

Implementation of circular economical strategies for adaptive reuse of Hill-forts in Mawal Taluka- Pune, Maharashtra.

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ABSTRACT

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The circular economy is used as a consumption model, for providing rational optimization framework in order to share, rent or lease, reuse, repair, reconstruct, and recycle existing materials and products to generate an economy. Adaptive use of cultural elements like heritage buildings, forts, art, tradition, and literature will lead to the development of an economy. For all Adaptive Reuse projects, the safe bearing capacity of site along with its total embodied energy, and non-renewable energy of resource materials play crucial roles. However, highlighting the significance of reducing environmental footprint can be achieved by analysing and implementing PESTLE parameters. For any adaptive reuse, a structural audit shall be mandate to verify the conservation plan followed with the managerial plan of circular economy. To encourage tourism in Maharashtra, investment is being made in conservation and repairs of the infrastructure, local heritage and better local facilities to access them. The implementation of the circular economy in encouraging fort development plays an important role in its adaptive reuse. Adaptive reuse of the forts in Maharashtra will allow reduced pollution and waste, and help generate revenue; thus, making it self-sustainable. The application of strategies of circular economy will reduce air, noise, and land pollution and even preserve the historical values of Forts. It can be used to evaluate the appropriateness of the reuse of re-functioned forts. The model studies and proposes a qualitative approach towards adaptive reuse of forts as per the PESTLE parameters of the related context.

Keywords: Circular Economy, Adaptive-reuse, Fort, Heritage, Managerial plan

Introduction

The objectives of State tourism to promote the growth and sustainable development of local people, to create employment opportunities and bring about socio-economic benefits to the community, especially in the interior and remote Maharashtra that could enrich and promote its cultural heritage-through preservation and protection of natural resources and environment. The first step towards consideration of an adaptive reuse project is to undergo a structural audit, that helps determining the strength of the building. This audit also helps us understand the external building condition, strength of the materials and methodology used when the structured was erected. A PESTLE analysis after the audit can be implemented to understand the government, social, technological, environmental, and economic interventions at various levels previously as well as in current situations.

Heritage can be identified as preserving traditions tangible as well as intangible for our future generations, provoking the sense of belonging. The

National Heritage Conference Defined Heritage as "that which a past generation has preserved and handed on to the present and which a significant group of population hands on to the future." *JETIR2109404- adaptive reuse.pdf (JETIR2109404 Journal of Emerging Technologies and Innovative Research (JETIR) www.jetir.org)* Adaptive Reuse is defined as reuse of architecture for a new purpose or repurposing of an existing structure for new use. It represents a form of sustainable strategy to avoid waste of demolition of a building and constructing a new one. Although most typologies of built structures are eligible for such a transformation, this research focuses on historic hill- forts and structures, in Maharashtra that are valuable to their urban fabric. It can be noted that the adaptive reuse of such structures will benefit the culture, environment as well the economic fabric around them.

Linear economy emphasizes on recycling referring to the recirculating the toxic hazardous material that has poisonous repercussions on our ecosystems. The

linear economy is based on a cradle to grave approach: extraction, processing, production, use – and ends in huge amounts of products and material wasted. Circular economy is essential to provide opportunities to improve the environment. It can help deal with the triple planetary crisis, by keeping resources in loop for longer. The growing global population has increasing demands of raw materials, while the supplies are decreasing. Circular economy in India can help us independence from other countries with respect to the raw materials.

1. Linear and Circular Economy:



Image 1: circular-economy-unido-blog.jpg
(beesmart.city)

Sustainable development requires an integrated approach concerning environment and resources along with their various systems, interconnections, long-term trends, limits, and economic development. Cultural heritage buildings are in urban skyline areas of Maharashtra, can be subjected to adaptive. Cultural heritage acts a resource for economic development, e.g., many districts in and around Pune help preserve cultural history and attract tourists.

2. Adaptive reuse:

Global carbon emissions can be reduced from the building sector through sensible retrofits and renovations. A project manager can help create a decision-making framework linking the functional service life of a building with its adaptive reuse.

Adaptability is an extremely important factor in Asset Sustainability of Forts, in Maharashtra. In forts particularly, the asset is in the government ownership-sometimes with the local authority, hence only operation and maintenance remain to be taken care of for completing its lifecycle. Each type of stakeholder, architect, developer, owner, could benefit by being a part of any process of adaptive reuse work. Numerous advantages for adaptive reuse in Maharashtra Hill-forts leading towards circular economy are:

Environmental: In adaptive reuse, most the materials are reused as per their structural conditions and strength. This enables avoiding new construction or use of natural resources. In addition, the energy consumed by materials and labour is lesser or sometimes none. One of the leading environmental benefits of reusing forts is retaining the original fort's "embodied energy." New structures have much higher displayed energy costs than adaptively reused ones.

Social: Keeping and reusing historic forts in Maharashtra has long-term benefits for the communities that value them and stabilizing in their lives. Adaptive reuse can restore and maintain the heritage, cultural significance of the fort, help to ensure its survival and retaining its identity. Protecting any form of heritage ensures secure future for upcoming generations by acting as valuable sources of information and preserving that precinct's lifestyle, construction technique, and architecture.

Cultural: Societies are culturally diverse and preservation of heritage plays an important role for maintaining its intrinsic value and its contribution to the identity of a place. Architecture of a place is identified through local customs and socio-cultural traditions, and its extent and nature. Various facets of tourism promote different cultures and traditions of the society, indirectly contributing to the growth of the tourism market.

Economic: Adaptive reuse is a very economically sustainable concept. The cost of new construction is less or zero when the existing structure is retained, due to demolition costs avoided and further, the proposed new activity initiates revenue generation that covers the cost of restoration or renovation. Adaptive reuse of historic buildings often costs only two-thirds of the new construction. The remaining capital can be used for supportive jobs that the building requires for its maintenance rather than erecting the new one. The old forts were built with

local and traditional materials, with traditional methodologies and skillsets; hence, local materials and labour can be utilized when restoring and readapting the old buildings. This will generate employment in local people and reduce costs, besides meeting the social cause.

Example: Parvati Temple Complex, Pune

Located on the Parvati Hills (within the old Pune, at Sahakar nagar) was originally constructed in the 18th century by Peshwas. It consists of a temple complex housing various smaller temple to may Gods. The Parvati hill has a height of 2100 feet from the sea level (at 260 feet from city level) and It has 108 steps leading to the temple, atop the hill. Entire temple complex with all individual temples are constructed out of Black Basalt Stone. The Peshwa Museum was actually built as a palace meant to live in.

It was later converted into a museum. It houses now, Nanasaheb Peshwa Samadhi, paintings, manuscripts, coins, clothing and a lot of other artefacts dating back to the Peshwa. The refreshment area, shoe stand and open gym are the new additions made in 1900s. Revenue generated from these avenues and other forms of donations help sustain the premises.

The Trust has undertaken the following work to preserve and develop the Parvati complex: Development of temple complex, gardens and building of a protective wall around the complex

- Renovation of Peshwa Museum and setting up of an audio-visual system
- Development of Maratha history centre on 1.12 acre of land at the foot of Parvati hill
- Development of 1.4 acre of land into community hall and jogging track
- Energy conservation measures and use of non-conventional sources of power generation like wind energy, geothermal energy, tidal energy, wind energy and solar energy
- Tree plantation and discouraging the use of plastic bags in and around the complex

Example: Jadhavgadh Fort, Jadhavwadi, Mawal, Pune

Jadhavgadh fort is a Heritage fort of approximately 31,000 sqft. area, built in 1710 in Jadhavwadi area-Mawal Taluka on the old Pune - Satara Road on the height of 2511 ft above sea level.

The Fort - a fine example of Maratha craftsmanship - was built by Pillaji Madhavrao in 1710, a Maratha General in the army of Chatrapati Shahuji.

Around 2005, it came under private ownership of Dr. Vithal Kamat, who restored the fort and made additions of Aai Museum and hotel-room accomodations in less supporting areas outside the fort – stables and livestock housing.

In 2007, the restored and renovated hospitality fort-hotel was made open to public.

It offers 3 restaurants, temperature controlled-pool, spa, banquet area, conference room, temple, guest room accommodations with varying features such as open-to-sky shower, balconies facing lake, balconies facing mountains etc.

It offers venues for destination weddings, conferences, picnics and stays.

The revenue generated helps in organizational, operational costs and maintenance of the fort and its premises.

Since past 5 years, the fort premises has become completely self-sustaining with equipment housed such as the Organic waste converter (OWC), sewage treatment plant (STP), RO-water purifying and treatment plant. Earlier they also had the vermiculture processes followed in the part of the premises as well. The manure created is used for the landscaped areas and agriculture zone of the premises.

All necessary services required for the management system of the structure are provided, such as Central Cooling / Heating, Fire fighting systems, PA systems, plumbing and drainage.

To operate all the facilities, in-house specialists, experts, skilled and semi-skilled employees are available the service at all times.

1. The Mawal area: As per the Census 2011, Mawal Taluka of Pune district has a total population of 377,559.

It has 5 landmark structures apart from the Mastani Lake, with 25 kms of proximity.

S.No.	Structures	Type	Proximity from Jadhavgad fort	Geographical Location	Prior use	Current use	Charges	In-charge authority
1	Purandhar fort	Hill-fort	21 kms	Narayanpur	Residential	trekking, camping, Training National Cadet Corps	25/-	CGI
2	Sardar Purandare wada	Hill-structure	7 kms	Narayanpur	Residential	trekking, film shooting	0	CGI
3	Sangameshwar temple	Hill-structure	7.5 kms		Religious structure	Religious structure	0	CGI
4	Jejuri temple	Hill-structure	23 kms	Jejuri	Religious structure	Religious structure	0	CGI
5	Malhargad killa	Hill-fort	16 kms	Kalewadi	Watch tower	trekking, historical display	25/-	CGI

These structures having no or nominal charge which does not suffice for its upkeep and maintenance. The previous examples of adaptive reuse explained,

attempts to emphasize on importance of self-sustaining buildings and employment of locals.

Particulars	Density	Male Population	Female Population	Total Population
Rural	207/sq km	1,15,137	1,04,647	2,19,784
Urban	2246/sq km	83,350	74,425	1,57,775
Total	334/ sq km	1,98,487	1,79,072	3,77,559
As per Census India 2011				
	literacy rate	77.96%	65.82%	72.20%
Rural population	2,19,784			
Urban population	1,57,775			
Total households	3,77,559			

	Total	Male	Female
Main Workers	139,759	103,333	36,426
Cultivators	31,509	19,677	11,832
Agriculture Labourer	11,582	5,715	5,867
Household Industries	3,905	2,637	1,268
Other Workers	92,763	75,304	17,459
Marginal Workers	17,639	8,675	8,964
Non Working	220,161	86,479	133,682

<https://www.censusindia.co.in/subdistrict/mawal-taluka-pune-maharashtra-4191>

In Mawal Taluka out of total population, 157,398 were engaged in work activities. 88.8% of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 11.2% were involved in Marginal activity providing livelihood for less than 6 months. Of 157,398 workers engaged in Main Work, 31,509 were cultivators (owner or co-owner) while 11,582 were Agricultural labourers.

Availing management principles, creating correct responsibilities and duties, training and providing employment to the semi-skilled and/or unskilled population of the mawal area can help create circular economy.

Conclusion:

Implementation of strategies and technical output:

- The Project Manager or circular economy manager appointed is expected to enhance climate change synergies across the conservation including circular economy, nature conservation, sustainable economy, organizational engagement of the Adaptive-reuse-Fort Project.
- Providing strategic oversight to ensure timely and effectively delivery of project results/outputs

- Managing the development and monitoring of workplans and budgets; working closely with the finance manager on finance reporting and budget tracking
- Manage project consultants and team members to ensure successful delivery of projects (as relevant)
- Identifying project risks to oversee risk management and monitoring and evaluation framework

References:

Image 1. circular-economy-unido-blog.jpg
(1500×1265)(beesmart.city)

Why we need to shift from linear to circular economy
- The Daily Guardian

Sustainability | United Nations

Climate Change & Circular Economy Manager |
WWF (panda.org)

Model_Heritage_Regulations.pdf

Report by NAGAR.pdf

<https://www.censusindia.co.in/subdistrict/mawal-taluka-pune-maharashtra-4191>