

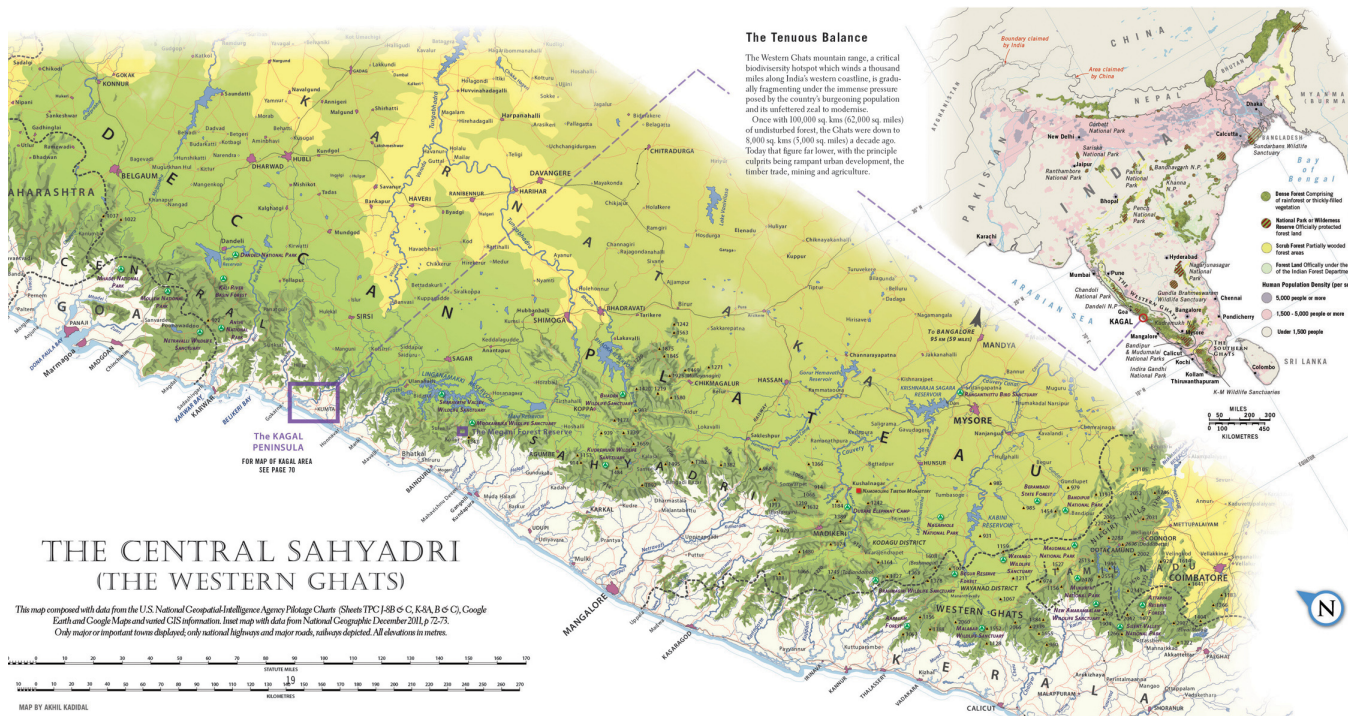
Potentialities Of An Indigenous Environment

Culture, local ecology, livelihoods, natural economy, sustainability, conservation, identity, invention

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(This paper explores indigenous potential of Kagal cove in Western Ghats India and underlines the critical role of local innovation and knowledge in sustainable development strategies)





In his seminal work, “On Growth and Form”, Scottish biologist and mathematician D’Arcy Wentworth Thomson, conceives of form not as a given, but as a precise product of dynamic forces, which are shaped by flow of energy and stages of growth. His vision presents the physical world and its biological form as a symphony of harmonious forces, with specific underlying principles. Drawing parallels between D’Arcy’s hypothesis published in early 20th century, and the intrinsic relation between an environment and its tangible-intangible forces, this paper explores the meaning and essence of ‘Kagal’ (Fig. 1), and lays out potentialities for a responsible and compelling future.

‘Culture is the whole complex of distinctive spiritual, material, intellectual and emotional features that characterizes a society or a group.’ (UN World Commission on Culture and Development) In common parlance, the environment of a place is appreciated in tangible terms. This physical domain has been adequately discussed in this book with precise data about the geography, topography, orography and climate of Kagal. Complementing these tangibles are the intangibles, which include the common deposit of knowledge, beliefs, values, behaviours and attitudes, together making the culture of a place. Recognizing and understanding these intangibles through empirical research is an essential step in creating systems and processes of absolute ‘value’. A key research question in Kagal will be to analyse these intangibles and investigate their potential for tangible material manifestations. How can we create an authentic local model, which explores a synthesis of ‘what was’, ‘what is’ and ‘what may be’? How can we strike a balance between shaping a place and being shaped by the place? Can we recognize the accumulative work of past generations and integrate their intelligence within our psyche? Can we move beyond the short-term fever of speculation for rapid profit, and create long-term inclusive natural economy based development structures, which echo a sense of reverence, and yet bring substantial economic benefits for the place? Can the community create awareness about sustainable and ethical business models? These are some of the questions we will be addressing in this paper.

‘Memory is the basis of all human life and all culture. All intelligent activity is a recapitulation of past experiences’. (Leon Krier, 1981) The key challenge and opportunity in an indigenous environment lies in finding the right balance between tradition and invention; between conservation and transformation; between nostalgia and reality. Metaphor of a ‘bridge’ would be appropriate in such a context: a bridge between differing worldviews and states of consciousness where manual and intellectual faculties fuse; a connection between traditional-hand based artisan culture and contemporary machine based industrial culture; a bond between collective time honoured systems of thinking and individual entrepreneurial genius. How can we create this bridge in Kagal? One of our recent projects, which investigated the potential of indigenous snake-boat (or palliyodam)¹ construction methods in Kerala and used it as a springboard for material and structural innovation, explored this ambition. Research began with an immersive, on-site ethnographic study, which resulted in a precise inventory of skills, resources and knowledge systems. This stage of immersion increased our sensitivity and awareness about the craft and its economic potential. It also highlighted the integrity of the place, where aesthetic and technical

continuity emerged at all tangible and intangible levels; manifesting in architecture, cuisine, music, dance and language. Nothing seemed discordant, arbitrary, imitative or out of place. Memory and material fused together in a rare display of continuity. Living with the artisans allowed us to absorb these intangible values and enabled the ‘bridge’ to develop emotionally, cognitively and materially. From a design viewpoint, we were introduced to the value of ‘constraint’ and ‘faith’ in finding enduring solutions. In the case of the palliyodam, the process is nurtured by a rare combination of parameters: availability of appropriate timber and skilled artisans, proximity to dense tropical forests and a vast river network, a close-knit collective culture, a sacred system of beliefs, and a profound sense of reverence and purpose. From procuring the material (Anjili or *Artocarpus Hirsutus*² timber), to manually transporting timber logs through the river network; from collective ceremonial worship, to patient and precise handcrafting over a period of one year; we witnessed the critical role of collective instinct, trust, intelligence and coordination, which have together shaped these iconic boats over seven centuries. The resultant artefacts (Fig. 2), which are upto 200 feet in length, continue to attract a loyal audience with the annual Kerala boat race acting as the focal point of this celebration. From a business viewpoint, each boat costs upwards of \$60,000 and generates 15000 man-hours of work. This has led to significant long-term socio-economic benefits. Snake-boats are no longer made for altruistic, nostalgic or sacred reasons only. They drive the local economy and have become a major aspect of admiration and leverage for the government. Kerala is today recognised as an exclusive tourist destination offering genuine value for its patrons.



Fig 2



Fig 3

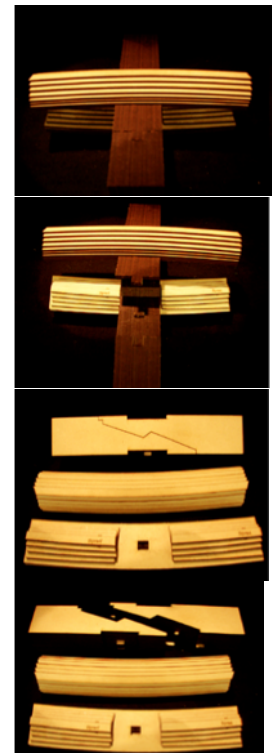


Fig 4

As non-natives, witnessing the practice and popularity of a 14th century craft in the 21st century gave us hope for the future, where past and present blend through an entrepreneurial frame. It convinced us of the value of indigenous knowledge and the opportunity, which lies hidden in transforming these learning's into compelling business solutions. In the second phase of our research we improvised the snake boat construction process to develop a timber joinery system (Fig. 4), where scarf joints were optimised to develop three-dimensional interlocking joints for collapsible architectural structures. A key aspiration for all stakeholders in Kerala can be to extend this research based approach for developing other natural economies. How can the material and construction processes used in these snake boats be improvised and scientifically advanced for contemporary needs? Can ergonomic, morphological and material improvements in these boats bring them into mainstream for public use? Perhaps the Indian Navy and maritime industry can repurpose these boats for recreational purposes. Perhaps a range of modular timber homes or modular coffee shops can be developed in response to South-India's substantial appetite for coffee. Perhaps a bespoke range of premium timber furniture can be developed under a localized brand strategy. These thoughts and provocations highlight the necessity and intent of invention in a place. The

snake boat industry, though successful, has remained stagnant with limited and short-sighted attempts at innovation. It has not evolved with changing skill levels, demographics, migration patterns and aspirations. The indigenous community has also avoided diversification, making it less resilient in the event of sudden disturbances in resource supply or other unpredictable events. Such stasis needs to give way to a more vibrant approach of constant innovation for sustainable development, where native material and knowledge systems are improvised in sensitive, balanced and inventive ways.

Research based innovations, which use ethnographic immersion, design transformation and entrepreneurship, can act as appropriate precedents for Kagal. Another ongoing research project focuses on indigenous plant based construction methods where 'living root bridges' of Meghalaya (Fig. 5) are a key reference. Grown by indigenous khasi³ tribes using the aerial roots of *ficus elastica*⁴, these structures range in span from 15 feet to 250 feet. The horticultural technique used for growing these natural systems has been perfected over many centuries using locally available materials and skills. As compared to concrete and steel bridges, these plant-based material systems cause no environmental damage, have minimal material cost and increase in strength with time and use, lasting many centuries. In addition they are grown, maintained and nurtured by the local communities epitomizing the intimate relationship between humans and the forest. Such reverence, care and connectedness for the environment and all its tangible and intangible forces is seen right through the Khasi worldview. This includes their laws of inheritance and succession, laws of consanguinity and kinship, classification of land and forests, village durbar based system of governance, practice of 'sacred groves' and numerous rituals reinforcing the need for living in harmony with our environment. A key research question in Kagal will be to investigate the coastal geography of the place and its natural potentialities. Perhaps the horticultural technique used for growing the living root bridges can be improvised for connecting the waterways in Kagal. Perhaps this can inspire plant-based outdoor living spaces, which are low-cost and sustainable. Perhaps these can be adopted to create barrier structures, which arrest soil erosion and perform remedial action on the land and water. Perhaps these living systems can lead to a new living plant-based architectural identity, which is born from the land and all its tangible and intangible features.



Fig 5



Fig 6

Another relevant ongoing research project, which explores the domain of plant-based constructions, is green brick (Fig. 6). This research project⁵ is developing a low-cost, plant-based sustainable modular brick, which is developed from a combination of native soil, plants, seeds and natural fibre. The living brick will ultimately perform as an alternative construction material, which would gradually transform an individual dwelling into a productive, fertile and healthy living structure. A key research question in Kagal will be to find native solutions for developing an indigenous DNA at every level. Perhaps an in-situ alternative earth-based construction material will lend to an authentic architectural identity for the individual dwellings. Perhaps locally available plant based natural fibres like coir, bamboo, bagasse, rattan, grass and palm can be developed to create indigenous fibre-based technologies for architecture and design. These technologies and related products can play a pivotal role in creating self-sufficient economic and resource clusters, which have far-reaching socio-cultural benefits for the region, making it resilient to sudden collapse in supply chain.

We believe that akin to the projects discussed above, Kagal will have its own cultural peculiarities and natural economy based entrepreneurial opportunities, which are yet to be discovered, incorporated and celebrated in surprising ways. A key objective will be to highlight these attributes, investigate their potential and physically optimise them through precise research and development to ultimately create a bespoke Kagal model. The community based boat-building ethos of Kagal offers a potential reference for its development scheme and identity: an identity, which connects 21st century needs with skills and aesthetics from a bygone era. Perhaps this ethos is leveraged akin to the Palliyodams of Kerala or Gondolas of Venice. Perhaps this skill leads to a new aesthetic, which is non-didactic and non-imitative informing Kagal's products and services at all levels. Perhaps the fragrances and flavours from local flora can be optimised to target high value industries like medicine, leisure and floriculture. Perhaps local animal based products can be developed into low-cost energy alternatives akin to the Yak-dung briquettes of Arunachal Pradesh. The list can go on and the decisive factor here will be evaluating the feasibility of these products for creating high social and economic value from a long-term perspective. This criterion will be informed by an accurate understanding of the place and its potential, and balancing it with environmental concern through a fine dose of restraint for preventing damage to local resources beyond their natural replenishment cycle. Perhaps resource capacities and thresholds are monitored in a manner where ancient wisdom and values are fused with contemporary advances in science and technology akin to the work carried out by Rural Technology Action Group in India and Oak Village Wood Laboratory⁵ in Japan. This will bring local wisdom and native people on par with professional groups creating fertile platforms for exchange and collaboration. Perhaps the educational system of the state is linked with the Kagal model to create a symbiotic relationship akin to foxfire model in Japan⁶. Numerous such threads can emerge from this inquiry driven by the essential need for living authentic, responsible, creative and balanced lives; lives which are inextricably and harmoniously linked with the environment, and all its tangible and intangible forces. We hope that Kagal will shine as a responsible model for Western Ghats and become a compelling example for India and beyond.



Fig 7

Notes and references

[1] <http://www.sanjeevshankar.com/snakeboat.html>

[2] Anjili or *Artocarpus Hirsutus* Lam (Moraceae) is a tropical evergreen tree species native to India. It prefers moist, deciduous to partially evergreen woodlands and grows in altitudes ranging from sea level to an elevation of 1000 metres in places with an annual rainfall of 1500 mm or more. These trees are endemic to Western Ghats and are found in evergreen forests. The timber from this tree is used extensively in snake boats and construction of ceilings, doors, windows and furniture. <http://www.ias.ac.in/resonance/Volumes/11/12/0101-0101.pdf>

[3] The term “Khasi” means “born of the mother”; “kha” means “born of” and “si” refers to “ancient mother”. For a detailed elaboration, see Shangpliang, R. 2010. *Forest in the Life of Khasis*. New Delhi: Concept Publishing Company, p.1.

[4] Native from the Himalayas to Malaysia, Sumatra and Java, *Ficus elastica* (or India rubber tree or India rubber fig) is a broadleaf evergreen shrub or tree that may grow to 50-100' tall in its native habitat. With high drought tolerance, pest resilience and diverse soil tolerance it is widely grown in the tropics as an ornamental tree. Milky sap from these trees was used to make an inferior rubber in the early 1900s. Mature *ficus elastica* trees (family: moraceae) develop *ficus benghalensis* (banyan)-like aerial roots.

<http://www.missouribotanicalgarden.org/gardens-gardening/your-garden/plant-finder/plant-details/kc/b597/ficus-elastica.aspx>

<http://edis.ifas.ufl.edu/pdf/files/ST/ST25300.pdf>

[5] <http://www.sanjeevshankar.com/researchdata/pdf/Green-Brick-Presentation.pdf>

[6] http://www.oakv.co.jp/kenchiku/1106_gh_1.html

[7] http://www.japanfs.org/en/news/archives/news_id029352.html

Figures

[1] Illustration and photograph by Akhil Kadidal, India 2013

[2] Palliyodam, Aranmula village, Kerala. Length 158 feet. Photograph taken by Sanjeev Shankar, India 2008.

[3] Traditional artisan positioning anjili timber planks to begin construction of a palliyodam. Ibid.

[4] Interlocking scarf joint in timber, London 2010. Ibid.

[5] Double decker living root bridge, Nongriat village, Meghalaya. 2013. Ibid.

[6] Concept illustration for Green Brick, 2010. Illustration by Sanjeev Shankar

[7] Concept illustration for Kagal Cove, 2013. Ibid