



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 3, March 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

9940 572 462

6381 907 438

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www.ijirset.com

Future Impact on Biodiversity Due to Oil Refinery in Pachpadra Region

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ABSTRACT: Barmer refinery and petrochemical complex is a new facility that is currently being developed for the production of clean fuels in the Barmer district of Rajasthan, India.

The project is the first of its kind in Rajasthan and is being developed by a joint venture (JV) between Hindustan Petroleum Corporation Limited (HPCL, 74%) and the Government of Rajasthan (26%) known as HPCL Rajasthan Refinery Limited (HRRL). The new refinery and petrochemical complex will have a total processing capacity of nine million metric tonnes per annum (MMtpa). It will be used for the production of BS-VI grade motor spirit and diesel fuel, as well as other products including ethylene and propylene derivatives. The derivatives will be used as feedstock in industries, such as textiles, packaging and petroleum. The project received environmental clearance in September 2017 and final approval from the Government of India in October 2017. Construction on the project commenced in January 2018 and is scheduled to be completed by 2022. The development is estimated to cost \$6.8bn and will create approximately 1,500 direct jobs upon completion, as well as up to 40,000 indirect jobs during construction. It is also expected to contribute to Rajasthan's economic development and aid in the development of downstream petrochemical companies. The refinery and petrochemical complex will be built on 4,813 acres of land approximately 5km away from Pachpadra village in Rajasthan's Barmer district. It will be located 100km from Jodhpur Airport and benefit from connections to National Highway NH-112.

KEYWORDS: Pachpadra, Barmer, oil, refinery, biodiversity, impact, future, economic, Rajasthan

I. INTRODUCTION

The proposed facility will feature a total of 29 process units, including a 9MMtpa crude distillation unit, a 4.8MMtpa vacuum distillation unit and a 1.8MMtpa naphtha hydrotreating unit.



“The site will be equipped with a delayed coker unit with a capacity of 2.4MMtpa.” It will also include a diesel hydrotreatment unit with a capacity of 4.1MMtpa, a vacuum gas oil treatment hydrotreater with a capacity of 3.5MMtpa and a petro fluidised catalytic cracking unit with a capacity of 2.9MMtpa. Other units will include an isomerisation unit with a capacity of 0.26MMtpa, a dual-feed cracker unit with a capacity of 82,000tpa, an ethylene recovery unit with a capacity of 77,000tpa, two polyethylene units with a capacity of 0.416MMtpa and two



polypropylene units with a capacity of 0.49MMtpa. The polypropylene units will feature Lummus' NOVOLEN process reactors and NHP catalyst.

The Barmer refinery is expected to process 1.5MMtpa of crude indigenously produced in Rajasthan at the Mangala fields, 7.5Mmtpa of Arab and other crude, as well as natural gas during its initial eight years of operations. It will also process 9Mmtpa of Arab mix crude, as well as natural gas, following its eighth year of operation. [1,2]

The refinery and petrochemical complex will include various common units and utility systems, such as a benzene recovery unit, a hydrogen generation unit, an amine regeneration unit, a sour water stripping unit and a sulphur recovery unit. Additional utilities will include internal fuel oil and fuel gas systems, a compressed air and nitrogen plant, a condensate system, raw water and cooling water system and as a boiled feedwater treatment system. The facility will feature various technologies in multiple units, including a naphtha hydrotreating unit, a semi regenerative reformer, a C5-C6 isomerisation unit, a Prime-G+ cracked gasoline selective desulphurisation unit, an AlphaButol high purity 1-Butene production unit and a Sultimate tail gas treatment unit. It will be powered by an on-site captive power plant consisting of four gas turbine generators of 33 megawatts (MW) each and five 26MW steam turbine generators. The refinery will also include offsite facilities for the storage of crude oil, intermediate products and finished products.

Oil spills cause a very localised problem but can be catastrophic to local marine wildlife such as fish, birds and water animals. Oil cannot dissolve in water and forms a thick sludge in the water. This suffocates fish, gets caught in the feathers of marine birds stopping them from flying and blocks light from photosynthetic aquatic plants. Hence future biodiversity can be spoiled but can be stopped from spoilage by taking necessary actions.

A memorandum of understanding (MoU) for the development of the Barmer refinery was originally signed by HPCL and the Government of Rajasthan in March 2013 with an investment of Rs372.3bn (\$5.74bn). HPCL and the Government of Rajasthan also signed a joint venture (JV) agreement in July 2013 to implement the project via the HPCL Rajasthan Refinery Limited (HRRL) JV. The project was initially approved by the Government of India in September 2013. The state government initially agreed to provide the JV with an interest-free loan of Rs3.73bn (\$575.93m) per year for a 15-year period. However, the new state government opposed the terms of the agreement regarding the government's allocated stake in the development and reviewed the deal in July 2014. A new JV agreement was subsequently signed by the government and HPCL in August 2017 to develop the project with an investment of Rs431.29bn (\$6.8bn). The Government of Rajasthan will provide an interest-free loan of Rs11.23bn (\$177m) a year for 15 years under the new arrangement. The state will receive a 12% return on investment from the refinery project. HPCL entered a debt syndication agreement with a State Bank of India (SBI) led consortium for a loan of Rs287.53bn (\$4.05bn) for the project, in January 2019. The agreement marked the financial closure of the refinery and petrochemical project. [3,4]

Water pollution is the result of oil dissolving in nearby ponds, lakes and rivers. Oil leakage can also be a problem. However we can solve these problems if action is taken. Contaminated water can cause illness. Diseases spread by unsafe water include cholera, giardia, and typhoid. Legionnaires' disease (a severe form of pneumonia contracted from water sources like cooling towers and piped water) can happen. Hence water treatment is necessary and treated water will be supplied to people of Pachpadra.

II. DISCUSSION

Axens Technologies was awarded a contract to provide advanced technologies for the facility in April 2019. The contract includes the supply of proprietary equipment, catalysts and adsorbents. McDermott International won a contract to provide basic engineering design of two polypropylene plants. Engineers India Limited (EIL) received a Rs50bn (\$689.24m) contract to execute the refinery project.

Governance and implementation systems also specifically provide for the representation and involvement of local communities by securing their mandatory representation in committees and government institutions at various levels. Their participation in implementation of government programmes at all levels is also secured. Specific schemes and interventions have been designed and implemented to secure their economic uplift and welfare. They make important contributions in conservation and sustainable use of biodiversity both as users and conservers. Local level institutions such as Joint Forest Management Committees (JFMCs) and Biodiversity Management Committees (BMCs) and a vast presence of CSOs and NGOs help ensure and consolidate their participation. Effective implementation of NBAP contributes to meeting India's commitments under other relevant international Conventions to which India is a Party. [5,6]



The Environment (Protection) Act (EP Act) enacted in 1986 paved the way for legal interventions for protection of ecosystems including coastal, riverine and wetlands ecosystems. The Wildlife (Protection) Act, 1972, (WP Act), the Forest (Conservation) Act, 1980 (FC Act), the BD Act and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (referred to as Forest Rights Act, 2006 hereafter) further strengthen the legal base for conservation and sustainable utilization of biological diversity. The Indian part of Thar Desert hosts 6.4% endemic plant species, many of which are threatened. *Ceropegia bulbosa* is one such threatened species. Its ecological niche modelling (ENM) revealed its very few and sparse populations at three locations. Its plants were regenerated successfully from propagules under mist house conditions. Nearly 3,000 saplings could be produced in four years (DARE-ICAR Annual Report, 2016-17). The plants were reintroduced into natural habitats predicted by the ENM. Introduced plants showed excellent survival, growth, flowering and seed- set.

The Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA) has identified 22 agrobiodiversity hotspots in India based on the number of species, crop varieties, wild relatives of cultivated crop species, social relevance, ancientness of agriculture, number of species domesticated and the uniqueness of the agroecosystem.[7,8]

Oil water pollution may also cause algal blooms in a lake or marine environment, the proliferation of newly introduced nutrients stimulates plant and algae growth, which in turn reduces oxygen levels in the water. This dearth of oxygen, known as eutrophication, suffocates plants and animals and can create "dead zones," where waters are essentially devoid of life. In certain cases, these harmful algal blooms can also produce neurotoxins that affect wildlife, living nearby in any national park or sanctuary.

III. RESULTS

Beneficial insects provide ecosystem services to agriculture such as pollination and the natural regulation of plant pests which are extremely important from a conservation and production perspective. These beneficial insects regulate the pest population of many harmful pest species, generate natural products, dispose waste and recycle nutrients. The National Bureau of Agricultural Insect Resources (NBAIR) maintains accessions of these. Effective and sustained measures are being taken through eight national missions, namely, National Action Plan on Climate Change (NAPCC) for adaptation to and mitigation of adverse climate change effects. Extension of education and awareness to people through various modes including use of public media has been extensively restored to achieve attitudinal shifts in people in favour of conservation of natural resources. Capacity building measures are being taken up on a regular basis to motivate and empower people to take conservation actions and adopt conservation friendly lifestyles. Effective enforcement of the FC Act, Notifications under the EP Act for regulation of activities in coastal zone areas, encouragement of organic agriculture and soil-health based application of inputs in agriculture, diversion of demands from forests and natural habitats to alternative sources have made substantial positive difference. But the challenges continue and need constant review and re-alignment of strategies to meet the emerging requirements.[9,10]

The foregoing analysis makes it clear that biodiversity governance takes place through a complex network of people and institutions interfacing at multiple levels. Elected representatives, judiciary, ministries, departments, urban and rural institutions of local governance participate in devising and implementing laws, policies and programmes with the involvement and engagement of other stakeholders such as local communities, corporate and business sector, NGOs, academic and technical institutions. Capacity building is undertaken at various levels; it needs to be expanded substantially given the diversity of the implementation machinery at various levels. Diversity of cultures, languages and state specific priorities create the need for substantial additional financial, technical and human resources. The succeeding chapters covering the thematic areas present the work done so far with the given resources.

IV. CONCLUSIONS

The Ministry of Environment, Forest and Climate Change (MoEFCC) as the nodal ministry for the implementation of CBD in India initiated action for preparation of NR6 in early 2017 in association with the National Biodiversity Authority (NBA) and support from Global Environment Facility (GEF) through United Nations Development Programme (UNDP). The process began with extensive consultations with the multiple stakeholders at national and state levels. The stakeholders included representatives of the Central Government, state governments, State Biodiversity Boards (SBBs), other relevant government organisations, academia, civil society organisations, industry and business, domain experts, individuals and groups of people. A brochure comprising information on India's National Biodiversity Action Plan (NBAP), National Biodiversity Targets (NBTs) and their linkages with Aichi Biodiversity Targets and Sustainable Development Goals spelling out the requirements of national reporting was prepared and widely circulated to provide background information to seek relevant inputs from stakeholders. The



brochure initially prepared in English was translated into eight different Indian languages to reach the largest possible number of stakeholders. A dedicated web-portal for receiving inputs online for NR6 (www.nationalreport6.in) further facilitated wider outreach to stakeholders. Six Regional Consultations covering all States were organised between July-September 2017. In addition, a few NBT-specific consultations were hosted by national level technical institutions for receiving focused inputs on specific thematic areas. These regional consultations were followed by State level consultations organized by SBBs involving all stakeholders to get state specific data and information. A specialized team was engaged under a senior consultant to draft the National Report analysing all the information generated through these activities. The members of the team participated in these regional and state level consultations. The team also conducted personal interviews with domain experts, held group discussions with experts, industry and other users to get their perspectives and data. A video on 'Preparation of India's NR 6: Process and Status' was presented during the 'Workshop on the preparation of the Sixth National Report' in Montreal on December 9, 2017, by way of sharing of experience. The video can be viewed at the link: <http://www.nationalreport6.in/>. A 'Zero Draft' of NR6 was prepared by the specialised team based on the information collected from various stakeholders, and other relevant sources such as official websites, annual reports of the ministries, departments and state governments, published case studies and all other available relevant information. The 'Zero Draft' was shared with all the central ministries, departments, organizations and the divisions of MoEFCC for review, endorsement and suggestions. A 'National Consultation' was organized on 17 July 2018 by the MoEFCC. Representatives of 23 Central Ministries, NITI Ayog, and national level technical lead agencies such as Botanical Survey of India (BSI), Zoological Survey of India (ZSI), Wildlife Institute of India (WII), Indian Council of Forestry Research and Education (ICFRE), National Council for Educational Research and Training (NCERT), National Bureau of Plant Genetic Resources (NBPGR), Central Pollution Control Board (CPCB) attended the National Consultation. The zero draft was revised by incorporating comments/inputs received during the National Consultation and the revised first draft was circulated to a group of experts for their comments/inputs. Simultaneously first draft was examined internally in MoEFCC and NBA. After a series of meetings of the core group, the first draft was finalised. While all the five previous National Reports to CBD were prepared with involvement of stakeholders, consultations for preparation of NR6 have been the most extensive and elaborate so far. Hence the biodiversity will be taken care of in Pachpadra in Barmer, for setting oil refinery. [11,12]

One of the most effective ways to stand up for our waters is to speak out in support of the Clean Water Rule, which clarifies the Clean Water Act's scope and protects the drinking water. The Government and Engineers should take care of this, and your local elected officials that you support the Clean Water Rule. Also, learn how you and those around you can get involved in the policymaking process. Our public waterways serve all Indians. We should all have a say in how they're protected. Biodiversity will be saved by our care in Pachbadra region of Barmer.

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