECO cement pastes and mortars,
- vii) Studies of the thermodynamics of Ternary $\text{CaO-SiO}_2\text{-Al}_2\text{O}_3$ or quaternary system $\text{CaO-SiO}_2\text{-Al}_2\text{O}_3\text{-Fe}_2\text{O}_3$ to understand the cement chemistry,
- viii) Use of the developed ECO binders in certain building applications.

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

The project was considered in the 7th TFAC meeting held on 04.09.2019, wherein the TFAC after deliberation had decided to not recommend the project. The PI has vide email dated 10.10.2019 represented against the decision of TFAC which is reproduced below:

“Comment 1: *The Committee stated that disposal of wastes and waste management of hazardous wastes in an environmentally safe manner is the major concern of this Ministry. The Committee suggested that PI should attempt to use various types of waste materials such as construction and demolition wastes, flyash more than 35% mix (> 50-60%), Red mud waste from bauxite mining, hazardous wastes, etc which are presently major environmental challenges for the country and require being utilised in a major way in an environmentally safe and effective manner instead of low-grade limestone.*

Response: *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 no need to do mining 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.*

But PI thinks the TFAC committee understood low-grade limestone, instead of low-grade limestone waste. I have also well mentioned low-grade limestone slurry waste; not low-grade limestone. 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. These above things were discussed in the Proposal and presentation too.

Yes, of course. In India; 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.

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:

- Up to 30% less CO₂ 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.

Comment 2: The Committee was of the view that that the focus of the project should be on waste management rather than use of low grade limestone, which involves mining low-grade limestone, which is an environmentally degrading and polluting activity.

Response: It is low-grade limestone slurry **waste**; not low-grade limestone (Stated in project proposal and presentation too). And thus as it is a waste, therefore no need to do mining. Therefore, it can not an environmentally degrading and polluting activity. The pollution activity will be minimized by using this waste without any environmental degradation.

Comment 3: While identifying alternate materials, PI must examine characteristics such as cost, life of the product, strength, eco-friendly nature, etc.

Response: About this, the detailed methodology has been well discussed in the submitted project proposal along with the two flow charts.

Comment 4: The PI has asked very high Equipment grant although the Institution is a CSIR laboratory and is well equipped.

Response: PI can curtail whole equipment funds and can do the outsourcing in IIT Roorkee for advanced instrumental analysis, as per need. After curtailment, the fund can reduce to **37.42 Lakhs from 87.42 Lakhs.**"

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

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

Tenure	1 st Year	2 nd Year	3 rd Year	Total Budget
3 years	61,77,600	13,44,600	12,20,400	37,42,600

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

COMPONENT	Year 1	Year 2	YEAR 3	Total Cost
Salary	66,0000	66,0000	66,0000	19,80,000
Consumables	300000	300000	300000	9,00000
Travel Cost	35000	50000	35000	1,20,000
Contingency	25000	25000	25000	75,000
Institutional Charges	457600	99600	90400	647600
Any Other	-	10000	10000	20,000
Total Budget	61,77,600	13,44,600	12,20,400	37,42,600

Additional manpower Requirement:

1. Lab Assistant
2. Project Assistant
3. MTS

PI made presentation before 9th TFAC held on 18.11.2019. It was informed that 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 µm), enriched with CaCO₃ and MgCO₃ 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.

Synopsis of the Project:

1. To set testing and verification of suitable waste raw materials as primary feed materials.
2. Influences of raw mix composition and different burning temperatures on clinker properties.
3. Clinker characterization, cement performance testing.
4. The correspondence between the predicted phase composition and real phase composition.
5. The influence of quantities of different phases on the hydration behavior and strength development.
6. The ECO- binder and product development.

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 Committee after deliberations recommended the project for funding. The Committee desired that the break-up of cost component should be provided by the PI in the Correspondence section of the MIS-Portal.

3. 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”** by PI: Dr Janmejy Sathy, 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:

S.No	State	District	Sub -District	Latitude	Longitude
3.	ARUNACHAL PRADESH	CHANGLAN	Vijoyanagar	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 2nd meeting of TFAC held on 29th April 2019. It was placed for reconsideration in the 8th TFAC meeting held on 16.09.2019; however the PI did not attend and had sought deferment.

In the TFAC meeting held on 29th April 2019, it was 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 Committee 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 Committee 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 Committee 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.

The project was taken up for consideration by TFAC in the meeting on 18.11.2019.

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
6. Attitude and perceptions of local communities towards Chinese pangolin and pangolin Conservation
7. 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 state 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 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 in North East India.
- (iv) Reduction of poaching cases due to education awareness programs.
- (v) People's perception towards conservation of pangolin will be changed.
- (vi) Degree of hunting, trading and trading routes will be available helping to restrain pangolin trade in the region.
- (vii) 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:

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

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	468000	468000	504000	1440000
Equipment	147219	0.00	0.00	147219
Consumables	200000	200000	200000	600000
Travel Cost	300000	250000	250000	800000
Contingency	75000	50000	50000	175000
Institutional Charges	119022	104300	110400	333722
Any Other	0.00	75000	100000	175000
Total Budget	13,09,241	11,47,300	12,14,400	36,70,941

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

Casual Labor-1(Technical); 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

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

II RECONSIDERATION OF R&D PROJECTS OF OLD R&D SCHEME:

4. F.No. 19-72/2014-RE – Project titled **“Dairy Wastewater treatment using pilot –scale hybrid sub-surface Constructed Wetland systems operating under different recirculation rates”** by PI: Dr.Pradeep Sharma, Graphic Era University, Dehradun 248002

Consideration of the proposal was deferred as PI had expressed his inability to attend the meeting due to personal reasons.

5. F.No. 14/87/2014-RE - Project titled **“Fish community structure and patterns of diversity along impacted and unimpacted streams of Vindhya and Satpura hill ranges, Central India”** by PI: Dr.Anuradha Bhat, Indian Institute of Science Education and Research- Kolkata, Mohapur Campus, Viswavidyalaya, Mohanpur 741252, Nadia, West Bengal

Consideration of the proposal was deferred as PI had expressed her inability to attend the meeting due to personal reasons.

6. F.No.14/34/2014-ERS/RE - Project titled **“Patterns of tree cavity occurrence and use by vertebrates in tropical forests of the Western Ghats: a community web approach and its implications in forest management”** by PI: Dr.P.Balakrishnan, Division of Conservation Biology, Jawaharlal Nehru Tropical Botanic Garden & Research Institute, Palode, Thiruvananthapuram-695562, Kerala

Project Details: This is an on-going project started on 21st June, 2016 for a period of 3 years with a total cost of Rs. 42,52,910/-. **The tenure of the project was over on 20th June, 2019.** A total of Rs 18,94,000/- has been released so far out of approved project cost of Rs 42,52,910/-. Unaudited Utilization Certificate, Expenditure Statement, GFR 12A, GFR 19, invoices, DBT details and one copy of Annual Progress report for FY 2017-18 have been received.

The project was listed for consideration of the Annual Progress Report for FY 2017-18 but the PI has however not attended the meeting and hence was not considered. It is proposed to consider it in the next meeting of the Committee. PI requires furnishing audited UC, ES for FY 2017-18.

PI has submitted APR for FY 2018-19 and other requisite documents. He has also sought one year extension (19.06.2020) and for transfer of project from JNTBGRI to KFRI. Permission/ No-objection of Director, JNTBGRI dated 14.08.2019 for transfer of the project from JNTBGRI has been attached. Director, JNTGBRI has vide letter dated 14.08.2019 also conveyed his “No-objection” for transfer of the project. The PI also informed that the research Fellows working in the project have no objection to moving from Tiruvanathanpuram to Thirussur for completion of the balance work in the project.

The Committee noted that documents have been received without a covering letter from the PI. The Committee after deliberations agreed for the release of the next instalment subject to receipt of documents including APR with a covering letter on the Institution letterhead and subject to all the documents received being complete and in order. The Committee also agreed for one year extension of the period of the project from 20.06.2019 until 19.06.2020 without entailing additional costs. The Committee also agreed for the transfer of the project from JNTGBRI to KFRI, Thirussur.

7. F.No.14/16/2013-RE - Project titled **“Reproductive biology of Scleractinian corals in Andaman and Nicobar Islands”** by PI: Dr.C.Raghunathan, ZSI Andaman and Nicobar Regional Centre, Port Blair 744102

The project was considered in the 1st Steering Committee meeting held on 07.06.2018.

Project Details: The project was started on 31st August, 2014 for a period of 3 years with a total cost of Rs. 44,45,000/-. Project tenure was over on 30th August, 2017. A total of Rs 33,36,250/- has been released so far out of approved project cost of Rs. 44,45,000/-. The PI has submitted FTR. Consolidated UC and other documents received vide letter dated 21.10.2019.

Broad Objectives of the Project:

- i) Studies of fecundity of scleractinian corals in selected families at different seasons.
- ii) Studies on growth and regeneration of corals by sexual and asexual mode of reproduction.
- iii) Studies on substrate specificity for the settlement of coral’s planula larvae.
- iv) Coral transplantation studies on selected species in permanent monitoring plots.
- v) Ex-situ studies on coral lifecycle.

The Steering Committee had desired that the study findings may be shared with the State Governments where coral reefs are found in our country for implementation of recommendations/ findings. The PI had agreed to submit Consolidated UC duly signed and with seal of the relevant authorities at the time of project study. In addition, supporting documents such as details of permanent equipment purchased under the project, invoices and photographs of permanent equipment transferred to parent institution after completion of study from the HOD to be furnished. FTR has been circulated to PCCFs of the State Govts of all coastal States, A&N Islands Admn. and Lakshwadeep Adm for implementation

of recommendations/ findings vide Ministry's letter dated 23.07.2019. No response has been received from any of the States.

The TFAC appreciated the work carried out and after deliberations agreed for release/settlement of balance funds and for closure of the project.

8. F.No.19-56/2013-RE - Project titled **“Impact of Environmental Bioaerosol Pollution on Human Health: A “case-control study” for Exacerbation of COPD in North Indian Population”** by PI: Dr.Chirashree Ghosh, Department of Environmental Studies, University of Delhi 110007

Project Details: This is an on-going project started on 1st November, 2015 for a period of 3 years with a total cost of Rs. 37,72,216/-. The tenure of the project's term will be over on 30th October, 2018. A total of Rs. 31,06,644/- has been released so far out of approved project cost of Rs 37,72,216/-. Original documents such as UC, ES are awaited. In addition, information on DBT related data is also awaited.

Objectives: The objective of the approved project is to establish relationship between environmental pollutant Bio-aerosol exposure and exacerbation of Chronic Obstructive Pulmonary Disease (COPD), to analyze and categorize the concentration of different fractions of Bio-aerosol in indoor and outdoor environment and conduct epidemiological study to evaluate respiratory dysfunction with reference to bioaerosol exposure and development of COPD etc.

PI made a presentation on the progress of the study. It was clarified that the population studies were restricted to NCT Delhi. PI obtained clearance during 2015-16 for collecting human samples from GTB Hospital & UCMS Institutional Ethical Committee (IEC), to get the access for indoor Bio-aerosol environmental monitoring and recruitment of staff. This study was undertaken in three Socio-Economic Zones namely SEZ-I (Low), SEZ-II (Mid) and SEZ-III (High). Different sites based on different land-use configuration such as dumping site, commercial site, University health Centre, University library, Patel Chest Respiratory Hospital and life style attributes were selected and on that basis, two experimental modules (outdoor and Indoor) were prepared.

Major findings of the study carried out so far:

- (i) Land use pattern has a bearing on the microbial dynamics.
- (ii) Seasonal trends varied with the local micro-climate.
- (iii) There are various potential season dependent factors (other than meteorological parameters) which affect the microbial count at each site.
- (iv) Outdoor as well as indoor microbial counts showed a similar seasonal pattern in all SEZs i.e., lowest in pre-monsoon season.
- (v) The indoor microbial count was influenced by outdoor microbial count across all SEZs, despite the use of different ventilation systems.

Other findings include:

1. Aerosolised microbial count at diverse residential areas majorly depends on build-up in environment.
2. COPD exacerbation episodes increase with fall in temperature.
3. COPD exacerbation episodes increase with increased bacterial counts.
4. No linear relationship was established with Relative Humidity and Fungi.

The PI informed that as approval for purchase of two major equipment Bio-aerosol cascade Impactor & Multimode ELISA Reader was not received from the Ministry, the project work

was delayed during past two years could not be completed in time. PI had sought ex-post facto approval for purchase of bioaerosol cascade Impactor in 2017 and approval for purchase of alternate equipment - multimode reader, spectrophotometer Nanodrop facilities.

The allotted budget under manpower head hasn't been exhausted fully as on date due to late joining of research assistant (since April, 2018). The tenure of project was for 3 years (from November 1st, 2015 to 30th October, 2018). The PI had sought extension of project by five more months i.e from 1st November, 2018 to 31st March, 2019 for completion of the project and submission of FTR with no extra fund to complete the following:

- (i) Continuation of site specific regular Bio-aerosol monitoring along with OPD patient follow-up specifically tagged confirmed COPD patient.
- (ii) Conducted site specific survey for generating primary data base for epidemiological study (to evaluate respiratory dysfunction).
- (iii) Continuation of genomic DNA extraction, RNA extraction and preparation of samples.
- (iv) Specific primers for RAPD (Random Amplification of Polymorphic DNA) method and for Investigation of serum cytokine level through ELISA (Enzyme-linked immune sorbent assay) method is undergoing.

The Steering Committee after discussions had agreed to the above. The Committee had desired to know the composition of bio-aerosols (fungi and bacteria) found in PM10 and PM2.5 in the geographical of study. The Committee had requested PI to furnish documents such as APR to be sent to Ministry at the earliest along with other documents.

An Interim Report for FY 2019 has been submitted vide e-mail dated 18.11.2019 and documents such as UC, ES, etc also have been sent vide email dated 14.11.2019.

The PI made a presentation before the TFAC. It was stated that as the project got delayed in terms of release of funds, certain equipment could not be purchased and alternate equipment had to be purchased. The PI gave a presentation on the status of the 4 balance activities which needed to be completed. It was stated that:

- In both indoor sites as well as outdoor sites –an uniform trend has been observed. The Bioaerosols count showed a continuous decreasing trend from November to January month, however there is a sudden upsurge in the month of February.
- November being month of highest concentration. Because of humid conditions that persisted due to rainfall, provided favorable atmosphere for the growth of airborne pollutants.
 - Season has an influence on the microbial size distribution
 - I/O ratio shows indoor sources are major contributors of bioaerosol emission in comparison to outdoor sources
 - Bioaerosols are maximum in stage 3 , stage 4 and stage 5, possibly due to agglomeration of microbes
 - Bioaerosol are respirable and can penetrate deep into the bronchioles and alveoli of an exposed individual
- COPD exacerbation episodes increase with fall in temperature.
- COPD exacerbation episodes increase with increased bacteria counts.
- No linear relationship could be established with RH and Fungi

The PI informed that the work relating to **Objective 4 given below** has not been completed. **Objective 4:** To evaluate correlation among (i) seasonal and temporal bioaerosols enumeration, (ii) inflammatory cytokine levels, (iii) respiratory dysfunction in order to

identify the role of Gene Environment interaction in COPD in association with ambient bioaerosols.

The PI sought an extension upto May 2020 for completion of the study and for the submission of FTR.

The Committee noted that the composition of bio-aerosols (fungi and bacteria) found in PM10 and PM2.5 in the geographical of study as sought by Steering Committee is yet provided. The Committee after deliberations agreed for another extension of the project until May 2020 for completion and submission of FTR with no additional budget. The Committee decided that no further extension should be provided to the PI for completion of the project. The Committee agreed for release of next instalment as per GFR 2017, subject to receipt of Hard copy of the Interim Report and hard copies of documents submitted to be complete and in order.

9. F.No.14/13/2013-ERS/RE - Project titled **“Assessment of Anthropogenic pressure and its impact on Forest and Grassland Ecosystem of Dachigam National Park, J&K India”** by PI: Dr. Azra Musavi, Department of Economics, Aligarh Muslim University, Aligarh 202001

Objectives:

1. To quantify dependence of local communities on park resources and its contribution to local livelihoods.
2. To investigate impact of dependence on structure of Dachigam forest and grassland ecosystems and map areas affected by resource extraction for restoration.
3. Examine park-people conflicts and attitudes of people towards conservation of Dachigam and alternatives to forest resources.

The study Area of Dachigam National Park (DNP) is 141 Km², located in North-West Himalayas under the Biogeographic Zone (2A) of India (Rodgers & Panwar 1988) and between Latitude 34° 05'– 34° 11' N and Longitude 74° 54' E– 75° 09' E, about 22 km far from Srinagar . It is broadly divided into Upper and Lower Dachigam.

Most of the villagers are dependent upon DNP for their livelihood in terms of the following ecosystem services:

- Fuelwood was one of the most utilized ecosystem goods in the selected villages & constituted 26% of total monetary value of ecosystem goods derived from DNP
- Value of Timber & Medicinal Plants also had high monetary value (>20%) ecosystem goods from DNP
- Fodder was also an important ecosystem good collected by local inhabitants
- Fish is also collected by local inhabitants for livelihood

In addition, pastoralists were also dependent upon DNP. About 70% families were willing to support forest department in conservation efforts. There was negligible land ownership and lack of funds for growing fodder. Due to a lack of purchasing power and lack of funds for growing fodder, income generation through livestock through grazing. If there were restrictions they would either steal or agitate.

Broad Recommendations:

- Local communities & Pastoralists should be involved in planning alternatives
- The public delivery system of alternative cooking fuels should be strengthened
- Alternatives like rotational grazing, limiting herd-size & developing alternative pastures need to be explored

- Awareness of need for conservation should be spread both among local communities & graziers
- Government should take initiative to bring the marginalized groups including the graziers in the mainstream through better education and alternative employment opportunities to reduce their dependence on DNP

The Committee after deliberations recommended that the project be closed and balance payments if any be released if all the requisite documents have been submitted and are in order.

10. F.No.24/06/2010-RE - Project titled **“Integrated Farming System in Degraded Coastal Land Areas of West Bengal and its Socio-Economic and Environmental Impact on the People”** by Prof Kalyan Bhattacharjee (PI) and Shri Somnath Saha (Co-PI, Community for Social Work, 84 Rabindra Pally, Shyam-Nagar, North 24 Parganas, West Bengal 743127

The project was considered in the 3rd meeting of Steering Committee held on 30.08.2019.

Project Details: The project was started on 10th May, 2016 for a period of 3 years with a total cost of Rs. 56,43,635/-. The tenure of the project will be over in 9th May, 2019. A total of Rs 39,56,028/- has been released so far out of approved project cost of Rs 56,43,635/-. This is an NGO. Audited Utilisation Certificate, Expenditure Statement, GFR 12, DBT details, photographs of equipment and Annual Progress Report for the FY 2017-18 have been submitted in May, 2018.

Objectives: The objective of the approved project was Identify the probable reasons of resource mis-utilisation and its impact of socioeconomic condition of the people, improve productivity of degraded land and water resources of the coastal region through integrated farming system approaches, enhance livelihood security and employment generation for the poor farming communities of the coastal region, empower stakeholders including men and women farmers through capacity building and skill development, assess the impact of integrated farming system (IFS) on socioeconomic and environmental upliftment to identify the pathway of IFS and its impact on resource productivity, to examine the nature and costs of those impacts and to suggest appropriate adaptation strategies and evolve adequate mitigation measures.

Introduction of diversified cropping in the same farm land and at the same time to reduce input cost and to increase the income of the individual land holders and increase high cost benefit ratio, Development of marketing facilities improve the economic benefit among the disadvantaged people. Integrated Farming System (IFS) where the total ecology is maintained in a sustainable approach with a goal of profit maximization from a single piece of land throughout the year and to mitigate climate aberrations/contingent planning in one go and multi farming system with emphasis on multi-cropping, rotational cropping, inter-cropping, mixed-cropping practices with allied activities like horticulture, livestock, fishery, agro-forestry, apiculture, conservation/ etc. are proposed to enable farmers not only in maximizing the farm returns for sustaining livelihood, but also to mitigate the impacts of drought, flood or other extreme weather events and at the same time promoting alternate micro-enterprises like organic manure/super compost production units, Goat farming/poultry farming, mushroom cultivation, fishery based activities etc.

Co-PI Shri Somnath Saha had attended the meeting and made a presentation on the progress of the study. Co-PI gave a presentation.

The Steering Committee after deliberations had desired that the Report be forwarded to Ministry of Agriculture for dissemination to the farmers with the help of their KVKs, etc. The Committee had observed that the NGO needs to register on the MoEFCC NGO Portal and submit GFR-12A and GFR-19 on the PFMS portal.

PI has submitted the FTR in November 2019 which was taken up for consideration by the TFAC. PI did not attend the meeting and the Co-PI Shri Somnath Saha PI made a presentation before the TFAC. The PI stated that the following interventions were taken up under the project:

(i) Participatory Intervention

A. Soil and Water Conservation

- Construction of slope bunds through integrated farming system
- Bund Stabilization with cultivation of different horticultural crops

B. Soil Health Management

- Compost pits
- Diversified cropping with legumes
- Duck- cum- fish Farming – The dropping of duck are recycled as manuring improve nutrient status value
- Regular Soil test and application of inputs according to soil test value

C. Crop Management

- Diversified crop management with at least three crop in the same land simultaneously
- Diversified farming to harness maximum sunlight and get sustained income
- Propagation techniques of different horticultural crops through nursery raising
- Integrated crop -livestock system

D. Promotion of Marketing Of Bio Inputs And Organic Agriculture Produces

- Identification of market outlay in the District headquarter
- Vegetable gardens for own use and sale of excess vegetable
- Selling of fish and duck through duck – cum Fish farming

(ii) Field Level Intervention

- An integrated farm plan with new cropping pattern
- Harvesting of rainwater through intensify land use and diversify farming practice through providing good quality irrigation water for Rabi / Summer crops. Initiation of integrating farming practice for demonstration and technology dissemination covering (i) Fish cum Horticulture (ii) Fish cum Vegetable Farming (iii) Integrated Crop cum Fish Farming
- Adoption of different propagation techniques of different horticultural crop through construction of nursery
- Diversified cropping practice with different agronomic , vegetable and leguminous crop has been introduced in the agricultural farming system and identification and application of different components to reduce the input cost of cultivation followed by
- Intensive practice of diversified farming through innovation of produced organic compost analysis.

- Use of biofertiliser & biopesticide such as *Azotobacter*, *Azospirillum*, Phosphate solubilising bacteria, neem-cake etc in the agricultural field to improve the soil health and reduce the production cost
- Use of bio-manure in field level to observe its efficiency in increasing yield of field crops
- Analysis of soil sample through laboratory and kits methods on regular basis and application of organic manure on the basis of soil fertility status

iii) Intervention of Enterprise in Framing System for Employment and Income Generation

- Vegetable Garden for own use and sale of excess vegetable
- Sale of horticultural seedling through nursery management system

The PI stated that the integrated farming system provides scope not only to augment income of the farmers but also bring improvement in soil health through recycling of organic waste and thereby increase the overall productivity of the crop. The energy obtained from the IFS in various forms is much higher than energy input as the by products/waste of these allied enterprise provide all the raw material and energy required for the food chain in another system. There is an urgent need to study the nutrient dynamics of soil with continuous cropping and recycling of manorial resource with different system. Land shaping cum sweet water storage structure is the recommended practice to combat dual problem. It was suggested that, in 20 % area of the land a rain water harvesting pond should be dug out and the soil spread over the rest of the plot. This technology sustain the farmer with long-term storage of sweet water for cultivation of the land in coastal areas.

The PI gave the following recommendations:

- i) Reframing the agricultural systems in an integrated way (i.e practice of Integrated Farming Systems) towards improving socio-economic and environmental condition of people and equally involving the needs of ecosystem to address equally the questions regarding food, fibre, medicines, homestead materials etc.
- ii) Reducing input costs, and thereby equally increasing income of all land holders through introduction of bio-diversified cultivation practices.
- iii) Preparation for soil and water conservation in mini watersheds taken as a unit of ecological system based on existing land and water resources in farms as are present in the project area.
- iv) Increasing community practice for production of organic composts, vermicompost, biofertilisers and bio-control agents for efficient utilization of all environmental parameters in soil to crop plants involving butterflies, bees, crop-friendly insects, etc.
- v) Enhancing skill and capacity building among farmers and all stakeholders in the project area by introducing IFS including organic compost, vermicompost production, hands-on practice for different propagation techniques through nursery, preparation of bio-fertilisers and bio-control agents etc. including marketing linkage.

The TFAC after deliberations decided that the project is completed and recommended release of balance funds to PI, if all the necessary documents have been submitted and are found to be in order. The TFAC also desired that the FTR be circulated to Ministry of Agriculture, ICAR, State Agriculture, Animal Husbandry and Fisheries Depts for their information and use.

11. F.No.14/41/2014-RE - Project titled **“Studies on the moth fauna of Pachmarhi Biosphere Reserve – an assessment of the species richness, relative abundance and distribution as environmental indicators”** by PI: Dr.S.Sambath, Central Zone Regional Centre, Zoological Survey of India, Scheme No.05, Plot No.169, Vijay Nagar, Jabalpur, Madhya Pradesh 482002

The PI made a presentation. It was stated that Moths play a significant role in the terrestrial ecosystem as one of the efficient pollinators, ecological indicators; serve as food of various animals including insects. Hence, they are one of the important components considering in the insect biodiversity conservation. They are highly habitat sensitive to change in the environment due to biotic and abiotic factors which directly or indirectly affect at the species level. It also have economic importance as most of them cause injuries to various plants and attain the status of pests of economically important agriculture, horticulture crops and forest tree species.

The present study also helps to generate baseline data on distribution, diversity, population status and conservation of moth fauna of Pachmarhi Biosphere Reserve. The information would available for wildlife manager and other forest administrators for the preparation of the management plans. Suitable conservation measures would be suggested for moth species studied.

Objectives of the project

1. To determine the species composition and relative abundance of moth population across different season and habitat in Pachmarhi Biosphere Reserve.
2. To determine the microhabitat associations, host plant relationships and to relate moth species composition to vegetation across the different habitat.
3. To prepare the distribution map of the moth fauna using GIS techniques.

Objectives undertaken so far

1. Four Field survey have been carried out in Bori WLS, Pachmarhi NP & Satpura Tiger Reserve as parts of PBR to assess the species composition of moths.
2. Survey have also been made to record the vegetative composition of different localities of above Conservation areas.
3. 1150 morpho species have been collected with the help of Light Trap.
4. Data have been analyzed to find out species composition and relative abundance.

Work Completed:

- Four surveys were conducted from Bori Wildlife Sanctuary, Satpura Tiger Reserve and Pachmarhi National Park and surrounding areas, district Hoshangabad, Madhya Pradesh.
- A total of 1145 morpho species were collected, and were identified into 139 species and 112 genera belonging to 17 families in 10 super families.
- Of the 139 species recorded, 51 species belonging to Erebidae, 25 species belonging to Crambidae, 16 species belonging to Noctuidae, 16 species belonging to Geometridae, 07 species belonging to Nolidae. 05 species each belonging to Notodontidae, 04 species belonging to Euteliidae, 03 species belonging to
- Sphingidae and Pyralidae, 02 species belonging to Bombycidae, and 01 species each belonging to Ypnomeutidae, Cossidae, Thyrididae, Hyblaeidae, Drepanidae, Lasiocampidae and Uraniide .
- Host-Plants of the moth species identified have also been collected.
- During the course of study, 121 species belonging to 95 genera were added to the moth fauna of Pachmarhi Biosphere Reserve. Of the 121 species, 42 species belonging to 39

genera were added during the reporting period. These are *Xyleutes persona* Le Guillou, 1841, *Banisia plagifera* Butler, 1886, *Anobostra (Loryma) varians* Butler, 1898, *Bostra indicator* Walker, 1863, *Cirrhocrista brizoalis* Walker, 1859, *Glyphodes onychinalis* Guenee, 1854, *Haritalodes derogata* Fabricius, 1775, *Lamprosema tampiusalis* Walker, 1859, *Leucinodes apicalis* Hampson, 1896, *Paliga machaeralis* Walker, *Parotis marginata* Fabricius, 1794, *Pycnarmon alboflavalis* Moore, 1888, *Pycnarmon cribrata* Fabricius, 1794, *Synclera traducalis* Zeller, 1852, *Metanastrina aconyta* Cramer, 1777, *Ocinaria albicollis* Walker, 1862, *Trilocha varians* Walker, 1855, *Maxates acutissima* Walker, 1861, *Ectropida shoreae* Prout, 1934, *Hypomecis cineracea* Moore, 1888, *Isturgia disputaria* Guenee, (1858), *Scopula pulchellata* Fabricius, 1794, *Neocerura liturata* Walker, 1855, *Netria viridescens* Walker, 1855, *Laelia* sp., *Lymantria rhodina* Walker, 1865, *Psimada quadripennis* Walker, 1859, *Hypena abyssinialis* Guenee, 1854, *Hypena varialis* Walker, 1866, *Gesonina nigripalpa* Wiltshire, 1976, *Grammodes geometrica* Fabricius, 1775, *Lophoptera illucida* Walker, 1865, *Lophoptera* sp., *Earias vitella* Hampson, 1912, *Nolathripa* sp., *Maliattha quadripartita* **Walker, 1865**, *Acontia marmoralis* Fabricius, 1794, *Athetis tarda* Guenee, 1852, *Pericallira ricini* Fabricius, 1775, *Psimada quadripennis* Walker, 1859, *Risoba obstructa* Moore, 1881, *Helicoverpa assulta* Guenee, 1852, and *Agrotis segetum* Denis & Schiffmuller **respectively were recorded for the first time from this biosphere**

The Committee after deliberations decided that the funds should be released for next instalment subject to receipt of APR and other requisite documents such as UC, ES, etc and if are complete and in order.

12. F.No.14/8/2014-RE - Project titled “**Exploration of Biodiversity and Conservation issues of Talley Valley Wildlife Sanctuary, Arunachal Pradesh with reference to wildlife species distribution along climate and topographical gradients**” by PI: Dr.Ashalata Devi, Assistant Professor, Dept. of Environment Science, Tezpur University, Napaam, Tezpur, 784028 Assam

The PI informed that she would not be able to attend the meeting and hence the project was deferred for consideration in the next meeting.

Internal Consideration of projects of Old R&D Scheme:

13. F.No.14/122/2013-RE - Project titled “**Diversity and microhabitat utilization pattern of spiders in Satpuda landscape**” by PI: Dr.Atul Keshava Rao Bodke J.D.Patil Sangludkar Mahavidyalaya Daryapur, Maharashtra 444803

The project was considered in the 1st Steering Committee meeting held on 07.06.2018.

Project Details: The project was started on 31st January, 2014 for a period of 3 years with a total cost of Rs. 24,17,500/-. Project tenure was over on 30th January, 2017. A total of Rs 16,76,910/- has been released so far out of approved project cost of Rs 24,17,500/-. The PI has submitted FTR.

The Steering Committee had desired that specimens of newly found species be also given to ZSI for their catalogue. The Committee noted that the ecosystems of these spiders of Satpuda Landscape require being conserved as the spiders perform various ecosystem services in maintaining ecological balance and control of insect populations. The study

findings may be given to the relevant institutions and departments of State Government for implementation of recommendations/findings. In addition, the PI is requested to furnish to Ministry a Consolidated UC with supporting documents such as details of permanent equipment purchased under the project, invoices and photographs of permanent equipment transferred to parent institution after completion of study from the HOD to be furnished. FTR can be finalised based on response on the comments sought above.

The Ministry had forwarded copies of the FTR to PCCFs of the Depts of Env & Forest of the States of Madhya Pradesh and Maharashtra and also to Director, ZSI. No response has been received from the States. **Director, ZSI has vide letter dated 11.09.2018 has responded** stating that the study is the first of its kind in the study area with complete details and information on the landscape. It is a original piece of work and is relevant and significant to the current state of knowledge of spiders of Satpuda landscape. Of the 7 species, 3 are new to science along with record of 3 families, 5 genera, and 5 species as additional to Indian fauna. ZSI has also stated that this information could be basis for a conservation plan for the spiders of Satpuda landscape.

The TFAC after deliberations recommended closure of the project and for release of balance of funds/settling of dues. Requisite documents such as consolidated UC, ES etc are required from the PI for processing for settlement of dues/payment of balance release of funds.

14. F.No.19-116/2008-RE - Project titled **“Utilisation of soil macro and microorganism for the decomposition of cellulosic waste materials”** by PI: Dr.M.Vasanthy, Dept of Environment Biotechnology, School of Environment Sciences, Bharathidasan University, Tiruchirapalli 620024

The proposal was considered in the 2nd meeting of Steering Committee held on 17.07.2018.

Project Details: The project was started on 02.09.2010 for a period of 3 years for a total cost of Rs. 30,04,080/-. The tenure of the project was over on 01/09/2013. A total of Rs 24,86,700/- has been released so far in 3 instalments out of approved project cost of Rs 30,04,080/-. The PI has submitted the FTR. PI has also submitted consolidated audited UC along with supporting documents during the meeting.

Outcome of the study:

- Earthworms can be used for conversion of ligno-cellulose waste into manure, thereby reducing the aesthetic and solid waste pollution generated by these wastes.
- However, High Density Poly Ethylene (HDPE) used as lining in paper cups were not biodegraded by either bacteria or by the earthworms used in the study.

The PI informed the Committee that, in view of these important findings, environmental awareness campaigns were organised by the PI for different target groups of people such as local communities, schools, farmers, house wives etc of Ariyalur district, Tamil Nadu, South India for motivating them to replace use of HDPE lined paper cups with cups made of ceramic or stainless steel and use of leaf/ceramic/stainless steel plates instead of plastic plates as the most feasible solution for management of solid wastes.

The Committee after deliberations desired that the findings and outcome of the study be shared with Hazardous Substances Management (HSM) Division of the Ministry and with CPCB and for obtaining their comments/views, if any. The Committee also requested the PI to furnish an audited consolidated UC along with supporting documents for final settlement of dues.

It was informed that the FTR was circulated to CPCB and to HSMD of MoEFCC vide Ministry's letter dated 18.10.2018 seeking comments on the FTR, if any, however **no response has been received.**

The TFAC recommended for closure of the project and for release of balance funds/settling of dues if any, subject to receipt of all requisite documents which are complete and in order.

15. F.No.14/27/2010-ERS/RE - Project titled "**Habitat Ecology and Species Diversity of Cordyceps in district Pithoragarh, Central Himalaya**" by PI: Dr.Chandra Singh Negi, Department of Zoology, LSM Government Post Graduate College, Pithoragarh (Uttarakhand)

Project Details: The project was started on 31.01.2012 for a period of 3 years with a total cost of Rs. 23,81,750/-. Project tenure was over on 30.01.2015. A total of Rs 19,18,100/- has been released so far out of approved project cost of Rs. 23,81,750/-. This case was considered in 2nd SC meeting held on 18th July, 2018. The PI had made a presentation.

The Steering Committee after deliberations had desired that ICFRE, FRI, BSI, ZSI and State Biodiversity Board may also be consulted on the FTR for their comments/views and also forwarded to State Government and Forest Department of Uttarakhand for implementation of recommendations/findings and for necessary follow up. The Committee requested the PI to furnish an audited consolidated UC along with supporting documents for settling the accounts.

The FTR was circulated as recommended by SC above vide Ministry's letter dated 15.10.2018 to ICFRE, Director, BSI and ZSI, Uttarkhand State Biodiversity Board, Chief Secretary and Additional Chief Secretary, Government of Uttarkhand seeking comments, if any. No response has been received from any of the aforesaid organisations.

The project was again internally discussed by the Steering Committee in its 5th meeting of Steering Committee wherein the Committee had noted that the PI has completed the project in 2015 but settlement of dues and formalities for completion are still incomplete.

- (i) For completion of the project with MoEFCC and for settlement of dues, the following documents - GFR 12A and GFR -19 are required to be submitted by the PI through PFMS Portal and the Expenditure Statement & Utilisation Certificate are required be uploaded on the PFMS Portal.

The TFAC noted that this has been received/completed by PI and the balance payments due may be released to the PI.

16. F.No.14/16/2006-RE - Project titled "**Floristic studies on Macrophytic diversity of Nameri National Park (Assam) and Pakke Tiger Reserve (Arunachal Pradesh)**" by PI: Dr.Nilakshi Devi, Lecturer, Dept. of Botany, Guwahati University, Guwahati-7891014

The project as considered in the 2nd Meeting of Steering Committee held on 18.07.2018.

Project Details: The project was started on 01.12.2008 for a period of 3 years with a total cost of Rs. 7,66,080/-, which is revised to Rs. 9,17,280/- on account of Fellowship arrears. Project tenure was over on 30.11.2011. A total of Rs 6,79,446/- has been released so far out of approved project cost of Rs 9,17,280/-. FTR was accepted by Apex committee in its 6th meeting held on 11.02.2015, however details of outputs and outcome are not available in records. The PI has submitted FTR.

Broad Objectives of the project:

- i) Classify the species on the basis of a) Status: RET, endemic, abundant and dominant, etc. b) Ethnobotanical and other uses: food, medicine, material culture etc.
- ii) Categorize the species on the basis of their presence i) near streams, rivers, water bodies and dry places, etc. ii) in Core area and periphery i.e. disturbed habitats (in open and closed area).
- iii) Relate the presence and absence of faunal species on the basis of above.

The Steering Committee after deliberations desired that FTR may be forwarded to State Biodiversity Board of Assam, National Biodiversity Board and Botanical Survey of India (BSI) and to State Governments of Assam and Arunachal Pradesh for their information and comments, if any and for implementation of recommendations/findings. The PI was requested to furnish an audited Consolidated UC, ES and other supporting documents for settling of accounts.

The FTR was forwarded to PCCF, Govt of Assam and Arunachal Pradesh and to Assam State Biodiversity Board via Ministry's letter dated 18.10.2018 for comments and implementation of recommendations. No response has been received. The TFAC recommended that the project may be processed for settlement of funds/balance payments subject to receipt of all requisite documents and found to be complete and in order.

17. F.No.19-29/2011-RE - Project titled **"STREAT- Sustainable Semi-Decentralized Sewage Treatment- Wastewater Reuse, Nutrient Recovery and Biogas production in the Delhi Metropolitan Area"** by PI: Dr. Mukesh Khare, IIT, New Delhi 110016

The Project was considered in the 3rd meeting of Steering Committee held on 30.08.2019.

Project Details: The project was started on 16.04.2012 for a period of 3 years with a total cost of Rs. 21,52,800/-. Project tenure was over on 15.04.2015. A total of Rs 10,75,250/- has been released so far out of the total approved project cost of Rs. 21,52,800/-.

Objectives: The objective of the approved project was to introduce a technology for treatment of municipal wastewater in a decentralised manner, instead of sending to a STP through extensive sewerage network and pipelines which are cost intensive. **Rotating biological contactor or RBC** is a biological treatment process used in the treatment of wastewater following primary treatment. The already compact RBC can be obtained as a modified module by systematic extension, such as micro filter and disc membrane. All three units will work with a driving motor on one shaft, and thereby may not

require any further treatment for N- and P- elimination- that N and P can be reclaimed with locally available additives.

Co-PI of the project had made a presentation to the SC.

Objectives of the project:

- Development of RBC as a decentralised option for treatment of sewage.
- Treatment of the post-RBC effluent for removal of pathogens and recovery of P so as to make it suitable for irrigation purpose.
- Anaerobic digestion of the sewage sludge mixed with other locally available organic solids so as to recover energy with simultaneous use of the digested solids as biofertilizer.

Major findings of the study:

- The laboratory scale study gave a promising result proving decentralized systems such as RBCs are in the long run cost efficient as well as environmentally sustainable sewage treatment technology. The need of the hour is on-site wastewater treatment, RBC is the best viable option.
- Ozonation proved to be an efficient disinfection technology. The pathogen count were negligible.
- Phosphorus recovery using lime is an answer for exporting phosphatic fertilizers in India. The way-old technology of precipitation proves efficient and cost effective.
- Anaerobically digesting the sludge from RBC makes the system self-sufficient.

The Steering Committee had desired that a summary table be prepared giving comparison of the conventional wastewater treatment technology vis-a-vis this technology developed on three issues: (i) Efficiency in terms of treatment of the wastewater in terms of physico-chemical characteristics (parameters) of the input (wastewater) and output (treated water) and how they compare with ISI standards, (ii) Cost of treatment per litre or MGD including feasible scale of operation (maximum and minimum), (iii) long-term use of technology (sustainability) in terms of O&M. The MoEFCC could forward the details of the technology for pilot-scale and wider use thereafter in specialised Missions and Programmes such as National River Conservation Programme (NRCP), Namame Gange Scheme of MoWR&GR, Swatchh Bharat Mission of Department of Drinking Water, M/o Rural Development, Smart Cities Programme of M/o Urban Development, and State Governments such as Govt of NCT of Delhi, Administration of A&N Islands, Lakshwadeep Island, etc. Copy of the FTR may also be forwarded to CPCB for their comments.

The Steering Committee had also requested the PI to furnish pending documents such as consolidated audited UC, ES, photographs of permanent equipment, Bills & Invoices of Permanent Equipment, balance 8 pending UCs of IIT, Delhi for settling the balance amount/dues by the Ministry. In addition, 10 copies of FTR may also be provided for circulation by MoEFCC to the Ministries/Departments as given above.

The PI has furnished the details in a summary table vide letter dated 07.10.2019, which was circulated to the TFAC. The TFAC noted that the response of the PI is vague and the issues sought by the Steering Committee have not been answered. The Committee noted that all the 3 issues have been left unanswered with no specific quantified data in the Table: (i) Efficiency in terms of treatment of the wastewater in terms of physico-chemical characteristics (parameters) of the input (wastewater) and output (treated water) and how

they compare with ISI standards, (ii) Cost of treatment per litre or MGD including feasible scale of operation (maximum and minimum), (iii) long-term use of technology (sustainability) in terms of O&M. The table has not provided specific data comparing the technology tested with conventional technology vis-a-vis BIS Standards on Drinking Water Quality. Also cost comparison in Rupee terms for every litre of water treated has not been given. The TFAC also reiterated SC's observations and sought CPCB's comments on the FTR and the Addendum table provided by PI.

The TFAC after deliberations decided that the matter should be brought back to the TFAC for its consideration upon receipt of the aforesaid details both from PI and comments from CPCB.

18. F.No 14/257/2013 - Project titled **“Aquatic Fungal Diversity of Hill Streams of Himachal Pradesh – Monographic Study and Its in-vitro Screening for Lignocellulotic Enzymes”** by PI: Dr.I.B.Parasher, Professor, Dept of Botany, Panjab University, Chandigarh – 160014.

The project was considered in the 5th TFAC meeting held on 03.07.2019.

Project Details: The project was started on 7th September, 2015 for a period of 3 years with a total cost of Rs. 28,95,000/-. The tenure of the project was over on 6th September, 2018. A total of Rs 18,20,000/- has been released so far out of approved project cost of Rs 28,95,000/-. PI had been requested to make a brief presentation before the Committee on the Outputs-Outcome of the Project and for furnishing of documents for settling of accounts. PI had attended the meeting and submitted 5 copies of FTR & Executive summary, equipment bill and photographs.

The Steering Committee had noted that a large number of new species have been recorded under the study. The Committee had desired that a copy of this study be forwarded to Director, BSI for their information and use and comments, if any. PI was also requested to furnish audited consolidated Utilization Certificate, Expenditure Statement, GFR 12, GFR 19, DBT details and any balance Bills/Invoices for settling of accounts.

The FTR was forwarded to Director, BSI and comments received by email dated 13.06.2019 were considered. The Committee, after deliberations, desired that the PI prepare an Addendum Report of 3-4 pages with point-wise response to issues raised by Botanical Survey of India, Kolkata and submit the same to the Ministry. Addendum report has been received from PI on 29.10.2019 incorporating point-wise response to queries which had been forwarded to BSI for their comments. Comments of BSI vide email dated 13.06.2019 received from Director, BSI were circulated to TFAC and considered.

The TFAC after deliberations decided that the project has been completed and the project closed. The Committee also recommended that balance payments/settling of dues, if any, be released to the PI subject to receipt of all requisite documents which are complete and in order.

19. F.No.19-22/2011-RE - Project titled **“Validation of Soil Amendments and Microbial Culture in reducing pesticides residues in Soil, Crops, and ground water under field conditions”** by PI: Dr.Anjana Srivastav, Department of Chemistry, College of Basic Science & Humanities, GB Pant Univeristy of Agriculture & Technology, Pantnagar, Uttarakhand

The aforesaid project as considered in the 2nd meeting of Steering Committee held on 18.07.2018.

Project Details: The project was started on 01.04.2012 for a period of 3 years with a total cost of Rs. 25,37,760/-. Project tenure was over on 30.09.2015 (including 6 months extension). A total of Rs 21,10,960/- has been released so far in four instalments of the total approved project cost of Rs. 25,37,760/-. The PI has submitted a copy of FTR submitted to Ministry earlier, during the meeting.

The Steering Committee after deliberations had desired that copies of FTR be circulated to ICAR, Ministry of Agriculture, GoI and with Agriculture and Horticulture Depts of Govt of Uttarakhand and U.P. for their comments/views, if any and also for implementation of recommendations/ findings of the study.

The TFAC was informed that the FTR had been circulated to the aforesaid Ministries/State Dept and Institutions. A response dated 02.04.2019 had been received from Indian Council of Agricultural Research which was circulated to the TFAC. The TFAC after deliberations decided that the comments of ICAR be forwarded to the PI for her information. The Committee recommended closure of the project and for release of balance payments/settling of dues, if any subject to receipt of all requisite documents which are complete and in order.

20. F.No. 23/23/2012-RE - Project titled “**Conservation of Seven RET medicinal plants of the Western Ghats through standardisation of seed and seedling identification, germination, species restoration, seed and field gene banking**” by PI: Dr.C.Anil Kumar, Senior Scientist, Conservation Biology Division, JNTGBRI, Thiruvananthapuram, Kerala

This case was considered in 4th Meeting of SC held on 28.09.2018 wherein PI made a presentation on the APR. The FTR was considered in the 7th meeting of TFAC held on 04.09.2019.

The project was started on 21.06.2016 for a period of 3 years with a total cost of Rs. 42,52,910/-. The tenure of the project will be over on 20th June, 2019. A total of Rs 27,93,815/- has been released so far out of approved project cost of Rs 42,52,910/-. Carry forward letter issued for FY-2017-18. (Rs 15,75,743 dt.Nov.2017). Second instalment of Rs. 8, 99,815 was released during 2018-19. Documents for FY 2018-19 as well as consolidated for the project tenure awaited. Amount to be settled/sanctioned is Rs 14,59,095

The Steering Committee after deliberations had observed that the study is unique and the findings are important and need to be implemented for the survival of the tree species which offer cavities for various types of other species is very important. The trees form a complex ecosystem support a large number of various types of biodiversity by offering species-specific micro habitats for invertebrates such as insects, and worms and vertebrates such as birds, snakes, amphibians, etc. and require being conserved and protected. Such species in all types of forest ecosystems and biosphere reserves require being conserved and protected. The Committee recommended further release of funds for its completion and the database so prepared should be shared with States and Forest institutions in the country for their knowledge, use and implementation.

The PI had requested for six months extension of the project (Up to this financial year 31st March 2019) without additional fund for the following:-

- To plant seedlings and replenish floral wealth at the recently flooded selected areas of Kerala state.
- Seed storage studies and reintroduction of endemic species *Rauwolfia hookeri* and *R. micrantha*, and restoration of *Ensete superbum* and *Piper barberi*.

The Committee had agreed for extension of the scheme without additional funds.

The Ministry had received the Final Technical Report which considered by the TFAC in its 7th meeting held on 04.09.2019. The TFAC had suggested that the PI should submit: a) A Protocol for Germination, b) number of seedlings produced using this Protocol, and c) number of seedlings introduced in the field, localities where seedlings were planted along with photographs. The information submitted to Ministry should be circulated to concerned Ministry/State Department(s)/ Institutions such as BSI, State Biodiversity Board for their information. An amount of Rs 3 lakhs requires to be released by Ministry. The TFAC after deliberation accepted the Final Technical Report (FTR) subject to submission of details as sought above for the record of the Ministry and recommended the closure of the project and release of balance amount/fund due to PI.

The Addendum Report was received from the PI vide letter dated 04.10.2019 and considered by the TFAC. The TFAC after deliberations noted that the PI has responded to the details/requisite information sought by the TFAC. The TFAC recommended that the project has been completed well and recommended closure and release of balance payments/settling of funds subject to receipt of all requisite documents such as UC, ES, etc which are complete and in order.

21. F.No.19-183/2013-RE - Project titled **“Nanno-bioremediation of Textile Industrial Effluents in Tiruppur District, Tamil Nadu”** by Dr.P.Jegathambal, Prof., Water Institute, Karunya University, Coimbatore, Tamil Nadu

The MS, TFAC informed that an email dated 26.09.2019 has been received from the PI stating that the project work was started after receiving the first instalment of the project funds (Rs. 18,26,500) on 26.09.2016. Tenure of the project was over on 25.09.2019. PI had requested MoEFCC for the release of the second instalment to continue the project work on 25.12.2017. The project was reviewed in the Fourth meeting of the Steering Committee held on 28.09.2018 but the the second instalment of amount Rs.9,49,786 was received only on 29.03.2019, after uploading of all documents in PFMS and completing EAT module as per standard procedures. Considering the release of the second instalment only on 29.03.2019 and also based on our planned objectives to be completed (both in laboratory and industry), PI has requested that the project be extended till December 2020 with an expectation to receive the third instalment of Rs. 14,40,714/-. PI has assured that the project can be completed with significant results during the extension period of the project and the funds provided will be utilised with all austerity and purposeful manner.

The TFAC after deliberations decided that the project can be extended for one year subject to the following: i) presentation to be made by PI on the progress made on release of 2nd instalment, ii) receipt of an APR and submission of all requisite documents which are complete and in order.

3.0 Draft OM on “Revised Emoluments for Junior Project Fellow and Senior Project Fellow engaged in projects of MoEFCC and its Institutions and Offices”

A Draft OM prepared by Division was circulated to members and discussed. After deliberations, the TFAC recommended the Draft OM on “**Revised Emoluments for Junior Project Fellow and Senior Project Fellow engaged in projects of MoEFCC and its Institutions and Offices**”, which is annexed (**Anenxurure-3**) to the minutes.

4.0 Any Other Matter with the Permission of the Chair

4.1. Correction in Minutes of 4th TFAC meeting held on 29.05.2019.

22. F.No.14/8/2013-RE) “**Genetic Diversity analysis and conservation of Threatened *Salvadora oleoides***” by Dr. Maneesh Singh Bhandari, Division of Genetics and Tree propagation, Forest Research Institute, Dehradun

The TFAC after deliberations approved the incorporation of the following under item 22 of minutes of 4thTFAC meeting:

The PI has submitted vide letter dated ‘Nil’ a Work Plan on the modifications suggested by Director, BSI. The TFAC after deliberations recommended extension of the Project upto March 2020 for completion of balance work as per the Revised Work Plan submitted by PI without additional cost”

The meeting ended with a Vote of Thanks to the Chair.

ANNEXURE-1**LIST OF PARTICIPANTS OF NINTH MEETING OF TECHNICAL & FINANCIAL APPRAISAL COMMITTEE (TFAC) OF R&D SCHEME HELD ON 18.11.2019 IN MoEFCC**

- | | | |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 1. | Prof. C. R. Babu (Retd.), Prof Emeritus
and former Pro-VC, University of Delhi | Chairperson |
| 2. | Dr.M.Dwarkanath | Member |
| 3. | Dr. Dr. K. Chandra Sekar Scientist-E
Representing Director, G.B. Pant National Institute of Himalayan
Environment and Sustainable Development, | Member |
| 4. | Shri K. Venkatrama Sharma representing, Director, NCCR | Member |
| 5. | Dr. T. Chandini, Advisor (RE), MoEFCC | Member-Secretary |

SPECIAL INVITEES

1. Dr.C.Raghunathan representing Director, ZSI
2. Shri A.N.Singh, Additional Director (Scientist E), HSM Division, MoEFCC

MOEFCC

1. Dr. Rubab Jaffer, Joint Director (RE)
2. Shri NareshJaiswal US(RE)
3. Ms. AkankshaSanchan, ASO (RE)
4. Shri Goldee, Office Assistant

LIST OF PROJECT INVESTIGATORS (PIs) PARTICIPATED IN THE 8th TFAC MEETING

1. Prof R. Murugesan, Department of humanities and social sciences, National Institute of Technology, Tiruchirapalli 620 015
2. Shri Atul Kumar, TERI, New Delhi
3. Consultant with NIT, Tiruchirapalli
4. Er. Rajesh Kumar, CSIR Central Building Research Institute, Roorkee
5. Dr Janmejay Sethy, Assistant Professor, Amity Institute of Forestry and Wildlife, Amity University, Gautam Budhh Nagar, Noida 201303, Uttar Pradesh
6. Dr.P.Balakrishnan, Division of Conservation Biology, Jawaharlal Nehru Tropical Botanic Garden & Research Institute, Palode, Thiruvananthapuram-695562, Kerala
7. Dr.C.Raghunathan, ZSI Andaman and Nicobar Regional Centre, Port Blair 744102
8. Dr.Chirashree Ghosh, Department of Environmental Studies, University of Delhi 110007
9. Dr. Azra Musavi, Department of Economics, Aligarh Muslim University, Aligarh 202001
10. Shri Somnath Saha (Co-PI) (Tentative), Community for Social Work, 84 Rabindra Pally, Shyam-Nagar, North 24 Parganas, West Bengal 743127
11. Dr.S.Sambath, Central Zone Regional Centre, Zoological Survey of India, Scheme No.05, Plot No.169, Vijay Nagar, Jabalpur, Madhya Pradesh 482002

ANNEXURE-2**AGENDA FOR THE 9th MEETING OF TFAC HELD ON 18.11.2019****I RECONSIDERATION OF R&D PROJECTS RECEIVED ONLINE UNDER NEW R&D SCHEME:**

S. N.	Registration No.	Thematic Area	Title of project	Details of P.I.
1.	70/2018/RE	Solid Waste Management	Municipal Waste Recycling A Model for Sustainable Energy and Clean Products – Application of AI and Institutional Policy for MSWM (Application of Modern Methods in Municipal Solid Waste Management Services relevant for situation in India)	Prof R. Murugesan, Department of humanities and social sciences, National Institute of Technology, Tiruchirapalli 620 015
2.	398/2018/RE	Solid Waste Management	Development of low energy-low carbon ECO cementitious binders via synergistic use of low graded industrial wastes for sustainable development	Presentation by Er. Rajesh Kumar, CSIR Central Building Research Institute, Roorkee and to consider his representation received vide email dated 14.10.2019
3.	275/2018/RE	Wildlife Conservation	Tracking and assessment threats of highly critically endangered scaly giant (<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

II RECONSIDERATION OF R&D PROJECTS OF OLD R&D SCHEME:

S. N.	File No.	Thematic Area	Title of project	Details of P.I.
1.	F.No.19-72/2014-RE	Water Pollution	“Dairy Wastewater treatment using pilot –scale hybrid sub-surface Constructed Wetland systems operating under different recirculation rates”	Dr.Pradeep Sharma, Graphic Era University, Dehradun 248002
2.	F.No.14/87/2014-RE	Biodiversity Conservation	“Fish community structure and patterns of diversity along impacted and unimpacted streams of Vindhya and Satpura hill ranges, Central India”	Dr.Anuradha Bhat Indian Institute of Science Education and Research-Kolkata, Mohapur Campus, Viswavidyalaya, Mohanpur 741252, Nadia, West Bengal
3.	F.No.14/34/2014-ERS/RE	Ecosystem & Landscape Conservation	“Patterns of tree cavity occurrence and use by vertebrates in tropical forests of the Western Ghats: a community web approach and its implications in forest management”	Dr.P.Balakrishnan, Division of Conservation Biology, Jawaharlal Nehru Tropical Botanic Garden & Research Institute, Palode, Thiruvananthapuram-695562, Kerala
4.	F.No.14/16/2013-RE	Biodiversity Conservation	“Reproductive biology of Scleractinian corals in Andaman and Nicobar Islands”	Dr.C.Raghunathan, ZSI Andaman and Nicobar Regional Centre, Port Blair 744102

5.	F.No.19-56/2013-RE	Air Pollution	“Impact of Environmental Bioaerosol Pollution on Human Health: A “case-control study”for Exacerbation of COPD in North Indian Population”	Dr.Chirashree Ghosh, Department of Environmental Studies, University of Delhi 110007
6.	F.No.14/13/2013-ERS/RE	Ecosystem & Landscape Conservation	“Assessment of Anthropogenic pressure and its impact on Forest and Grassland Ecosystem of Dachigam National Park, J&K India”	Dr. Azra Musavi, Department of Economics, Aligarh Muslim University, Aligarh 202001
7.	F.No.24/06/2010-RE	Sustainable Development	“Integrated Farming System in Degraded Coastal Land Areas of West Bengal and its Socio-Economic and Environmental Impact on the People”	Prof. Kalyan Bhattarjee (PI)/ Shri Somnath Saha (Co-PI) (Tentative), Community for Social Work, 84 Rabindra Pally, Shyam-Nagar, North 24 Parganas, West Bengal 743127
8.	F.No.14/41/2014-RE	Biodiversity Conservation	“Studies on the moth fauna of Pachmarhi Biosphere Reserve – an assessment of the species richness, relative abundance and distribution as environmental indicators”	Dr.S.Sambath Central Zone Regional Centre, Zoological Survey of India, Scheme No.05, Plot No.169, Vijay Nagar, Jabalpur, Madhya Pradesh 482002
9.	F.No.14/8/2014-RE	Ecosystem & Landscape Conservation	“Exploration of Biodiversity and Conservation issues of Talley Valley Wildlife Sanctuary, Arunachal Pradesh with reference to wildlife species distribution along climate and topographical gradients”	Dr.Ashalata Devi (Tentative), Assistant Professor, Dept. of Environment Science, Tezpur University, Napaam, Tezpur, 784028 Assam

Internal Consideration of projects of Old R&D Scheme:

10.	F.No.19-116/2008-RE	Solid Waste Management	Utilization of soil macro and microorganism for the decomposition of cellulosic waste materials	Dr.M.Vasanthy, Dept of Environment Biotechnology, School of Environment Sciences, Bharathidasan University, Tiruchirappalli 620024
11.	F.No.14/122/2013-RE	Biodiversity Conservation	“Diversity and microhabitat utilization pattern of spiders in Satpuda landscape”	Dr.Atul Keshava Rao Bodke J.D.Patil Sangludkar Mahavidyalaya Daryapur, Maharashtra 444803
12.	F.No.14/27/2010-ERS/RE	Biodiversity	Habitat Ecology and Species Diversity of <i>Cordyceps</i> in district Pithoragarh, Central Himalaya	Dr.Chandra Singh Negi, Department of Zoology, LSM Government Post Graduate College, Pithoragarh (Uttarakhand)
13.	F.No.14/16/2006-RE	Biodiversity	Floristic studies on Macrophytic diversity of Nameri National Park (Assam) and Pakke Tiger Reserve (Arunachal Pradesh)	Dr.Nilakshi Devi, , Lecturer Deptt. of Botany Guwahati University Guwahati-7891014

14.	F.No.19-29/2011-RE	Water Pollution	STREAT- Sustainable Semi-Dcentralized Sewage Treatment- Wastewater Reuse, Nutrient Recovery and Biogas production in the Delhi Metropolitan Area	Dr. Mukesh Khare, IIT, New Delhi 110016
15.	F.No 14/257/2013	Biodiversity	Aquatic Fungal Diversity of Hill Streams of Hiamchal Pradesh – Monographic Study and Its in-vitro Screening for Lignocellulotic Enzymes.	Dr.I.B.Parasher, Professor, Dept of Botany, Panjab University, Chandigarh – 160014.
16.	F.No.19-22/2011-RE	Pollution	Validation of Soil Amendments and Microbial Culture in reducing pesticides residues in Soil, Crops, and ground water under field conditions	Dr.Anjana Srivastav, Deaprtment of Chemistry, Collge of Basic Science & Humaties, GB Pant Univeristy of Sgriculture & Technology, Pantnagar, Uttarakhand
17.	F.No. 23/23/2012-RE	Biodiversity	Conservation of Seven RET medicinal plants of the Western Ghats through standardisation of seed and seedling identification, germination, species restoration, seed and field gene banking	Dr.C Anil Kumar, Senior Scientist, Cosnervation Biology Division, JNTGBRI, Thiruvananapuram, Kerala
18.	F.No.19-183/2013-RE	Pollution	Nanno-bioremediation of Textile Industrial Effluents in Tiruppur District, Tamil Nadu.	Dr.P.Jegathambal, Prof., Water Institute, Karunya University, Coimbatore, Tamil nadu

3.0 Draft OM on Revised Emoluments for Junior Project Fellow and Senior Project Fellow engaged for projects of MoEFCC and its Institutions and Offices

4.0 Any Other Matter with the Permission of the Chair

4.1. F.No.14/8/2013-RE) “Genetic Diversity analysis and conservation of Threatened *Salvadora oleoides*” by Dr. Maneesh Singh Bhandari, Division of Genetics and Tree propagation, Forest Research Institute, Dehradun

Annexure-3**Draft OM on “Revised Emoluments for Junior Project Fellow and Senior Project Fellow engaged in projects of MoEFCC and its Institutions and Offices”**

No. 38/1/2017-RE
 Government of India
 Ministry of Environment, Forest & Climate Change
 (RE Division)

Indira Paryavaran Bhawan,
 Aliganj, Jor Bagh Road,
 New Delhi – 110 003

Dated.....

OFFICE MEMORANDUM

Subject: Addendum to Revised Guidelines on emoluments and other conditions of service for Junior Project Fellow, Senior Project Fellow and Research Associates (Non-NET) engaged in R&D Schemes/Programmes/Projects of the Ministry of Environment, Forest & Climate Change – regarding.

In continuation to the Ministry of Environment, Forest & Climate Change (MoEFCC)'s Office Memorandum (O.M.) No. 38/1/2017-RE dated 24th July 2019 and superseding the earlier OM No. 2/6/2013-RE dated 2nd September 2015, the following are the revised Guidelines on emoluments and other conditions of service of Junior Project Fellow (JPF), Senior Project Fellow (SPF) and Research Associate (RA), who are Non-NET and engaged in R&D Schemes/ Programmes/Projects of the Ministry of Environment, Forest & Climate Change, and its attached/subordinate/associated offices and Institutions:

1. Junior Project Fellow (JPF)/Senior Project Fellow (SPF):

(i) Emoluments: The Fellows – JPF and SPF who are non-NET qualified, i.e. neither NET-JRF nor NET-SRF would be given fellowships at the revised emoluments given in the table below:

Sl. No.	Designation & Qualification	Existing Emoluments	Revised Emoluments
i.	Junior Project Fellow (JPF)* <ul style="list-style-type: none"> ➤ Post Graduate (PG) Degree in Basic Sciences/Environmental Sciences or Graduate Degree in Professional Course. 	Rs. 16000	Rs. 25000
ii.	Senior Project Fellow (SPF)* <ul style="list-style-type: none"> ➤ Qualification prescribed for JPF with two years research experience 	Rs. 18000	Rs. 30000

*This category of JPF/SPF is applicable only when NET qualified candidates are not available for the project sponsored by the Ministry.

(ii) Guidelines for selection of Junior Project Fellow (JPF) and Senior Project Fellow (SPF), who are non-NET candidates, engaged in R&D Schemes/ Programmes/Projects of the MoEFCC, and its attached/subordinate/associated offices and Institutions:

The Project Investigator of a project funded by the MoEFCC shall adhere to the instructions given below while engaging JPF/SPF, who are Non-NET candidates, in his/her project and select the Project Fellows as per procedure given below:

- i. An open advertisement shall be given in Employment News, any National and Regional Newspaper for the specific projects(s) with relevant details.
- ii. Qualification for JPF/SPF shall be the same as for JRF/SRF respectively as given in MoEFCC's OM No. 38/1/2017-RE dated 24th July 2019 and shall be indicated in the advertisement.
- iii. Prepare criteria for selection in terms of qualification and experience of Non-NET candidates.
- iv. A Tabulated summary of the applicants, who have responded, for their suitability for the project in terms of qualification and experience based on the criteria shall be prepared.
- v. Constitute a Selection Committee as per institutional norms with at least 3 experts in addition to the Project Investigator. The Committee shall scrutinise the applications and shortlist the candidates on the basis of the criteria.
- vi. The Committee shall also conduct an interview of the short-listed candidates and select the JPF/SPF who is most qualified as per the selection criteria.
- vii. Speaking minutes of the Selection Committee providing justification for recommending a non-NET candidate for selection will also be prepared and kept in record of the PI and the Parent/Host Institution/Department.
- viii. The PI and the host institution/Department shall review the performance of the JPF after two years through an appropriate Review Committee constituted in consultation with the Head of the Institution. The fellowship as indicated after two years slab may be provided after successful assessment by this Review Committee and details of which shall be communicated to the Ministry.

2. Selection of Research Associates who are Non-NET: Research Associate –I (RA-I)/ Research Associate – II (RA-II)/ Research Associate –III (RA-III):

After obtaining the degree of Ph.D./M.Tech, the SPF (Non-NET) selected as per Paras 1) and 2) above, shall be eligible for being appointed as Research Associates with the same emoluments as RAs selected from SRFs (NET) as per MoEFCC's O.M. No. 38/1/2017-RE dated 24th July 2019.

3. Service Conditions:

Service Conditions of JPF/SPF and RA shall remain the same as given in MoEFCC's O.M. No. 38/1/2017-RE dated 24th July 2019.

4. Date of Effect: This Order shall be applicable w.e.f. 01.01.2019.

5. All the Divisional Heads of the MoEFCC are requested to ensure that the above Guidelines are followed in regard to the remuneration and other benefits to Junior Project Fellow, Senior Project Fellow and Research Associates (Non-NET) engaged in R&D projects funded by them. They are requested to circulate these orders to their autonomous/attached/subordinate offices funded by them for implementation.

This issues with the approval of the Competent Authority and with the concurrence of IFD vide their Diary No.....dated.....

(Naresh Jaiswal)

Under Secretary to the Government of India

To

- i. All Heads of Divisions of Ministry of Environment, Forest & Climate Change for information and circulating to all subordinate offices/autonomous bodies/field offices/attached offices, including ZSI, BSI, ICFRE, IIFM, CPCB, NBA, CZA, NTCA GBPNIHESD, WII, and SACON
- ii. Deputy Secretary (IFD), MoEF&CC, New Delhi

Copy to:

- i. PPS to Secretary (EF&CC)
- ii. DG, FC &SS, MoEF&CC
- iii. PPS to AS (RA)
- iv. PPS to AS&FA
- v. ADG, FC, MoEF&CC
- vi. ADG, WL, MoEF&CC
- vii. IGF, WL, MoEF&CC
- viii. IGF, FC, MoEF&CC
- ix. IGF, RT, MoEF&CC
- x. JS (Admn)
- xi. DS(Admn.)
- xii. Consultant (IT) for uploading on the website of the Ministry for wider publicity
- xiii. PS to Adviser (RE)/Guard File/Sanction Folder.
