

## Towards an architecture of appropriate technology in Timor-Leste

Peter Clements

This paper will explore issues of appropriate technology in the field of architecture in Timor-Leste, as it relates to sustainable community development, regional identity and local economy. As a post-colonial developing nation in the Asia-Pacific, Timor-Leste has commenced constructing a new identity through built form since achieving independence in 2002, following the near-total destruction of all infrastructures during the Indonesian withdrawal in 1999. It is within this Timorese context that an expanded version of Kenneth Frampton's 'critical regionalism' theory may be fused with the toolkits of appropriate technology and permaculture to create architecture of appropriate technology. This architecture of appropriate technology should take into account not only regional differences in climate, light and topography, as espoused by the critical regionalism movement, (Frampton 1983) but also engage with local culture, class, politics, economy and history of place. I argue that the range of architectural expression permitted by critical regionalism theory should be expanded beyond Frampton's criteria:

The fundamental strategy of critical regionalism is to mediate the impact of universal civilization with elements derived *indirectly* from the peculiarities of a particular place. It is clear from the above that critical regionalism depends upon maintaining a high level of critical self-consciousness. It may find its governing inspiration in such things as the range and quality of the local light, or in a *tectonic* derived from a peculiar structural mode, or in the topography of a given site (Frampton 1983).

Firstly, let us ask for definitions: what is appropriate technology; what is architecture; and how is this relevant to the newly independent and developing country of Timor-Leste?

### What is architecture?

Architectural historian Nikolaus Pevsner famously wrote 'a bicycle shed is a building; Lincoln Cathedral is a piece of architecture' (Pevsner 1943). This definition accords with the conservative view of architecture as the design and construction of 'stately and superb' (*First degree or ceremony initiation*) monuments to the state and other dominant institutions in society. But a more socially minded definition must include the multitude of socially useful buildings such as schools, hospitals, health clinics, markets, houses and places of employment and leisure.

Within Timor-Leste the aspiring middle classes have viewed Architecture as synonymous with the colonial 'white house' of painted brick walls and tiled or tin roof, while Timorese journalist Dr Emanuel Braz argues a return to local building materials such as *becak* palm frond cladding would produce a more authentic Timorese post-colonial architecture.<sup>1</sup> The taste preferences for various built forms in Timor-Leste is an emerging field of research which has only begun to be explored, and can be informed by the socially-minded critique of Architecture noted above.

### What is appropriate technology?

Dr Fritz Schumacher coined appropriate technology, also known as 'intermediate technology' in his book *Small is beautiful: economics as if people mattered*, (Schumacher 1973) where he argued that appropriate economic development in developing countries requires labour-intensive 'intermediate' technologies, which lend themselves to decentralised small-scale establishments. By reducing dependence on expensive imports of high technology, replacement parts and foreign technicians, 'low-cost small scale development ideas' (McRobie 1981, xii) could create independent livelihoods for everyday people, particularly in rural areas of developing nations. Schumacher acknowledged

<sup>1</sup> Pers Comm, September 2014, Melbourne, Australia.

Gandhi's influence on appropriate technology in building 'small, simple and non-violent' village technologies. (McRobie 1981, 1).

Hazeltine and Bull define appropriate technology as being the application of technology that is simple to maintain, small-scale, decentralised, labour-intensive, energy-efficient, environmentally sound and controlled by the local community (Hazeltine and Bull 1998, 3, 270). Although appropriate technology was originally an engineering concept, in the fields of cultural construction such as architecture, it offers solutions that strengthen local identity and economy to create authentic built form, while engaging with complex issues of community development, class and status-seeking.

### **How architecture and appropriate technology can be brought together in Timor-Leste**

Architecture as a design-based process has the capacity, if permitted, to take into account not only regional differences in climate, light and topography, but it can also express local culture, politics, identity, economy and history of place. The following six points are practical examples of how appropriate technology can be incorporated into architecture in Timor-Leste to better meet housing needs and provide more appropriate development: Firstly, *permaculture* practices, as expanded specifically for the Timor-Leste socio-economic context (McKenzie and Lemos 2008, 5) can be incorporated into Timorese architecture both within buildings themselves and also the surrounding landscape. Mollison and Holmgren (1990, 2) describe permaculture as:

a model which integrates several principles of many disciplines – of ecology, of energy conservation, of landscape design, urban renewal, architecture, agriculture (in all its aspects) and the location theories of geography. We took into account problems of unemployment and of early retirement, of urban neurosis, and of the feeling of powerlessness and lack of direction common to many of us in today's world.

Examples of appropriate technology that can be incorporated into architecture building upon the permaculture model includes solar panels, re-purposed materials and shipping containers, water-tanks, ventilated improved pit-latrines, fuel-efficient cook-stoves, simple water hand-pumps, kitchen gardens, composting bins, hand-forged security window screens and locally made breezeway ventilation bricks. Within Timor-Leste the traditional construction materials of becak palm frond panel cladding, bamboo and thatched roofing could be minimally upgraded with fire-retardant additives to permit their continued use in modern settings. Skills to construct appropriate technologies are currently being taught in 2015 at trade-training centres in Timor-Leste such as CNEFP Tibar and Don Bosco Training Center, Comoro Dili. Secondly, the *Sweat-Equity* model organises low-income families to contribute volunteer hours to construct groups of houses, of which one becomes their own, under the guidance of a government-sponsored professional building advisor (e.g. Group Self Build, Department of Human Services, Victoria, Australia where teams of 12 families typically build 12 houses together). These *sweat equity* hours of volunteer labour replace the need for a monetary deposit, since a temporary bridging loan is provided by the government until a private mortgage can be secured against the completed house.

The Office of Housing provides a special bridging loan to pay for the land, building materials and establishment costs. Each group works under the supervision of an appointed building adviser and the quality three-bedroom brick veneer homes are completed over a 12-month period. Ms Pike said a building professional provided training and assistance throughout all stages of the building process. "All the major tools are provided, as are the building materials. Participants are able to choose their own decorative finishes, such as paint colours, tiling and so on (Pike 2000).

Thirdly, *Participatory Design Workshops* can reduce the resource misallocation of top-down central planning, where local communities are assisted by field workers to conduct initial needs surveys, develop building designs in group design workshops and take ownership of design, construction and maintenance of the built environment. A challenging example of government social housing in Timor-Leste, which may have been mitigated by participatory design, was the Millennium Development

Goals (MDG) Suco Program, where many prefabricated tin houses were subsequently abandoned. Wallis and Thu (2013) note:

The majority of rural Timorese families continue to rely on cheap firewood for cooking and the kitchen is typically separated from the main residence. Unsurprisingly, small thatched shelters have been informally constructed behind some houses for this purpose.

Judicious use of *Pre-fabricated Components* should only be employed if designs can be developed via *Participatory Design Workshops* where end-users are fully in control of the design process and the level of local content (for example, local palm frond cladding to a steel frame).

Fourthly, *Appropriate Structural Engineering* must be engaged to ensure the proposed construction is designed to withstand the cyclonic wind, earthquake, flooding and land slippage forces that buildings are subjected to across Timor-Leste (preferably by a locally based structural engineer). A simple construction guide could be developed to highlight the most important requirements for safe building engineering, for instance tie-down of roofs and reinforcement of concrete column-beam connections. Traditional Timorese architecture understood these forces, the thick thatched roofs providing protection from broiling sun and torrential rain, the timber construction swayed with earthquakes but did not collapse, the open sides provided ventilation, and the floor was raised several steps above the flood level.

Fifthly, for reasons of economy and geography, construction of large complex buildings in Timor-Leste is heavily influenced by practices and materials imported from neighbouring Indonesia and also patronage by Chinese construction companies. These influences bring with them a rapidly-developing-nation mindset where environmental sustainability, local climate and regional identity is not a priority. Although air-conditioning can be a welcome relief from the tropical humidity of Dili, it is in these multi-storey buildings that air-conditioning should be combined with the appropriate technologies of openable windows, cross ventilation, façade sun-breakers and artistic expressions of Timorese identity to create an architecture truly grounded in both local climate and local culture. As the first skyscraper in Timor, the Ministry of Finance Building office tower erected in 2014 on the Dili foreshore testifies, the placeless air-conditioned glass box threatens to erase the hard-fought cultural identity of Timor-Leste.

Sixthly, we stress the importance that practitioners of appropriate technology architecture in Timor-Leste maintain an independent outlook when implementing construction projects. Here we can take further inspiration, in a similar vein to Schumacher and Gandhi, from Noam Chomsky's anarchist philosophy of independent thought and do-it-yourself development, Chomsky having been a long-time advocate for the independence of the East Timorese people. (Chomsky 1996, vi). By working independently with small-scale reliable partners (Chomsky 1996, 218) and not relying upon funding from a single state or corporate source, we can play a balancing act which greatly improves the chances of creating an authentic architecture which truly reflects local climate, culture, economy, politics and regional identity.

## **Conclusion**

It is evident that appropriate technology offers many valuable strategies to the development of appropriate built form in the context of developing countries such as Timor-Leste. Hopefully practitioners of built form whether urban or rural, amateur or professional, can gain from an informed critique of modern development theory and a critical critique of critical regionalism. Despite being born out of a successful strategy to revitalise international modernist Architecture, Critical Regionalism fails to engage with a host of local cultural practices and it is here that the tool kits of Appropriate Technology, permaculture and postmodern identity can avoid a future of faceless urban development. We foresee a future where appropriate technology moves out of being merely a technological practice into a philosophical underpinning of the sustainable community development sector offering new strategies to express local culture, class, politics, economy and history of place in built form.

## Bibliography

- Chomsky, Noam 1996, *Powers and prospects: reflections on human nature and the social order*, Allen & Unwin, St Leonards.
- First Degree or Ceremony of Initiation: United Grand Lodge*, [www.bilderberg.org/First\\_Degree.htm](http://www.bilderberg.org/First_Degree.htm), viewed 14 October 2015.
- Frampton, Kenneth 1983, 'Towards a critical regionalism: six points for an architecture of resistance' in Foster, Hal (ed) *The anti-aesthetic: essays on postmodern culture*, Bay Press, Port Townsend, USA pp.16-30.
- Hazeltine, Barrett and Bull, Christopher 1998, *Appropriate technology: tools, choices, and implications*, Academic Press, San Diego.
- McKenzie, Lachlan and Lemos, Ego (eds) 2008, *A permaculture guidebook from East Timor*, Permatil, Dili.
- McRobie, George 1981, *Small is possible*, Abacus, London.
- Mollison, Bill and Holmgren, David 1990, *Permaculture one: a perennial agriculture for human settlements*, Tagari Publications, Tyalgum NSW.
- Pevsner, Nikolaus 1942, *An outline of European architecture*, Penguin Books, London.
- Pike, Bronwyn 2000, 'Group self build makes new home-ownership a reality' DHS Media Release (Department of Human Services, Victoria Australia), <http://hnb.dhs.vic.gov.au/web/pubaff/medrel.nsf/LinkView/0E9D9049155CB5834A25688F000A487C?OpenDocument> viewed 15 October 2015.
- Schumacher, E.F. 1973, *Small is beautiful: a study of economics as if people mattered*, Blond & Briggs, London.
- Wallis, Joanne and Thu, Pyone Myat 2013, 'In Timor, a new house does not make a home', ANU College of Asia and the Pacific, 27 November <http://ips.cap.anu.edu.au/news-events/all-stories/timor-new-house-does-not-make-home> viewed 11 October 2015.