

Local Initiatives in the Face of Coastal Change:

the Conservation of Cultural Monuments on the Upper Gulf of Thailand

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ABSTRACT



Impacts of climate change and human interventions on coastal landscape have prompted local communities to preserve their cultural heritage as an emblem of local identity. This paper investigates an adaptive response of local people to the conservation of cultural monuments affected by coastal inundation and shoreline retreat of the upper Gulf of Thailand. Though conservation measures demonstrate formal and structural alterations of monuments and sites, the cultural and social attachments between communities and monuments are still maintained.

INTRODUCTION

Coastal flooding and shoreline recession have been a major environmental crisis in the areas along the upper Gulf of Thailand. Stretching from Petchburi Province on the west side of the Gulf to Chonburi Province on the east, a 250 kilometer coastline faces a threat essentially deriving from land-based activities. The impact of such circumstances inevitably affects local cultural monuments. This paper is developed from a full research on the Database of Cultural Heritage Sites affected by the Coastal Changes of the Upper Gulf of Thailand. The research is based on the overlay of predictive data of shoreline recession with coordinates of cultural heritage sites. The result shows that ten coastal cultural sites will be affected by the loss of land in the next 100 years. This paper distills information from a broad data base to specific situations by focusing on local conservation of coastal cultural monuments. The main content draws information from field observations and interviews with local people. With stated examples of the sites from a full research, and additionally some

places outside the area of study, it aims to portray local approaches to physical adaptation.

Adaptive response of local conservation to coastal alterations leads to physical changes of cultural landscapes. Local communities considered their built heritage as living monuments where social and cultural lives transpire. A motivation for local conservation is not only to preserve cultural monuments for future generations, but also to maintain cultural traditions in their societies. Although not recognized at a national level, the values and significance of local cultural monuments have a strong association with the identity of the community and a vital history of the areas.

COASTAL CHANGES: CURRENT SITUATIONS

The coastal zones along the upper Gulf of Thailand are facing dramatic changes. These changes include numerous factors; variations of

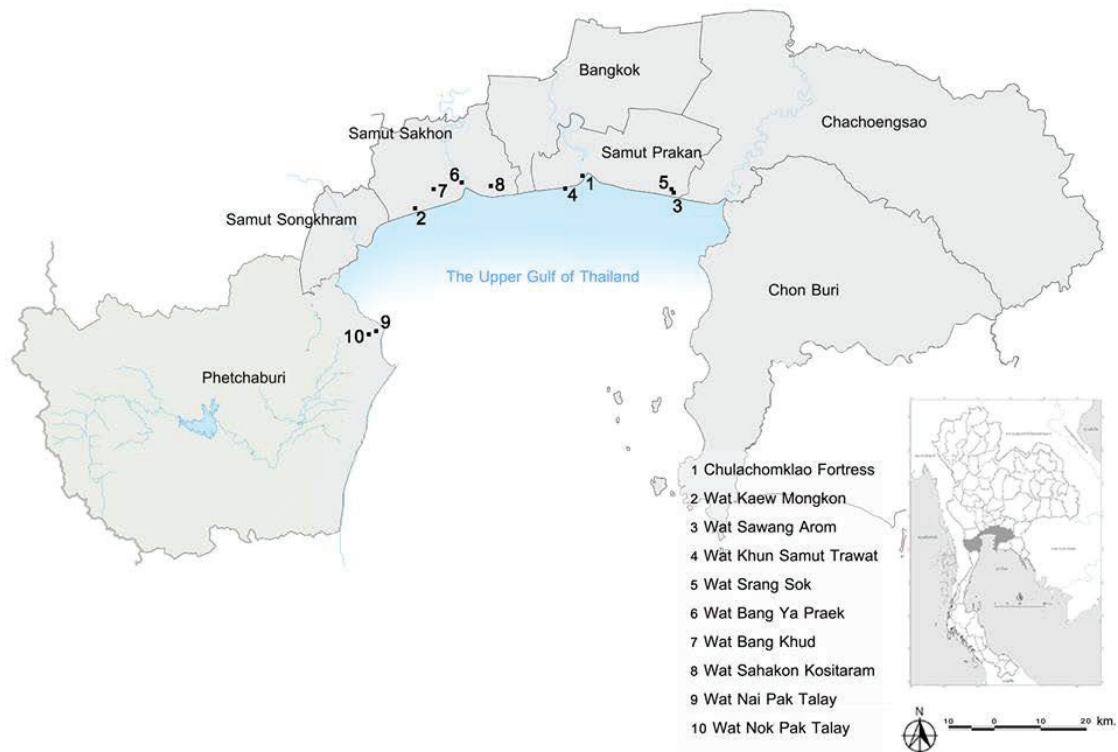


Figure 1:
The upper Gulf of Thailand and the sites mentioned in the text

sedimentation patterns and long shore transport, decline of mangrove forest due to the expansion of aquaculture farms, land subsidence as a result of sediment compaction after past heavy withdrawals of underground water, and new urban development. Sea level rises due to global climate change is arguably not a factor for the coastal alterations of the upper Gulf of Thailand. Vongvisessomjai (2006) reported that the sea level change depends primarily on latitudes and does not influence low latitude areas of Thailand. His research shows that the sea level in the Gulf of Thailand is decreasing at the rate of 0-5 mm. per year. However, a more recent study found that the sea level in the Gulf is rising 3.5-5mm. per year and currently threatening the estuarine areas Naeije et al. (2012).

The impact of the aforesaid factors cause severe coastal retreat and land subsidence, which affects a loss of land and the encroachment of sea water. Recent studies show that the shoreline erodes at the alarming rate of 5-25 meters a year. The most critical areas are the coast of Samut Prakan and Samut Sakon Provinces where aquaculture farms and urban development are concentrated. It is

predicted that in the next one hundred years the shoreline will recede to eleven kilometers if suitable protective measures are not implemented. In addition, coastal geography also plays an important role in accelerating erosion rate. The flat coast of the upper Gulf of Thailand tends to undergo erosion problems more than a steep shore (Office of Natural Resources and Environmental Policy and Planning, 2007).

Municipalities and government organizations, such as the Marine Department, are involved in shoreline management and protection. Structural measures such as seawalls, revetments, groins, and sand sausages are employed to reduce the impact of coastal recession. However, the results demonstrate negative effects rather than being successful. This is because structural measures are more suitable for sand beaches which provide steadier foundations (Watson & Adams, 2011). Thus far the most effective approach is to build offshore breakwaters with bamboo poles so as to create barriers for reducing wave energy and trapping sediments from the sea. After the sediments increase, mangroves can be planted.



Figure 2:
bamboo barriers as offshore breakwaters on the coast of Samut Sakon Province (left) and mangroves were planted behind the barriers on the coast of Samut Prakan Province (right)

CHARACTERISTICS OF CULTURAL HERITAGE IN COASTAL ZONE

The low alluvial plain of central Thailand was formed in the past 800-1000 years. Previously, the entire area was flooded by rising sea levels. Geological evidence indicated that in the Dvaravati period (6th -13th century) the shoreline of the present-day upper Gulf of Thailand reached Ratchaburi Province to the west, Lopburi Province to the north, and Chonburi Province to the east. Late Holocene sea-level changes, however, caused the shoreline to recede rapidly. A tidal basin and mangrove swamps replaced the estuary.

Settlements, which later developed into towns and kingdoms, were located on the new, low-lying plain, but they ignored the coastal areas. Simon de la Loubère, a French diplomat, portrayed a coastal landscape of the Ayutthaya period in the 17th century with the villages and towns situated inland along the rivers and canals, but far away from the intertidal zone and mangrove marshes. It was not until the 18th century that the coastal areas became populated.

Coastal cultural heritage reflects the historical development of the area. According to local history, coastal settlements began to take shape from late Ayutthaya to early Rattanakosin periods (late 18th - early 19th century). The earliest settlers earned their living from marine resources. These included the Chinese diasporas who migrated from southern China due to political complications and

natural disasters. Additionally, Mon descendants were also primary inhabitants in the areas along the coast. As the population grew, Buddhist monasteries were built as spiritual centers.

Buddhist monasteries highlight the coastal cultural landscape of the upper Gulf of Thailand. An ordination hall (ubosot, bot), a predominant structure in all Buddhist monasteries in central Thailand, is considered the most sacred as it is associated with monks or Sangha. Bordered by consecrated stones, the ordination hall occupies the central location in the monastic ground. A typical architectural form, dating from the 18th -19th century, is identified by a wooden structure with a rectangular floor plan. It has a Dutch-gabled roof and an open pillared gallery around a central structure. This emblematic style of early Rattanakosin period can be found in local monasteries in the coastal provinces of Samut Prakan, Samut Sakon, and Samut Songkram. A less common, yet substantial, form is Bot Maha-ud, a small ordination hall with one entrance on the opposite side of the presiding Buddha image. The enclosed space inside the building is believed to provide a potency and sacredness for incantation of amulets. This unique architectural form is inherited from late the Ayutthaya period and, for the coastal zone, can be seen mainly in Petchburi Province.

One of a few nationally recognized heritage sites in the area of study includes Chulachomklao Fortress, renovated during the reign of King Rama V. It was re-equipped to guard against the invasion of the British and French during the Franco-Siamese



*Figure 3:
pre-stressed concrete poles and outer tyres built offshore
in front of the Chulachomklao Fortress, Samut Prakan
Province*

Crisis in 1893. Situated at the mouth of Chao Phraya River, the Fortress was a land battery with seven emplacements of Armstrong guns. It was a typical fortification designed for coastal defense. The structures currently face a severe shoreline recession and flooding. Due to the significance and value of the Fortress as part of the political history of a nation, tremendous efforts have been made to protect the area by private sectors and government organizations such as Royal Thai Navy and Metropolitan Electricity Authority. Mitigation approaches, primarily a shoreline protection, are initiated and implemented. Hitherto, the most effective measure is a construction of offshore breakwaters made of pre-stressed concrete poles and outer tyres. The resulting formation of clay deposits subsequently enhances mangroves development.

At present, the cultural landscape of the coastal areas along the upper Gulf of Thailand is primarily characterized by fishing villages, salt pans, urban settlements, aquaculture farms, and fishing industries. Each has different values and meanings for different stakeholders. Amongst many types of land use, religious sites maintain cultural significance for local people and, as a result, gain more local attention in conservation than any other built heritage.

LOCAL ADAPTATION: PERCEPTIONS AND MEASURES

Local perceptions of coastal flood problems tend

to be acquiescent. Villagers see tidal floods as a natural phenomenon to which coastal settlers should adapt themselves. However, the change in natural patterns has provoked local communities to reconsider their role in preserving their cultural monuments and to find sustainable solutions that can balance social and cultural needs. The local awareness of coastal heritage conservation has sometimes been associated with a sense of community. Religious sites, in particular, serve as cultural centers and represent the identity of the community. Religious monuments receive more local concerns since they hold cultural and social implications for the whole community.

The inundation of sea water used to be related to the tide. Recently, the shift of coastal environment, such as the growing of urban and infrastructure developments, affects the flooding pattern. Incorrect placement of new buildings creates a barrier to flood flows. Longer lasting period of flooding in the coastal areas prompted a conservation consciousness for local cultural heritage. Floods caused damage to main structures of monastic sites, particularly an ordination hall, preventing people from carrying out their routine religious activities.

The stewardship of coastal monuments in religious sites is primarily the responsibility of communities. National level policies on coastal heritage conservation, unfortunately, have not yet been mobilized. Perhaps the values of most coastal monuments are not nationally recognized. Locally decisions on which religious structure should be preserved and what measures should be taken depends chiefly on the abbots. In collaborations with villagers, the conservation campaign is launched by the abbot to appeal for sponsorship and donations from all Buddhists. Funding for repairing, retrofitting, and rebuilding new structures in monasteries is often raised during Thod Katin, a Buddhist ceremony of presenting new robes to the monks. On the contrary, cultural monuments with high artistic and historic values obtain support from government agencies. For example, the ordination hall and the preaching hall at Wat Srang Sok, Samut Prakan Province represent the architectural prototype of early Rattanakosin period. The value assessment of cultural heritage, in this case, determined by Fine Arts Department, is based on aesthetic values and its association with national level cultural monuments. The indicators of significance include wooden structures, the presiding U-thong style Buddha image (12th-15th



Figure 4:
the old ordination hall at Wat Sahakon Kositaram, Samut Sakon Province

century), and mural paintings drawn by the same craftsman as those at Wat Pra Kaew (Emerald Buddha Temple) in Bangkok. The conservation strategy is implemented by National Office of Buddhism.

In most cases, assorted conservation approaches for the cultural heritage of coastal areas reflect locally adaptive strategies in responding to floods. While municipalities and government agencies engage in mitigating the impact of coastal floods and shoreline erosion, local people find ways to protect their cultural monuments through environmentally resilient methods. These include structural elevation, elevating land surfaces, and rebuilding. Each cultural site, nonetheless, does not exclusively adopt one conservation technique, in fact, it can be a hybrid.

STRUCTURAL ELEVATION

The objective of building elevation is to raise a structure so that the building will be located above the height of flood waters. This measure has become a common resolution for flood-damaged ubosots situated in coastal areas. A local term 'deet bot', literally to lever an ordination hall, is widely recognized among people living in flood inundation zones. Originally placed on a low masonry plinth, the ordination hall is lifted with hydraulic jacks and positioned on new foundation walls. Both wood framed structures and masonry structures can be elevated. In some cases, the existing structures have technical restrictions that make the elevation impossible. For example, the ordination hall at Wat Sahakon Kositaram, Samut Sakon Province

is preserved in its original condition because the structure was built on a shallow foundation formed by clay jars.

Elevating an existing ubosot to avoid flood damage has brought a revival of old local traditions. Lot bot (to pass underneath the ordination hall) is a cultural practice reinvented to correspond to new architectural space. A lower area formed by the elevated structure is generally high enough to allow people to pass underneath it. The beneficence of walking through the basement is believed to dispel bad omens and bring in auspicious moments to life. Most Buddhists are urged to walk underneath the spot where the presiding Buddha image is situated. In many cases, a lower space is converted to storage or a temporary place for Buddhist rites. When flooding occurs, a sump pump is operated to remove standing water.



Figure 5:
Entrance to a walk underneath the elevated ordination hall

The elevation of maha-ud ordination hall at Wat Nok Pak Talay in Petchburi Province introduced a completely new form. The existing structure is characterized by a simple rectangular plan with a gabled roof. After renovation, the structure is raised on a platform with an enclosed basement. The gable was replaced by a two-tiered Dutch gabled roof which is a typical form of the 19th century design. In contrast, the maha-ud ordination hall of Wat Nai Pak Talay, situated on the opposite site, displays an attempt to preserve its original form after elevation. The change in physical appearances stems from the ideas outlined by the abbot and local craftsman.

ELEVATING LAND SURFACES

Often associated with building elevation is the elevation of land surfaces. This technique is identified by the addition of new material from off shore sources in order to elevate the existing flood-risk areas to a level that is relative to sea level. The disadvantage of this approach lies in the fact that coastal areas mainly consist of mudflats which make unstable foundations. Furthermore, the problem of land subsidence due to withdrawals of groundwater in the past, has been exacerbated and has caused the coastal areas along



Figure 6:
the ordination hall at Wat Nok Pak Talay, Petchburi Province (left) the present structure (right) the old structure of Bot Maha-ud during elevation



Figure 7:
the ordination hall at Wat Nai Pak Talay, Petchburi Province: (left) the present structure (right) the old structure prior to elevation

the inner Gulf of Thailand to sink three centimeters a year. New elevated land surfaces, therefore, gradually subside and, as a result, the whole process of land elevation has to be recommenced periodically. However, local people still rely on this technique.

Considered to be economical and expedient, land elevation helps protect local cultural heritage structures from floods merely for a few years. Monasteries in the coastal zones of Samut Prakan, Samut Sakon, and Samut Songkram have experienced operations of land elevation several times. Wat Srang Sok in Samut Prakan, for instance, brought gravel and soil from inland to elevate the ground of the monastic compound three times in the past decade. To avoid such problems, some monasteries, e.g. Wat Bang Ya Prak, Samut Sakon Province decided to employ a permanent material such as concrete for raising the monastic ground above tidal flood and street levels. Materials used for land elevation, however, have some implications. Local people have a preference for permeable surfaces over concrete pavement. This is because packed gravel and soil can allow water seepage. Moreover, a network of small canals is also preserved for drainage. They act as natural means for minimizing concentrations of water. As a result, careful selection of materials and preservation of canals helps reduce the impact of coastal flooding.

SET BACK AND REBUILDING

Shoreline retreat and flooding are now considered the most serious threats to settlements and cultural heritage along the inner Gulf of Thailand. Demonstrating just how vulnerable coastal cultural monuments are to flood damage is the nationally renowned case of Wat Khun Samut Trawat in Khun Samut Chin Village, Samut Prakan Province. The village was relocated but the ordination hall is marooned offshore. The building is completely bordered by seawater at high tide. To improve its resilience to flooding, the floor inside the building was raised above the high tide level, while the foundation is still on grade. As a result, monks and villagers need to crawl into the ordination hall to perform religious activities. Although experiencing many troubles, the abbot and the villagers agreed to keep the structure in place. This is based on the communal belief that faith in Buddhism surpasses nature. Every year fundraising efforts for conservation are

instigated by the community and the abbot through religious ceremonies. Such funds go exclusively to the construction of riprap revetments surrounding the ordination hall. The effort gradually paid off as the impact of the sea on the building lessens.

Local determination to stand against shoreline retreat and flooding of Wat Khun Samut Trawat, however, may not be repeated at other sites. Most monasteries chose to have their new ordination halls built on a higher foundation in the area away from flood-risk zones. The setback of religious monuments however does not happen only one time. Due to perpetual shoreline recession, the repositioning of monastic structures is not unusual. This arises in tandem with the relocation of settlements as village life is often attached to religious sites. These setback and rebuilding measures, nevertheless, are feasible only if they occur within existing property. The limited amount of land for relocation has become a serious concern for some coastal communities.

The new structures of ordination halls are often built in a stylized form of modern central Thailand. Archetypal designs and materials of the 18th -19th century are replaced by a high-ceiling masonry structure with a steep, three tiered roof and finials at the ridge and eaves. To avoid the effect of coastal flooding, the new structures are built on high foundations about 1.5 - 2.0 meters above the ground. In addition, due to the instability of coastal mud flats, communities have learned from past lessons that short pilings are not suitable for structural steadiness. Currently, most of the new monastic structures in Samut Prakan Province have to be constructed on 29 meter long concrete piles so as to secure stability.

When the abbots and villagers decided to build a new ordination hall, the existing structure is treated in various ways. For examples, Wat Bang Khud in Samut Sakon Province and Wat Sawang Arom in Samut Prakan Province decided to preserve the old structures as dead monuments. They received structural strengthening and regular maintenance. Wat Kaew Mongkon in Samut Sakon Province converted the old ordination hall into an assembly hall (viharn) and has a plan to elevate it. Wat Srang Sok in Samut Prakan Province have the wooden structures of ordination hall and preaching hall elevated and turned them into a tourist attraction and a local museum.



Figure 8:
Wooden structures of the ordination hall at Wat Srang Sok, Samut Prakan



Figure 9:
the existing ordination hall on elevated ground at Wat Kaew Mongkon, Samut Sakon Province (front), and the new ordination hall on the far right

Three conservation measures initiated by local communities as described above result in the transformation of the coastal cultural landscape. The architectural appearances are modified and a new landscape pattern begins. In tandem with architectural adaptation, bamboo piling and mangrove regeneration have been intensively practiced along the shore of Samut Sakon and Samut Prakan Provinces in order to protect cultural sites and coastal communities. Local adaptation introduces physical changes to the cultural landscape. Such changes, nonetheless, do not alter the essence of social and cultural life of local people. It is still sustained but in a new interpretation. Conservation of the coastal cultural heritage along the upper Gulf of Thailand reflects the ways local people respond to resources they have at hand, and adapt themselves to the changing environment at large.

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